

HANDBOOKS to the FLORA OF SOUTH AUSTRALIA

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Board of the
Botanic Gardens and
State Herbarium



FLORA OF SOUTH AUSTRALIA

PART I
THIRD EDITION



by

J. M. BLACK

Revised and Edited by JOHN P. JESSOP

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FLORA
OF
SOUTH AUSTRALIA

PART I

(THIRD EDITION)

Lycopodiaceae — Orchidaceae

By J. M. Black, A.L.S.

Revised and Edited by

John P. Jessop

(State Herbarium of South Australia)

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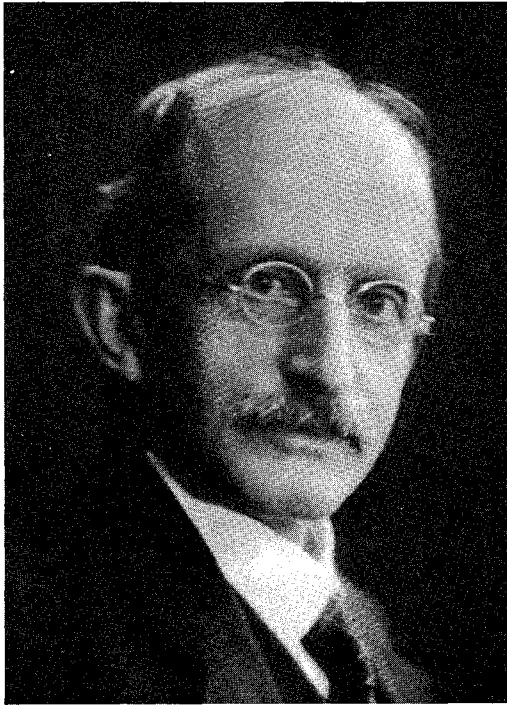
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PART 1

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JOHN McCONNELL BLACK, A.L.S., M.B.E.

(28 April, 1855, Wigtown, Scotland; 1 December, 1951, Adelaide).

Black immigrated to South Australia in 1877, where he was at first a farmer and then a journalist, but retired at the age of 47 and devoted the rest of life to private studies of which the foremost was the South Australian flora. His principal publication, and a classic in Australian botany, is "The Flora of South Australia" (1st ed., 1922-29), (2nd ed., 1943-57, of which he completed three of the four volumes himself). Other important publications are "The Naturalised Flora of South Australia" (1909) and many contributions to the "Transactions of the Royal Society of South Australia" (1909-45). His herbarium is now housed in the State Herbarium of South Australia. (For a full account of Black's life and botanical work see: Eardley, C.M. 1953. Trans. R. Soc. S. Aust. 76: i-vi).

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INTRODUCTION

When in 1922, J. M. Black published the first volume of his "Flora of South Australia", he knew fewer than 500 species of monocotyledons in the State. No doubt it was largely due to his own efforts that over the next twenty years an average of nearly eight species were added each year and his second edition (1943) described about 650 species. Since then the momentum has decreased; the foundations had been well laid, but more than four new monocotyledon species are still added on the average each year and many already known acquire new names. A fifth of all the monocotyledon species currently recognised in the major herbaria do not appear in Black's second edition and the number no longer under the name Black had used is probably nearly as great. The need for a third edition should, therefore, be obvious. If further evidence is required one need only refer to Hj. Eichler's supplementary volume, published in 1965, with its wealth of information on additions to and changes in the "Flora". It was important that all these data and other changes be incorporated into a revised edition. In 1975 I undertook to perform this task. There are many new discoveries yet to be made and I am aware that I shall have overlooked existing errors and introduced new ones. Much more work is needed on the plants treated in this edition, but I hope that significant progress has been made.

Unless otherwise stated I have prepared the text myself. However, a significant part has been written by others: R. J. Chinnock (ferns and their allies); N. H. Brittan (*Thysanotus*); C. R. Marsden (*Restionaceae*) and J. Z. Weber and R. Bates (*Orchidaceae*).

In addition to correcting names and adding new records, a number of other important changes have been made. Virtually all the keys have been rewritten. These include the keys to the families. As my own work has been almost exclusively with the Monocotyledonae I have hesitated to attempt a key to the Dicotyledonae, but Black's Dicotyledonae key is almost certainly the most unsatisfactory part of all his work. Realising that once work starts on the Dicotyledonae many changes will become necessary and despite probable omissions and errors it has been decided to publish this new key to the Dicotyledonae families. I hope that users will let me know of their problems and suggestions once they have tried this key so that I can correct it and publish an improved version in a future volume.

It has been possible to include many new illustrations. The orchids have been covered by an excellent set of detailed drawings by the artist at the Botanic Gardens, Adelaide, L. Dutkiewicz. A few other new drawings by Mr Dutkiewicz, Leeanne Crisp, Jane Reynolds, T. Iwagu and S. Hittingnuc have been prepared but, to supplement these, reference is made to readily accessible illustrations published elsewhere. The series of coloured plates was prepared by C. E. Woolcock.

Many vernacular names have been added. It would have been preferred to have listed only those which are in general use in the State but difficulties in identifying these led to a decision to list most which occur in the literature, including those in J. H. Willis's "Handbook to plants in Victoria".

Descriptions have not all been thoroughly checked, although some changes and many new descriptions have been introduced. It is desirable that these all be fully checked before any future edition appears and again I hope that users will assist by pointing out deficiencies.

Black's treatment of distribution was good, but suffered from the defects that his regions were not accurately defined and that many of the localities he mentioned would not be known to most readers. Since Black's time the number of records has increased enormously and problems have arisen in handling all this information. Reference to the region map (inside back cover) will show that while the regions used throughout this edition are well-defined, they tend to be larger than desirable and, by not following geographical features, to be misleading if not used in conjunction with the map. The user must therefore always check cited distribution against the map and must appreciate that reference to occurrence in a particular region does not imply that that species occurs throughout that region. New records for species in a particular region are of importance but must be accompanied by voucher herbarium specimens. (See later section on preparing specimens). Unless otherwise stated all records in this work can be verified by reference to specimens in a herbarium. The term "state", as used for distribution outside South Australia, is used also for Northern Territory, but the Australian Capital Territory is included in New South Wales.

As in Black's editions, the sequence of the families is based, for the most part, on Engler and Gilg's "Syllabus der Pflanzenfamilien". This classification, proceeding from the simpler to the more highly developed forms of plant life, has continued to be widely used in floras, although other systems based on recent concepts of evolutionary history have also been used.

With respect to naturalised plants, all aliens believed to be maintaining their populations, or even spreading, without deliberate human aid are described, and they are preceded by an asterisk. Many collectors tend to ignore plants they recognise as aliens and much needs to be done to improve records of the introduction and spread of potential weeds.

The adverse affect of man's activities on the native flora concerned Black and has continued to such an extent that in the settled areas it is only in reserves and a few isolated areas that reasonable stands of native vegetation remain. These must be protected and saved for future generations. To assist in determining conservation priorities it is important that vegetation not already in reserves be examined to find where insufficiently protected species occur. In doing so two important rules must be followed: records based on field identifications can generally not be trusted but must be verified by means of carefully selected, labelled and preserved voucher specimens and secondly the taking of such specimens must be done without further endangering any species.

ACKNOWLEDGMENTS

The authors of this volume are indebted to the many people whose work has been consulted or adapted. In most cases, reference in the text to a publication indicates that keys and/or descriptions owe something to that publication and may have been adapted from that source. We also owe much to botanists in South Australia and elsewhere whose collections and advice have made possible improvements which could not otherwise have been achieved. While most of the specimens used are housed in the State Herbarium, very many unique records are preserved only through the efforts of D. E. Symon and his predecessors at the Waite Agricultural Research Institute Herbarium. Mr Symon has been a source of much other guidance.

It is impossible to mention all those who have assisted, but a few must be singled out for special thanks. I am especially grateful to Dr L. A. S. Johnson and Mrs K. L. Wilson (National Herbarium of New South Wales) for their revision of my manuscript of *Juncus*, Prof. H. B. S. Womersley for his advice on the aquatics, Mr B. K. Simon (Queensland Herbarium) for his help with the Gramineae, Mr P. M. Kloot (Dept of Agriculture and Fisheries) and my colleagues in the Adelaide Botanic Gardens and State Herbarium especially Miss B. A. Welling who typed the manuscript. Mr Chinnock received assistance from Dr M. D. Tindale (National Herbarium of New South Wales; *Paraceterach*), Prof. T. C. Chambers (Melbourne University; *Blechnum*), Mr C. Marsden (Adelaide University; *Isoetes*) and Mrs M. Robinson (Adelaide University; *Ophioglossum*). Messrs Weber and Bates were assisted by Mr D. F. Blaxell (National Herbarium of New South Wales; *Prasophyllum*), Mr A. George (Western Australian Herbarium), Mr D. L. Jones and Mr R. C. Nash.

J. P. Jessop

USE OF THE KEYS

In this edition the dichotomous system of indented key has been used throughout.

The comparative characters given in the keys refer only to South Australian species, native or naturalised, and will often not work on specimens from other areas.

To identify a specimen one finds both the *leads* labelled '1', reads *both* and decides which best describes the specimen; reading only one of the pair of leads can be misleading. Take, for example, the key to *Potamogeton* (p.78). If one decides that the first of the leads numbered '1' is correct, one then repeats the same procedure on the leads numbered '2'. If, on the other hand, one chooses the second lead numbered '1' then one proceeds to the leads numbered '4'. After each decision one either finds the name of the plant or one encounters another choice.

It is important to realise that this procedure does not ensure the correct identification of a specimen; several difficulties may arise. The species may not have been included; the specimen may be abnormal; the key may itself be misleading or wrong; or the user may have made a mistake in using the key. Two important precautions must always be taken. First, choose a representative specimen; it is wise to examine several specimens to make sure that a typical specimen is being identified. Second, test the answer by reading the description of the species and checking carefully; any discrepancies must cast doubt on the identification, although some variation outside the description is likely to occur from time to time.

The State Herbarium in the Botanic Garden, Adelaide, offers the use of a special collection of specimens of the State flora for reference by any member of the public. This collection consists as far as possible of one specimen of each State species and is kept separate from the research collections so that it can be consulted without prior appointment at any time on weekdays between 9.00 and 5.00. Use of this collection (with guidance if necessary) will facilitate identifications and help ensure that identifications are correct.

ADVICE ON COLLECTING

Many projects, for example ecological surveys, require the correct identification of plants. Unfortunately, misidentifications are common and, equally unfortunately, through changes in classification and for other reasons name changes are also

frequent. This means that it is often essential to retain voucher specimens for later checking by the author of the work or by later researchers. The State Herbarium is usually happy to accept properly prepared vouchers for preservation in its collections.

Users of this "Flora" may find specimens they cannot identify or specimens which they believe to be atypical in their morphology or distribution. Again, vouchers will be needed to verify the record.

The State Herbarium exists to document the native and naturalised flora. It has always been dependent on the public for assistance, especially with building up its collection of dried specimens, and this situation will remain. I very much hope that many people using this "Flora", appreciating the value to botany of well-prepared specimens with informative labels, will assist in the work of the Herbarium by donating good specimens. The staff of the Herbarium is always happy to advise the public on the preparation of herbarium specimens (whether for the Herbarium or for other collections).

Members of the public may have specimens identified at the Herbarium, but it must be realised that poor specimens may not justify the work involved. It must also be borne in mind that the process of identifying specimens helps one to appreciate the characters by which related species are separated and is therefore invaluable in familiarising one with the flora.

I have outlined some reasons why specimens may need to be preserved. The following notes should help to ensure that the maximum benefit is obtained from each specimen collected, but always remember to make sure that no laws are contravened and that no species, or even population of a species, is endangered.

1. Collecting

Select good specimens, include all parts—flowers, fruits, leaves, stems, and roots—whenever possible. In the case of trees and shrubs, select a suitable piece about 40-45 cm long and 20-25 cm broad.

Several plants of a small herb should be collected from one spot in such a number that they cover at least one newspaper folder (about 44 x 29 cm). With large herbs, the stem may be folded in one or more places until it becomes a specimen of suitable size to cover the sheet.

The plant specimen, together with its label (see 3) should be placed in newspaper folders at the spot of collecting (one species per folder) and kept in a field press consisting of two sheets of pressed board with two leather straps.

2. Numbering

It is advisable for each collector to number his specimens, as this facilitates reference. If several sheets are collected from the same tree or shrub at the same time (duplicates), they should bear the same number. Small herbs which are clearly of the same kind and from one narrowly circumscribed locality collected at the same time can fill several sheets and be given the same number thus producing duplicates. Collectors should run on in their numbering and not repeat numbers used earlier, even when returning to the same spot and collecting the same plant they had collected at an earlier date.

3. Labels

Field notes are noted on the labels when collecting. These labels should preferably not be larger than 10 x 7.5 cm. The label is most important and should contain the following information:

- (1) precise locality, including longitude and latitude (degrees and minutes);
- (2) date of collection;
- (3) collector's name;
- (4) collector's number;
- (5) other relevant notes which cannot be recognised from the dried specimen, such as colour and scent of flower, size of plant, nature of bark;
- (6) ecological notes: other associated plants, kind of soil and terrain how common or rare;
- (7) vernacular names used in the area of collecting.

Each folder containing a duplicate must also have either a full label or at least a small label with the collector's name and number.

4. Pressing and Drying

Transfer the plants, together with their label, from the field press to fresh folders on the evening of collecting or, at the latest, on the next day, and adjust crumpled leaves, and so on. Separate each folder by at least eight thicknesses of dry newspaper and press firmly in a stout press with straps, or apply weights equivalent to about 25 kg. Exchange the layers of papers between the folders containing the plants for dry ones each day to speed up their drying and so prevent mould. This changing of layers which absorbs dampness has to be continued until the plants are dried. The time this requires is dependent on the kind of plant, the absorbency and dryness of the paper used, and the air humidity.

5. Lichens and Mosses

Lichens and mosses should be collected in paper bags and not pressed. Each specimen must be separately wrapped. They are dried in the bags.

6. Despatch to the State Herbarium

Fully-labelled herbarium specimens in newspaper may be sent to the State Herbarium in parcels packed tightly between two cardboards. The use of empty newspaper layers as padding increases the safety of the specimens. Loose packing will allow the plants to move and break and must, therefore, be avoided. If possible send only material which the Herbarium may retain. Identification lists can be sent to the collector provided a duplicate of each specimen has been kept with the corresponding collector's number.

Sending of fresh plants to the Herbarium (except on request for a special purpose) is discouraged as they often deteriorate (e.g. become mouldy, especially when packed in plastic bags) in transport, and cannot always be attended to immediately on arrival.

All material should be addressed to The Chief Botanist, State Herbarium of South Australia, Botanic Garden, North Terrace, Adelaide, South Australia 5000. If an identification is required, the purpose for which it is required should be stated.

NEW NAMES AND COMBINATIONS

New species

1. *Juncus aridicola* L. A. S. Johnson (p.322).
2. *Juncus continuus* L. A. S. Johnson (p.325).
3. *Juncus flavidus* L. A. S. Johnson (p.325).

New Combinations

1. *Paraceterach reynoldsii* (F. Muell.) Tindale (p.53), (= *Nothochlaena reynoldsii* F. Muell.).
2. *Caladenia filamentosa* var. *bicalliata* (R. S. Rogers) J. Z. Weber & R. Bates (p.395), (= *C. bicalliata* R. S. Rogers).
3. *Caladenia huegelii* var. *reticulata* (Fitzg.) J. Z. Weber & R. Bates (p.397), (= *C. reticulata* Fitzg.).
4. *Caladenia huegelii* var. *rigida* (R. S. Rogers) J. Z. Weber & R. Bates (p.398), (= *C. rigida* R. S. Rogers).
5. *Diuris sulphurea* var. *brevifolia* (R. S. Rogers) J. Z. Weber & R. Bates (p.417), (= *D. brevifolia* R. S. Rogers).
6. *Prasophyllum fuscum* var. *occidentale* (R. S. Rogers) J. Z. Weber & R. Bates (p.430), (= *P. occidentale* R. S. Rogers).
7. *Prasophyllum fuscum* var. *validum* (R. S. Rogers) J. Z. Weber & R. Bates (p.431), (= *P. validum* R. S. Rogers).
8. *Pterostylis alata* var. *robusta* (R. S. Rogers) J. Z. Weber & R. Bates (p.437), (= *P. robusta* R. S. Rogers).

GLOSSARY OF BOTANICAL TERMS

- Abaxial*, see *anterior*.
Abortive, imperfectly developed.
Accrescent, growing larger after flowering, as the sepals.
Achene, a dry indehiscent 1-seeded fruit.
Actinomorphic, see *regular*.
Acuminate, tapering suddenly into a point.
Acute, sharp, gradually pointed.
Adaxial, see *posterior*.
Adnate, see *connate*.
Adventitious, any organ produced in an abnormal position.
Adventive, introduced accidentally, as most weeds are.
Albumen, material stored within the seeds of many plants for the nourishment of the embryo; it lies between the seed-coats and the embryo-sac (*perisperm*), or within the embryo sac (*endosperm*).
Alternate, (1) leaves or flowers inserted at different heights along the branches; (2) intervening between: as stamens which are alternate with the petals.
Amphitropous, when the ovule is laterally attached to the funicle, so that the chalaza and micropyle are at opposite ends of the ovule.
Anadromic, with the first vein or pinnule of a pinna on the side towards the apex.
Anastomosing, applied to veins of a leaf joined by cross veins to form a network.
Anatropous (inverted), when an ovule is bent back along its funicle, so that the micropyle stands at the apparent base of the ovule and the chalaza at the opposite end (the apparent summit).
 Owing to the presence of the raphe the hilum of the seed does not coincide with the chalaza, but lies close to the micropyle. This is the commonest form of ovule.
Androecium, a collective name for the stamens.
Androgynous, when male and female flowers are mixed in a spike or head.
Angiosperms, plants having seeds enclosed in a seed vessel.
Annual, a plant flowering and dying in one year.
Annular, ring-shaped.
Anterior, the parts of a flower or leaf furthest from the axis of the branch or stem on which it grows.
Anther, see *stamen*.
Apiculate, ending abruptly in a short point; nearly the same as *mucronate*.
Apocarpous, a pistil or gynoecium consisting of one carpel, or of several carpels all free and distinct (*Ranunculaceae*, *Dilleniaceae*).
Appressed, pressed closely against another organ, as leaves against a stem.
Approximate, growing near together.
Arborescent, tree-like.
Aril (arillus), an expansion of the funicle into a membranous or fleshy appendage, sometimes covering a considerable part of the seed.
Aristate, with a stiff awn or seta.
Article, part of an organ which separates easily from the rest of the organ at a point called the articulation or joint.
Articulate, jointed.
Ascending, spreading horizontally and then becoming erect.
Auricle, ear-shaped lobe at the base of a leaf or other organ.
Awn, a fine bristle terminating on organ or inserted on its back.
Axil, the angle formed by the leaf and the branch.
Axile—Placentas are axile when they and the ovules are attached to the inner angle (inner suture) of the carpels of a compound ovary.
Axillary, arising from the axil of a leaf or a bract.
Axis, line passing through the centre of a body: the stem, the rhachis and branches of a panicle, the rhachilla of grasses, are all axes.
Barb, one of the lateral or radial hairs of a plumose bristle.
Barbellate, furnished with short, sometimes microscopic barbs, too small for the bristle to be called plumose.
Basifixed, an anther attached by its base to the filament, or other organ attached by its base.

- Berry*, a juicy fruit with the seeds immersed in the pulp.
- Biennial*, a plant which flowers and dies in the second year.
- Bifid*, cut in two for about half its length.
- Bipinnate*, applied to those leaves in which there are primary pinnate divisions (pinnae) which are themselves pinnate.
- Bipinnatifid*, a leaf whose primary lobes are again pinnatifid.
- Bipinnatisect*, twice pinnatisect.
- Bisexual*, a flower with the reproductive organs of both sexes.
- Biternate*, see *ternate*.
- Bract*, a small leaf at the base of the peduncles or pedicels, and differing from the other leaves in size or shape. Bracts may also occur on peduncles, scapes, or flowering branches without any pedicels in their axils.
- Bracteate*, furnished with bracts.
- Bracteole*, a small bract on the pedicel or even on the calyx. Bracteoles are usually two, and placed opposite each other.
- Bristle*, (1) a straight stiff hair, whether smooth or scabrous with minute teeth; (2) the upper part of an awn, when the latter is bent and has a lower stouter more hairy and usually twisted part, called the "column".
- Bulb*, a short thick rootstock in which the bud or buds are covered by leaf-scales.
- Bulbil*, a minute bulb.
- Caducous*, falling off very early.
- Callus*, (1) a hard protuberance on some petals such as the standard of *Swainsona* and the labellum of some orchids, (2) a hardened decurrent extension of the flowering glume along the rachilla in some grasses, such as *Stipa*: this callus and the adnate article of the rachilla fall off with the fruiting glume in the form of a short obconical stipes.
- Calyx*, outer envelope of the flower, consisting of free or united sepals.
- Campanulate*, bell-shaped.
- Campylotropous*, when an ovule is curved so that the micropyle and chalaza come near each other.
- Capillary*, hair-like, very slender.
- Capitate*, (1) shaped like a head (stigma, etc.); (2) growing in a head-like cluster (flowers of *Compositae*).
- Capsule*, a dry fruit (consisting of two or more united carpels,) usually splitting into pieces called *valves* when ripe, or opening at the summit by teeth or pores.
- Carpel*, a fruit-leaf folded lengthwise and united by its edges, the lower and swollen portion forms the ovary, inside which the ovules are produced; the upper and narrower portion forms the style and stigma.
- Carpophore* (*gynophore*), Stalklet or axis arising from the receptacle or other organ and supporting certain fruits.
- Cartilaginous*, gristly.
- Caruncle*, a fleshy appendage of the seed, growing near the funicle.
- Cauda*, a tail-like appendage.
- Caudex*, a trunk-like axis surrounded by a mantle of roots.
- Caudicle*, a strap-like structure connecting the pollen-masses in orchids to the viscid disk of the rostellum.
- Cauline*, inserted on the stem.
- Cell*, (1) the cavity of the ovary, and especially each cavity of a compound ovary or compound fruit; (2) a pouch or pollen-sac of the anther; (3) one of the minute masses of protoplasm which go to make up the tissue of plants.
- Centrifixed*, a 2-branched hair or other organ attached by its centre.
- Centrifugal* or *definite*, applied to that kind of inflorescence, such as the cyme, where the terminal flower opens first and then those on the lateral branches.
- Centripetal* or *indefinite*, that kind of inflorescence, such as the head, spike, raceme, or panicle, where the outermost or lowest flowers open first and the main rachis continues to lengthen, developing fresh flowers.
- Chalaza*, see *ovule*.
- Chelate*, shaped like a lobster's claw.
- Ciliate*, bordered by hairs like eye-lashes (*cilia*).
- Ciliolate*, bordered by very short hairs.

- Circinate* (*circinnate*), coiled with the apex innermost as in fronds of many fern species.
- Circumsciss*, when a capsule opens by a transverse line, so that the upper part comes off like a lid.
- Clathrate*, latticed or pierced with apertures.
- Clavate*, club-shaped.
- Claw*, the narrow lower part of a petal or involucre bract.
- Clinandrium*, the depression on the top of the column in orchids, on which the anther rests.
- Coenosorus*, a compound sorus formed by the fusion of sori.
- Collateral*, placed side by side.
- Column*, (1) the combination of stamens and style in a solid body, as in orchids and *Stylidiaceae*;
(2) the lower usually twisted part of an awn in grasses, passing into the bristle or slender upper part.
- Complicate*, folded flat together.
- Compound*, composed of several parts, as a leaf consisting of several leaflets, or a pistil consisting of several carpels; the opposite of *simple*. A compound panicle has the branches again divided.
- Compressed*, flattened lengthwise, either from side to side (*laterally*) or from front to back (*dorsally*).
- Concolorous*, of the same colour throughout.
- Conduplicate*, see *complicate*.
- Cone*, a fruit usually woody, ovoid or globular, consisting of scales arranged around an axis and sheltering the naked seeds.
- Confluent*, running together.
- Connate*, when organs are so closely united that they cannot be separated without tearing. Each of the connate parts is said to be *adnate* to the other.
- Connective* the part of an anther which connects the two cells.
- Connivent* (or *converging*), organs approaching one another at the summit.
- Cordate*, heart-shaped, with the notch below.
- Coriaceous*, leathery; stiff, tough but somewhat flexible.
- Corm*, a solid tuberous bulb-like rootstock, in which the buds are not covered by scales, or by very thin ones.
- Corolla*, inner envelope of the flower, consisting of free or united petals.
- Corona*, a small crown of free or united appendages inserted inside the corolla.
- Corymb*, inflorescence where the branches start from different points, but reach about the same height.
- Costa*, the midrib of a leaf.
- Costule*, the midrib of a pinna or pinnule.
- Cotyledon*, see *embryo*.
- Crenate*, bordered by blunt or rounded teeth.
- Crenulate*, crenate with very small teeth.
- Crustaceous*, hard, thin and brittle.
- Cryptogam*, plants without stamens, ovaries or seeds; that is the lower groups including the ferns.
- Cuneate*, wedge-shaped.
- Cusp*, a gradually attenuated point.
- Cyme*, an inflorescence branched like a panicle but in which the branches are usually opposite and the central flower opens first.
- Deciduous*, falling off finally.
- Decomound*, applied to a compound leaf in which the subdivisions are again compound.
- Decurrent*, when the blade of the leaf is prolonged downwards along the stem in raised lines or narrow wings.
- Decussate*, opposite leaves crossing each other in pairs at right angles.
- Deflexed* (*decurved*), bent downwards.
- Dehiscent* (*dehiscing*), opening when ripe, as a seed vessel or anther.
- Dentate*, toothed.

Denticulate, finely toothed.

Depressed, flattened from above downwards.

Dichotomous, forked once or several times.

Diffuse, spreading horizontally and loosely branched.

Digitate, a compound leaf whose leaflets spread from a common centre, like the fingers of a hand.

Dimidiate, appearing as if one half were wanting.

Dimorphic, occurring in two forms.

Dioecious, plant whose male and female flowers develop on different individuals.

Discrete, separate.

Disk, (1) an extension of the torus between the calyx and pistil. It may be conspicuous in the form of a ring or cushion, or reduced to separate glands or scales; (2) all the central or *disk-flowers* in a radiate flowerhead.

Dissepiment, one or more vertical partitions dividing the ovary and fruit into two or more cells. The dissepiment is usually caused by the adhesion of the sides of two adjoining cells or carpels = *septum*.

Distal, applied to the free end of the lavellum of an orchid, as opposed to the *proximal* or attached end.

Distichous, regularly arranged in two opposite rows.

Distinct, separate, free.

Divaricate, spreading in different directions from a common centre almost at a right angle.

Divergent, spreading in different directions with a more upright tendency.

Dorsal, relating to the back.

Dorsifixed, an anther attached by its back to the filament.

Drupe, a fruit in which the pericarp consists of three layers:—(1) the *epicarp* or skin, (2) the *mesocarp* or juicy layer, (3) the bony *endocarp* or stone; within the endocarp lies the seed or kernel. The peach and olive, and (among Australian plants) the fruit of *Nitraria schoberi* are familiar examples.

Emarginate, notched at the summit.

Embryo, the young plant while still enclosed in the seed, consisting of the *radicle*, or base of the future root, one or more *cotyledons*, or future seed-leaves and the *plumule*, or future bud. The radicle always points towards the micropyle.

Embryo-sac, see *ovule*.

Endemic, peculiar to a country or district and not native elsewhere.

Endocarp, the innermost layer of the pericarp.

Endopleura, the inner seed-coat, sometimes called the *tegmen*.

Entire, when the margin of an organ (such as a leaf) is neither toothed, lobed, or divided.

Epicarp, see *pericarp*.

Epigynous, when the sepals, petals, and stamens are inserted upon the inferior ovary and the adnate torus or receptacle, as in most *Myrtaceae*.

Epiphyte, one plant growing upon another, without deriving nourishment from it.

Equitant, when a leaf is folded lengthwise and the edges adhere except at the base, where it clasps another leaf on the opposite side of the stem.

Exalbuminous, without albumen.

Exindusiate, without an indusium.

Exserted, projecting beyond, as the stamens beyond the corolla, the awn beyond the glumes or the panicle beyond the uppermost leaf-sheath.

Exstipulate, without stipules.

Extravaginal, when the lateral shoot of a grass breaks through the subtending leaf-base.

Extrorse, an anther which opens towards the outside of the flower.

Falcate, curved like the blade of a scythe.

Family, a group of genera which resemble each other.

Fertile (of flowers) producing seeds; (of anthers) containing pollen.

Filament, see *stamen*.

Filiform, thread-like. When applied to leaf-blades it means more slender than *subulate*, but of similar construction.

Fimbriate, fringed.

Fistula, the opening in a hollow leaf-base through which the stem emerges.

Flabellate, fan-shaped.

Floral leaves or *leafy bracts*, the upper leaves at the base of the flowering branches.

Follicle, a fruit consisting of a single carpel opening only along the inner suture.

Free, not united with any other organ.

Free central placenta, one in the form of a central column rising from the base of the ovary, or consisting of a prolongation of the receptacle, and in both cases unconnected with the walls of the ovary.—*Primulaceae*, *Caryophyllaceae*, *Santalaceae*.

Frond, the fern leaf.

Free, the enlarged ovary and whatever other parts of the flower may adhere to it at the time the seed is ripe.

Funicle, a little cord by which the ovule is attached to the placenta.

Fusiform, spindle-shaped, tapering gradually at each end.

Galeate, helmet-shaped.

Gametophyte, a plant which bears sexual organs; in ferns usually a small but discrete plant very different from the *sporophyte* (which is the fern plant); in seed-plants reduced to a microscopic structure not recognisable as a discrete plant.

Geniculate, knee'd, bent like a knee.

Genus (pl. *genera*), a group of species which resemble each other.

Gibbous, when an organ is swollen at the base or at any other part.

Glabrescent, becoming glabrous gradually.

Glabrous, devoid of hairs.

Gland, a wart-like excrescence on or near the surface of an organ and usually secreting a fluid.

Glandular hairs, hairs tipped with a gland.

Glaucous, bluish-green, usually of a pale tint.

Globular, rounded like a globe or sphere (= *globose*).

Glume, bract enclosing the flower of grasses and reeds.

Glutinous, sticky.

Grain, the fruit of grasses, also called *caryopsis*.

Granular, covered with small rounded protuberances.

Gymnosperms, plants, such as pines, whose seeds are naked, *i.e.*, not contained in a seed-vessel.

Gynoecium, see *pistil*.

Gynophore, stalk supporting an ovary.

Gynostemium, a column formed by the union of style and stamens.

Habit, the general external appearance of a plant.

Hasate, shaped like a halbert, with two spreading somewhat triangular lobes at the base.

Herb, a plant which does not develop a woody stem.

Herbaceous, green and more or less succulent.

Heterogamous, when a flowerhead has the outer flowers female or neuter, and the inner ones bisexual or male.

Heterosporous, with spores of two kinds.

Hilum, the scar left on the seed where it separates from the funicle.

Hispid, rough with short stiff hairs.

Hoary, densely covered by almost microscopic hairs, which give the surface a whitish or greyish hue.

Homogamous, when a flowerhead has all the flowers bisexual.

Homosporous, with spores of one kind only.

Hyaline, delicately membranous and transparent.

Hypogynous, inserted below the ovary, as the sepals, petals, and stamens.

Imbricate, overlapping like tiles.

Incised, deeply and unequally cut into lobes or teeth.

Included, enclosed, as stamens within the corolla.

Incumbent, leaning upon another organ.

Incurved, bent inwards.

Indehiscent, a fruit which does not split open in a definite manner when ripe.

Induplicate, when the edges of petals or sepals are folded inwards in bud, but without overlapping.

Indusiate, possessing an *indusium*.

Indusium, (1) membrane covering the sporangia of some ferns; (2) a cup enclosing the stigma in *Goodeniaceae*.

Inferior.—An ovary is inferior when it is united with the cup-shaped or tubular torus or receptacle; the calyx, petals, and stamens are then all *superior* to the ovary, or epigynous. An *inferior radicle* points towards the base of the fruit; an *inferior (apotropous) micropyle* points towards the base of the ovary.

Inflorescence, arrangement of the flowers on a plant.

Internode, the part of the stem between two nodes.

Interpetiolar, stipules placed between the petioles of opposite leaves.

Interrupted, having bare spaces between the parts.

Intravaginal, when the lateral shoot of a grass does not break through the subtending leaf-sheath.

Introrse, an anther which dehisces by slits facing the pistil and therefore turned inwards.

Involucl, (1) the involucre of a partial umbel; (2) the outer calyx in *Dipsacaceae*.

Involucre, a number of bracts surrounding the base of a flowerhead or of an umbel.

Involute (inrolled), with the edges rolled inward, as in the leaf-blades of many grasses.

Irregular.—This term is used in its strictest sense to describe those rare *asymmetric* flowers which cannot be divided into two equal halves through any vertical plane (such as the *Valerianaceae*). It is here applied in a more general sense to a flower in which the parts of either the calyx or corolla are dissimilar in size or shape. It therefore includes flowers which are altogether asymmetric and those which are *zygomorphic*, or *bilaterally symmetrical*, i.e., which can be cut through only one vertical plane into two equal and similar halves (Peaflowers, Pelargonium, Violet, etc.).

Joint, see *article*.

Keel, (1) a projecting ridge along the middle of a flat or convex surface; (2) the two partially united lowest petals of pea-shaped flowers.

Kernel, see *drupe*.

Labellum, (1) the lowest petal of orchids, usually different in form from the two lateral ones; (2) the lowest petal of *Stylidiaceae*.

Labiate, lipped; where the limb of a corolla is divided into two parts, called an upper and lower lip.

Lacerate, jagged.

Lamella, a thin plate.

Lamina, the blade of a leaf, or the expanded upper part of a petal, sepal, or bract.

Lanceolate, shaped like the head of a lance, tapering at both ends.

Leaflet, each division of a compound leaf.

Lemma, the bract (*glume*) subtending the flower in grasses.

Ligulate, having the limb of the corolla strap-shaped, as in many *Compositae*.

Ligule, (1) a small membranous appendage at the summit of the sheath of grass-leaves; (2) the one-sided limb of the corolla in many *Compositae*.

Limb, the upper lobed and usually spreading part of a calyx or corolla; it is an expansion upwards of the tube or united part of the calyx or corolla.

Linear, long and narrow, with parallel edges.

Lobe, division of a leaf reaching about half-way to the midrib, or of some other organ which is only divided for about half its length.

- Lobed*, (1) cut about half-way; (2) a compound ovary or fruit which is deeply grooved between the carpels.
- Lobule*, a small lobe.
- Loculicidal*, when a ripe capsule splits open along the back of its cells (*i.e.*, along the dorsal suture or midrib of the carpels), as in *Juncaceae* and most *Liliaceae*. Each valve into which the capsule splits consists of 2 halves of adjoining carpels, with the dissepiment attached along the centre of the valve.
- Long-creeping*, in ferns a rhizome which elongates rapidly so that the fronds are usually distant.
- Lunate*, crescent-shaped.
- Lyrate*, a pinnatifid or pinnatisect leaf with a terminal lobe much larger than the lateral ones.
- Mamillary*, nipple-shaped.
- Marcrescent*, withering without being shed.
- Mealy* (farinose), covered with a scurfy powder like flour.
- Megasporangium*, sporangium containing *megaspores*.
- Megaspore*, spore giving rise to female gametophyte and egg cells.
- Megasporophyll*, leaf associated with a megasporangium.
- Membranous*, thin, transparent and flexible, not green.
- Mesocarp*, the second or middle layer of the pericarp; often succulent and then sometimes called the *sarcocarp*.
- Micropyle*, a minute opening in the coats of the ovule. In the great majority of plants the pollen-grain finds its way to the embryo-sac through the micropyle.
- Microsporangium*, sporangium containing *microspores*.
- Microspore*, spore giving rise to male gametophyte and sperm.
- Microsporophyll*, leaf associated with a microsporangium.
- Midrib*, the central nerve of a leaf.
- Moniliform*, when a pod or other organ is constricted at regular intervals, so as to resemble a necklace of beads.
- Monocious*, a plant which has the male and female flowers on the same individual.
- Monotypic*, having only one representative.
- Mucronate*, terminating abruptly in a short stiff point called a *mucro*.
- Muricate*, rough owing to many minute hard outgrowths.
- Naked*, flower without any perianth; seed without a pericarp.
- Nerves* (veins), the vascular bundles which start from the petiole and traverse the blade of the leaf, the smaller ones often forming a network.
- Node*, the swollen part of the stem from which leaves or branches spring.
- Nut*.—Properly a 1-seeded indehiscent fruit, such as the hazel-nut, with a hard dry pericarp ("shell"), but also used to describe any hard 1-seeded nut-like fruit, such as those of *Polygonaceae* and *Cyperaceae*.
- Obcordate*, inversely heart-shaped, broad, and rather deeply notched at the summit.
- Ob lanceolate*, lanceolate with the narrow end at the base of the leaf.
- Oblique*, slanting; (of a leaf) unequal-sided.
- Oblong*, much longer than broad, and rounded at both ends.
- Obovate*, ovate with the broadest part above the middle.
- Obtuse*, blunt.
- Opposite*, two leaves or other organs rising from the same level on opposite sides of the stem.
- Orbicular*, flat, circular or almost so.
- Order*, a group of families resembling each other.
- Orthotropous* (atropous), when an ovule has a straight axis, the chalaza being at its base and the micropyle at the opposite end.
- Ovary*, the lower part of the carpel or pistil, containing the ovules, and finally becoming the fruit.
Compound ovary, see *syncarpous*.
- Ovate*, when a flat surface, such as that of a leaf, is egg-shaped and broader below the middle.
- Ovoid*, egg-shaped (of solid organs such as fruits).

Ovule, the seed in its early stage. It consists of the *embryo-sac*, containing the future embryo, completely surrounded by the *nucellus*, which is in its turn surrounded (except at the micropyle) by an outer covering, usually consisting of two coats, an inner and an outer. At the base of the ovule is a spot called the *chalaza*, where nourishment enters from the placenta through the funicle, and at the opposite extremity is the small opening through the outer covering, which is called the *micropyle*.

Palea, the upper of two bracts enclosing the flower of grasses.

Palmatifid, leaf divided into diverging lobes, and so resembling the open hand.

Palmatisect, palmately divided nearly to the base.

Panicle, an inflorescence where the axis is divided into branches bearing several flowers.

Paniculate (*panicked*), arranged in a panicle.

Papilionate, with a corolla like that of a pea (literally butterfly-like).

Papillose, covered with minute protuberances called papillae.

Pappus, a ring of hairs or scales which represents the calyx in many *Compositae*.

Parasite, a plant growing upon another, and deriving its nourishment from the latter.

Parietal placenta, when the placentas and ovules are attached to the walls of a 1-celled compound ovary.

Paripinnate, a pinnate leaf terminating in two opposite leaflets.

Parted (*partite*), an organ divided into parts almost to its base.

Patent, spreading.

Pedicel, stalklet of a flower, when the peduncle bears two or more pedicellate flowers.

Pedicellate, growing on a pedicel.

Peduncle, stalk of a solitary flower, or common stalk (floral axis or rhachis) of several pedicellate or sessile flowers.

Pedunculate, growing on a peduncle.

Peltate, (1) leaf (or other flat organ) whose stalk is attached to its under-surface, instead of to the edge; (2) shield-like.

Pendulous ovule, one hanging from the summit of the ovary. The term *suspended* is sometimes used when the ovule is attached slightly below the summit.

Penicillate, arranged like a tuft of hairs.

Perennial, living for several years.

Perianth, the floral envelope, usually consisting of two whorls, the calyx and corolla. The term is specially employed to describe flowers in which the segments of the perianth are much alike but in whorls (as in *Liliaceae* and *Juncaceae*), or quite similar and in a single whorl (as in *Chenopodiaceae*).

Pericarp, the walls of the fruit, consisting of the ripened ovary. The walls or layers may be more or less fused into one, or they may be easily distinguishable as three: the epicarp, mesocarp, and endocarp. In inferior fruits the concave receptacle remains adherent to the pericarp and forms part of the fruit. Combined epicarp and mesocarp are often called *exocarp*.

Perigynous, when the sepals, petals, and stamens are inserted round the superior ovary on the cup-like or tubular torus or receptacle. The stamens also appear perigynous when inserted on the corolla.

Persistent, lasting until the fruit is ripe, as sepals or glumes; also applied to leaves remaining green during the winter: the opposite of *caducous* and *deciduous*.

Petal, one of the divisions or leaves of the corolla, usually coloured.

Petaloid, resembling a petal.

Petiolate, supported on a petiole.

Petiole, stalk of a leaf.

Petiolule, stalk of a leaflet.

Phyllode (*phyllodium*), a flat dilated petiole, fulfilling the functions of a leaf, as in many *Acacias*.

Pilose, with soft hairs.

Pinna, a primary division of a pinnate leaf; a leaflet.

Pinnate, a compound leaf whose leaflets are arranged on each side of the common petiole or axis.

When there is an odd terminal leaflet, the leaf is called *unequally pinnate* or *imparipinnate*.

Also applied to lateral nerves arranged on each side of the midnerve of a leaf.

Pinnatifid, with the margin pinnately cleft.

Pinnatipartite, cut more than half-way to the midrib.

Pinnatisect, pinnately divided almost to the midrib.

Pinnule, a secondary or tertiary division of a leaf.

Pistil or *gynoecium*, the innermost and female part of the flower, consisting of one or more carpels. When there is only one carpel, the terms carpel, pistil, and gynoecium are synonymous. When two or more carpels adhere by their ovaries the pistil or gynoecium is *compound* or *syncarpous*. When the carpels are separate the pistil is *apocarpous*.

Placenta, part of the ovary to which the ovules are attached by their funicles.

Plano-convex, flat on one side and convex on the other.

Plumose, when a hair or similar organ branches into rather long spreading secondary hairs, arranged irregularly or in two opposite rows like the barbs of a feather.

Pod, (1) the legume of *Leguminosae*, a dry fruit formed of a single carpel; (2) the *siliqua* and *silicula* of *Cruciferae*, a dry fruit composed of two carpels separated by a partition.

Pollen, see *stamen*.

Pollen-mass (*pollinium*), pollen-grains cohering by a waxy texture or fine threads into a single body.

Polygamous, when the same plant bears male, female, and bisexual flowers.

Posterior, the parts of a flower nearest to the axis of the branch.

Prickle, sharp excrescence arising from the bark and detachable without tearing the wood.

Procumbent, spreading along the ground, but not so closely as *prostrate*.

Proliferous (*viviparous*), plants which bear adventitious leaf-buds on the leaves or flowers, such buds being capable of rooting and forming separate plants.

Prostrate, lying flat on the ground.

Proximal, see *distal*.

Pseudodichotomy, false dichotomy.

Pubescent, downy, covered with short soft hairs.

Punctiform, like a point or dot.

Punctulate, finely dotted.

Putamen. A hard bony endocarp.

Quadrata, square or nearly so.

Raceme, an undivided axis or peduncle bearing pedicellate flowers.

Racemose, arranged in a raceme.

Radiata, flowerhead of *Compositae* which has ligulate flowers in the circumference and tubular flowers in the centre.

Radical, springing from the root.

Radicle, see *embryo*.

Ray, (1) all the ligulate flowers (*ray-flowers*) in a radiate flowerhead; (2) each of the branches of an umbel.

Receptacle, (1) floral axis, torus or thalamus. The summit of the peduncle or pedicel on which the parts of a single flower are arranged, either in whorls or spirally. It may extend upwards as an annular or cushion-shaped disk, and this may assume the form of glands or scales, which often alternate with the stamens (*Rutaceae*, *Zygophyllaceae*). It may be lengthened into a column or carpophore, such as those which bear the fruitlets of *Geraniaceae* and *Umbelliferae*, or into a small stalk supporting the ovary (some *Caryophyllaceae*, *Leguminosae*, *Proteaceae*). It is very frequently hollowed out into a cup or rarely a tube, which surrounds the ovary and bears the sepals, petals, and stamens on or near its margin, and is usually united with the ovary, or more rarely free from it (*Myrtaceae*, *Rosaceae*, *Oenotheraceae*, *Thymelaeaceae*). Formerly this hollow receptacle, when united with the ovary, was described as the "adnate (adherent) calyx-tube". (2) Floral base or common

- receptacle. The expanded summit of the peduncle on which the flowers, surrounded by an involucre of bracts, are inserted, usually in a dense cluster (*Compositae*, *Dipsacaceae*). In *Compositae* both forms of the receptacle are present.
- Recurved (reflexed)*, bent backward.
- Reduplicate-valvate*, when the edges of petals or sepals are turned backward and outward in the bud (see figure of *Boronia palustris*).
- Regular*, a flower in which the segments of the perianth, or the parts of either of the two whorls of the perianth (calyx and corolla) are alike in size and shape (although in the latter case the two whorls need not have the same number of parts), and are arranged regularly round the axis. The term regular is thus practically equivalent to *actinomorphic*, or *radially symmetrical*, i.e., where a flower can be bisected through two or more vertical planes into two similar halves. Such flowers are Buttercup, Poppy, *Boronia*, *Geranium*, the Cruciferous Family, etc.
- Reniform*, kidney-shaped.
- Replum*, the rim of the pod of *Cruciferae*, after the valves have fallen.
- Resupinate (reversed)*, when a flower is inverted by a twisting of the pedicel or the ovary so that the parts usually uppermost become the lowest.
- Reticulate*, when the nerves or veins cross each other like the meshes of a net.
- Retracted*, turned backwards.
- Retorse*, turned backwards.
- Retuse*, with an obtuse apex the centre of which is shallowly notched.
- Revolute*, when the edges of leaves are rolled backwards towards the midrib (see illustration of *Frankenia*).
- Rhachilla*, the rhachis of the spikelet in grasses and sedges.
- Rhachis*, any principal axis of inflorescence; also applied to the common petiole of a compound leaf.
- Rhaphe*, a cord adhering to one side of an anatropous ovule and connecting the chalaza with the placenta. It is often visible as a raised line on the seed (see illustration of *Frankenia pauciflora*).
- Rhizome (rootstock)*, (1) a subterranean stem; (2) in the pteridophytes used in a broader sense to include prostrate creeping and short erect stems below the ground or shortly above it.
- Rhombocuneate*, rhomboid in the upper part, cuneate below.
- Rhomboid (rhomboidal)*, lozenge-shaped.
- Root*, the descending axis of the plant, developed from the radicle and imbibing nourishment through its fibres.
- Rostellum*, an extension of the upper edge of the stigma in orchids.
- Rostrate*, beaked.
- Rosulate*, leaves arranged in a radical rosette.
- Rotate*, wheel-shaped, a corolla with very short tube and spreading limb.
- Runcinate*, a pinnatifid leaf with lobes pointing towards the base.
- Sagittate*, arrow-shaped; applied to a leaf with two straight acute lobes at the base.
- Samara*, a dry indehiscent fruit with a membranous wing at one end.
- Saprophyte*, a plant obtaining its nutrient from dead organic matter.
- Scabrous*, rough to the touch, usually on account of minute stiff, sometimes almost microscopic hairs or bristles.
- Scale*, (1) a reduced leaf; (2) any small scale-like organ.
- Scape*, a radical leafless flowerstalk.
- Scarios*, almost the same as *membranous*, but rather stiffer.
- Scattered*, when leaves are irregularly arranged round the stem.
- Scorpioid cyme*, the inflorescence of *Boraginaceae*, consisting of a succession of 1-flowered axes, which simulate a single axis, rolled up at the end, when in bud, like a scorpion's tail. It has the appearance of a 1-sided raceme, but the expansion of the flowers is centrifugal.
- Scurfy*, covered with minute loose scales.

- Sectile*, subdivided into small parts, as the pollen-masses of some orchids.
- Seed*, a ripened ovule, consisting usually of two coats, within which is the embryo, with or without albumen.
- Segment*, (1) each division of a pinnatisect leaf which reaches nearly or quite to the midrib, but is not separable without tearing; (2) each division of a perianth reaching to the base.
- Sepal*, one of the divisions of the calyx.
- Septal placenta*, when the placentas of a 2-celled ovary are attached to the partitions (septa).
- Septate*, divided by septa or partitions.
- Septicidal*, when a capsule splits open through the dissepiments and the component carpels fall away separately.—*Zygophyllum fruticosum*, *Dodonaea bursariifolia*, *Euphorbia*.
- Septifragal*, when the dissepiments remain attached to the axis of the capsule, but break away from the edges of the valves—*Dodonaea viscosa*, *Datura stramonium*.
- Septum*, the membranous partition separating the two valves of the pod of *Cruciferae* = *dissepiment*.
- Serrate*, toothed like a saw.
- Serrulate*, when the teeth are very small.
- Sessile*, without any stalk.
- Seta*, a bristle or stiff hair.
- Setaceous*, bristle-like. When used to describe narrow leaf-blades, it has the same meaning as *subulate*.
- Sigmoid*, shaped like the letter S.
- Silicule*, *siliqua*, see *pod*.
- Simple*, when a leaf is not divided into leaflets, the opposite of *compound*, although a simple leaf may be entire, toothed, or lobed; (of other organs) not lobed, branched, divided, or compound; (of a flower or perianth) having the segments or lobes in one whorl or cycle. A simple panicle has the branches undivided.
- Sinuate*, leaf or other organ whose edge consists of shallow irregular lobes or teeth, with rounded spaces, called *sinuses*, between them.
- Sinus*, the recess between two lobes or segments.
- Slow-creeping*, in ferns a rhizome which elongates slowly so that the fronds are usually clustered.
- Sorus*, a cluster of sporangia.
- Spathe*, (1) two or more bracts enclosing the flowers of *Iridaceae*; (2) a large bract enclosing the succulent flowerspike (*spadix*) of the Arum and Palm families.
- Spathulate*, a leaf broad towards the summit, narrowed lower down.
- Species*, a division of the genus, each species (group of individual plants) possessing characters which distinguish it from other species of the same genus. Each species bears two names, e.g., *Eucalyptus obliqua*, the first being the generic name, the second the specific one.
- Spicate*, arranged in a spike.
- Spike*, an undivided floral axis (rhachis, peduncle) bearing sessile flowers.
- Spikelet*, a small spike bearing one or several flowers, occurring chiefly in the grass family.
- Spine* (*thorn*), a sharp point proceeding from the stem or other organ and not detachable without tearing.
- Spinule*, a small spine.
- Sporocarp*, a thick-walled woody body containing sporangia.
- Sporophyte*, a plant which bears no sexual organs but only asexual spores (for example the fern plant and, despite appearances, spermatophytes in which the gametophytes which produce the sexual structures are microscopic).
- Spreading*, standing out horizontally, for example of leaves and petals.
- Stamen*, male organ of the flower, consisting of a short or long stalk (sometimes wanting) called the filament, which supports the *anther*. The latter consists of one or two pouches, or *cells*, containing the minute *pollen-grains*, by means of which the pistil is fertilised.
- Staminodium*, an abortive or rudimentary stamen.
- Standard*, the large posterior petal of *Papilionatae* (*Leguminosae*).

Stellate hairs, hairs with branches radiating like a star.

Stem-clasping (amplexicaul), when the base of a sessile leaf clasps the stem.

Stigma, a point or small head at the summit of the style; or the stigmas may occupy the inner face of the style-branches (*Compositae*) or the spreading hairs of the styles (*Gramineae*). Where there is no style, the stigma is sessile on the ovary. It is sticky and papillose and receives the pollen from the anthers.

Stigmatic plate, the front part of the column in certain genera of orchids, bearing the female elements, and composed of a pedicel (or expanded style), carrying a vertical plate on the face of which are the stigma, the rostellum, and the viscid disk.

Stipe, in ferns, the stalk of the frond.

Stipellae, two small, secondary stipules sometimes found at the base of leaflets.

Stipes, a small stalk, especially one rising above the insertion of the perianth and supporting a fruit, when it is the equivalent of a small gynophore; also applied to the stalks of scales and bracts.

Stipules, two small appendages growing at the base of the leaf-stalk.

Stolon (runner, sucker), a basal branch growing just above or just below the surface, rooting at intervals and producing new plants.

Stramineous, straw coloured.

Striate, marked with parallel longitudinal lines.

Strobilus, a cone-like structure containing reproductive structures, as in some pteridophytes and conifers.

Style, the narrow upper part of the carpel or pistil; it surmounts the ovary and supports the stigma, but is sometimes wanting.

Sub, a prefix meaning (1) *somewhat, almost*, as in *suberect, subglobular*; (2) *under, inferior*, as in *subfamily*.

Subulate, awl-shaped. When applied to a leaf-blade it means slender, rather stiff, orbicular in cross-section owing to the incurved or involute margins.

Superficial, on the surface.

Superior.—An ovary is superior or free when the calyx, corolla, and stamens are inserted below it on the floral axis, or when the hollow torus or receptacle is not united with it. In the first case the calyx, corolla, and stamens are hypogynous or inferior and in the second case they are inserted on or near the margin of the hollow torus and so become perigynous. A *superior radicle* points towards the summit of the fruit, and a *superior (epitropous) micropyle* points to the summit of the ovary.

Superposed, inserted one above the other.

Suture.—The *dorsal suture* of a carpel (carpellary leaf or fruit-leaf) represents the midrib of the leaf; it is the outer (anterior) suture or seam. The *ventral suture* is on the inner side of the carpel and indicates the line where the edges of the folded leaf have become united; it bears the placenta and ovules. Dehiscence may take place through one or both sutures.

Sympatric, growing together.

Sympetalous, a corolla in which the petals are united by their edges into a cup or tube. Less correctly called *gamopetalous* or *monopetalous*.

Syncarpous, an ovary, pistil, or fruit composed of two or more united carpels.

Tendrils, filiform organs by which climbing plants cling to some object within reach.

Terete, slender-cylindrical, but not so slender as *filiform*.

Ternate, arranged in or divided into threes.

Testa, the outer seed-coat

Tomentose, densely covered with short soft matted hairs (*tomentum*).

Toothed (dentate), notched so as to resemble a row of sharp teeth.

Torus, see *receptacle* (1).

Trichotomous, stem or branches divided into three, once or several times.

Trifid, cut about half-way into three parts.

Trifoliate, a leaf of three leaflets.

Trigonus, a stem or other organ which is triangular when cut transversely.

Tripartite, divided into three parts nearly to the base.

Tripinatisect, thrice pinnatisect.

Triquetrous, a triangular stem or other organ when the angles are sharp.

Trisect, cut into three segments to the base of midrib.

Truncate, cut off squarely.

Tuber, (1) a swollen branch of an underground stem, producing buds, as the potato; (2) a swollen part of a root, acting as a reservoir of nourishment.

Tubercle, a small wart-like protuberance.

Tuberculate, covered with tubercles.

Tunic, the outer covering of some bulbs and corms.

Turbinate, top-shaped.

Ultimate segment, final division of a leaf; in ferns it may be a pinnule or part of a pinnule if the segment is deeply lobed.

Umbel, inflorescence where the divergent branches or rays start from the same point. In a *simple umbel* each ray bears one flower.

Umbellule, a partial umbel borne at the summit of each ray of a compound umbel.

Umbilicate, with a conspicuous depression in the centre.

Umbonate, bearing a small boss or elevation in the centre.

Undershrub, a small shrub whose flowering branches die off in the winter.

Undulate (crisped), wavy on the edges.

Unilateral, one sided.

Unisexual, a flower of one sex, either male or female.

Utricle, a very thin loose covering of some fruits.

Valvate, petals and sepals whose edges, in bud, meet without overlapping.

Value, one of the pieces formed by the vertical splitting of the pericarp of certain fruits when ripe.

The valves usually consist of the backs of the carpels.

Variety, subdivision of a species.

Vascular bundles, long tubes or fibres which establish communication between the various parts of a plant. An open vascular bundle is one divided by a layer of cambium, so that the bundle is capable of constant growth; a closed bundle (as in Vascular Cryptogams and Monocotyledons) has no cambium and cannot increase in size.

Vascular commissure, vascular connection of vein endings.

Velum, a membranous veil.

Ventral, see *suture*.

Vernation, the manner in which unexpanded leaves are arranged in the leaf bud.

Versatile, when the anther is lightly attached by some point of its back to the filament, so as to swing easily.

Villous, beset with long soft hairs.

Vitta, linear longitudinal vessel in the fruit of some *Umbelliferae*.

Viviparous. see *proliferous*.

Whorl (verticil), a set of organs, proceeding from the same node, and arranged in a circle around the axis.

Whorled (verticillate), arranged in a whorl.

Wing, (1) any kind of flat membranous expansion; (2) one of the two lateral petals of papilionate flowers.

Zygomorphic, see *irregular*.

ABBREVIATIONS USED IN PART ONE

1°	primary
2°	secondary
a.	awn
AD	State Herbarium of South Australia
ADW	Herbarium of the Waite Agricultural Research Institute
an.	anther
ap.	appendage
br.	bract
c.	approximately
ca.	callus
caud.	caudicle
co.	column
d.	dorsal
g.	gland
gl.	glume
h.	hood
J.M.B.	J. M. Black
J.R.	J. Reynolds
l.	lateral
la.	lamina
L.C.	L. Crisp
L.D.	L. Dutkiewicz
lem.	lemma
lo.	lobe
m.	mid (middle)
ov.	ovary
pal.	palea
pe.	petal
rhach.	rhachilla
ro.	rostrum (rostellum)
se.	sepal
S.H.	S. Hittingnuc
sp.	species (singular)
spp.	species (plural)
st.	stigma
T.I.	T. Iwagu
w.	wing

The names of Australian States have been abbreviated.

KEY TO THE FAMILIES

1. Plants without flowers; reproduction by spores
(DIVISION 1, PTERIDOPHYTA)
 2. Sporangia solitary, sessile in the axils, or embedded in the bases, of the leaves (sporophylls); leaves small, undivided CLASS LYCOPSIDA
 2. Sporangia few to many on the undersurface or the margins of the leaves; leaves large, usually divided or pinnatisect CLASS PTEROPSIDA
1. Plants with male (pollen-producing) and female (ovuliferous) structures in flowers or cones; fertilised ovules forming seeds
(DIVISION 2, SPERMATOPHYTA)
 3. Seeds naked; carried on cone scales; no perianth
SUBDIVISION GYMNOSPERMAE
 3. Seeds enclosed in an ovary; usually with a perianth forming the outer parts of a flower
(ANGIOSPERMAE)
 4. Embryo with one cotyledon; leaves usually with parallel nerves; perianth frequently of two whorls of three parts each CLASS MONOCOTYLEDONAE
 4. Embryo with two cotyledons; nerves of the leaves branching pinnately and often reticulate; perianth usually in one or two whorls of four or five parts each CLASS DICOTYLEDONAE

CLASS LYCOPSIDA

1. Spores of one kind only (homosporous) LYCOPODIACEAE 1.
1. Spores of two kinds, each produced in a different class of sporangium (megaspores and microspores)
 2. Leaves all basal ISOETACEAE 2.
 2. Leaves cauline SELAGINELLACEAE 3.

CLASS PTEROPSIDA

1. Spores of two types; sporangia borne in erect or sessile woody conceptacles or singly in leaf axils.
 2. Leaves c. 2 mm long, imbricate along branches; plants free-floating AZOLLACEAE 17.
 2. Leaves more than 1 cm long, not imbricate; plants rooted in substrate MARSILEACEAE 18.
1. Spores of one type; sporangia borne on the undersurface of leaves or on non-woody erect spikes or combs.
 3. Sporangia borne on a spike or comb-like structure.
 4. Sporangia thick-walled, lacking an annulus and opening by a slit. OPHIOGLOSSACEAE 4.
 4. Sporangia thin-walled, annulus terminal SCHIZAEACEAE 7.
 3. Sporangia scattered or aggregated into groups on the undersurface of the leaf.

- 5. Sporangia not protected by an indusium or modified leaf margin even when immature.
 - 6. Fronds pseudodichotomously branched GLEICHENIACEAE 6.
 - 6. Fronds pinnate to tripinnate.
 - 7. Stem short, erect; two stipule-like structures present at base of stipe OSMUNDACEAE 5.
 - 7. Stem tufted or creeping; stipule-like structures absent.
 - 8. Rhizome and/or fronds bearing scales ADIANTACEAE 9.
 - 8. Rhizome and fronds bearing hairs only DENNSTAEDTIACEAE 13.
- 5. Sporangia protected by an indusium or modified leaf margin at least when immature.
 - 9. Sorus marginal or submarginal.
 - 10. Arborescent ferns developing a tall thick caudex; indusium 2-lipped DICKSONIACEAE 8.
 - 10. Non-arborescent ferns, caudex not developed; indusium variable but not 2-lipped.
 - 11. Indusium (true) opening towards the margin LINDSAEACEAE 14.
 - 11. Indusium opening towards the costa.
 - 12. Fronds lanceolate to narrow-triangular, bipinnate to decompound.
 - 13. Rhizome short, erect, densely scaly; sori borne on a vascular commissure joining the vein endings PTERIDACEAE 15.
 - 13. Rhizome long-creeping, usually hairy (but scaly in *Histiopteris*); sori terminal on free veins DENNSTAEDTIACEAE 13.
 - 12. Fronds linear-oblong to narrow-lanceolate, pinnatifid to pinnate or if bipinnate to tripinnate the segments on long filiform stalks.
 - 14. Sori terminal on free veins; fronds uniform ADIANTACEAE 9.
 - 14. Sori borne on vascular commissures parallel to the costa; fronds slightly or markedly dimorphic BLECHNACEAE 12.
 - 9. Sorus superficial.
 - 15. Sorus linear ASPLENIACEAE 11.
 - 15. Sorus orbicular.
 - 16. Indusium hairy THELYPTERIDACEAE 16.
 - 16. Indusium glabrous ASPIDIACEAE 10.

CLASS MONOCOTYLEDONAE

- 1. Free-floating fresh-water plants.
 - 2. Leaves at least 5 cm long, with a large bladder-like petiole PONTEDERIACEAE 41.
 - 2. Leaves not differentiated from the stems; plant thallus-like, to 15 mm long LEMNACEAE 35.
- 1. Terrestrial or aquatic but not free-floating.
 - 3. Fully submerged aquatics or rooted in water but with leaves or flowers floating.

- 4. Perianth 4; stipules axillary POTAMOGETONACEAE 25.
- 4. Perianth 0-3 or 6; stipules 0 or paired.
 - 5. Root-stock tuberous; perianth-segment showy, petaloid, c. 15 mm long, single APONOGETONACEAE 28.
 - 5. Root-stock rhizomatous; perianth 0 or bract-like or petaloid and less than 8 mm long.
 - 6. Leaves stipulate ZANNICHELLIACEAE 23.
 - 6. Leaves exstipulate.
 - 7. Flowers bisexual.
 - 8. Stems and rhizomes covered with long persistent fibres; carpel 1 POSIDONIACEAE 24.
 - 8. Stems and rhizomes without fibres; carpels at least 4, free RUPPIACEAE 26.
 - 7. Flowers unisexual.
 - 9. Perianth-segments 0 or 2; leaves alternate or sub-opposite.
 - 10. Leaves entire; marine ZOSTERACEAE 22.
 - 10. Leaves toothed; fresh-water NAJADACEAE 27.
 - 9. Perianth-segments 3 or 6; leaves basal, opposite or whorled HYDROCHARITACEAE 31.
- 3. Terrestrial or aquatic but then with leaves and flowers supported above the water surface.
 - 11. Perianth 0.
 - 12. Flowers in dense spikes divided into a male region above or below a female region.
 - 13. Spike subtended by a large spathe (arums) ... ARACEAE 34.
 - 13. Spike without a spathe (bulrushes) TYPHACEAE 21.
 - 12. Flowers solitary or in spikes, racemes, panicles or umbels, but if unisexual then the sexes not separated into separate parts of a cylindrical spike.
 - 14. Ligule at base of leaf-blade; leaf-base surrounding stem but the margins not fused GRAMINEAE 32.
 - 14. Ligule 0; leaf-base usually completely encircling and fused round stems CYPERACEAE 33.
 - 11. Perianth present.
 - 15. Ovary superior.
 - 16. Perianth conspicuous, petaloid; flowers bisexual.
 - 17. Anthers 6
 - 18. Carpels 3, fused LILIACEAE 43.
 - 18. Carpels 6 or more, free ALISMATACEAE 30.
 - 17. Anthers 3
 - 19. Leaves basal, linear XYRIDACEAE 38.
 - 19. Leaves cauline, linear-lanceolate to ovate COMMELINACEAE 40.
 - 16. Perianth membranous, scale-like or of bristles or filaments; flowers bisexual or unisexual.
 - 20. Perianth of bristles or filaments or fused to form a sack-like structure enclosing the ovary and fruit.
 - 21. Perennials or annuals; leaf-sheath tubular CYPERACEAE 33.
 - 21. Small annuals; leaf-sheath open on one side CENTROLEPIDACEAE 37.

- 20. Perianth of scale-like segments.
 - 22. Flowers unisexual, if bisexual the inflorescence a dense spike at least 30 cm long.
 - 23. Leaves well-developed, linear (in *Lomandra juncea* stems form simple leaf-like structures), radical or in a rosette terminating massive stems.
 - 24. Dioecious or flowers bisexual in spikes at least 30 cm long LILIACEAE 43.
 - 24. Monoecious ERIOCAULACEAE 39.
 - 23. Leaves all reduced to scales, on rhizomes and long aerial stems; dioecious RESTIONACEAE 36.
 - 22. Flowers bisexual, inflorescence various but if a dense spike then less than 30 cm long.
 - 25. Carpels fused.
 - 26. Ovules numerous; inflorescence branched or flowers clustered JUNCACEAE 42.
 - 26. Ovules 1 in each locule; inflorescence a raceme or spike JUNCAGINACEAE 29.
 - 25. Carpels free ALISMATACEAE 30.
- 15. Ovary inferior.
 - 27. Male and female structures combined in a central complex, the column; anther 1 ORCHIDACEAE 48.
 - 27. Male and female structures separate; anthers 3-12.
 - 28. Anthers 3 IRIDACEAE 47.
 - 28. Anthers 6-12.
 - 29. Water plants with floating leaves HYDROCHARITACEAE 31.
 - 29. Terrestrial plants; if growing in water then leaves erect above water surface.
 - 30. Inflorescence an umbel AMARYLLIDACEAE 44.
 - 30. Flowers solitary or inflorescence a panicle.
 - 31. Plant, including the solitary flowers, to 25 cm high HYPOXIDACEAE 45.
 - 31. Plant, including panicle, 6 m or more high AGAVACEAE 46.

CLASS DICOTYLEDONAE

(Family numbers are those used in the second edition)

- 1. Stems jointed, ridged; leaves reduced to whorls of scale-like teeth CASUARINACEAE 33.
- 1. Not as above.
 - 2. Flowers numerous, enclosed within a hollow fleshy receptacle; trees with latex (figs) MORACEAE 34.
 - 2. Flowers exposed or concealed by bracts.
 - 3. Plants entirely parasitic for their mineral and water requirements.

4. Erect leafless root parasites OROBANCHACEAE 103.
4. Parasitic on the aerial parts of the host.
 5. Leafless twiners.
 6. Perianth in whorls of 4 or 5 CONVOLVULACEAE 95.
 6. Perianth in whorls of 3 LAURACEAE 50.
 5. Not twining, usually producing leaves LORANTHACEAE 309.
3. Plants not parasitic (if partially so, then possessing both normal roots and chlorophyll).
 7. Flowers unisexual and arranged within a cup-shaped collection of connate bracts; a number of male flowers on articulate filaments surrounding a female flower consisting of a solitary stipitate 3-celled ovary EUPHORBIACEAE 68.
 7. Not as above.
 8. Perianth 0 or in 1 or more whorls but if in 2 whorls then not differentiated into a calyx and corolla (excluding the Compositae which are characterised by having a bifid style and florets in a capitulum).
 9. Flowers unisexual.
 10. Perianth 0.
 11. Large woody shrubs or trees.
 12. Leaves opposite OLEACEAE 90.
 12. Leaves alternate SALICACEAE 33A.
 11. Small, usually aquatic, herbs CALLITRICHACEAE 69.
 10. Perianth present.
 13. Leaves opposite or whorled.
 14. Stipules interpetiolar; ovary inferior RUBIACEAE 108.
 14. Stipules 0 or not interpetiolar; ovary superior.
 15. Leaves whorled CERATOPHYLLACEAE 48.
 15. Leaves opposite or in a half-whorl.
 16. Leaves compound RANUNCULACEAE 49.
 16. Leaves simple.
 17. Herbs with stinging hairs; style simple, stamens 4 URTICACEAE 35.
 17. Shrubs or herbs; styles or style-branches 2 or 3; stamens 3-numerous EUPHORBIACEAE 68.
 18. Ovary with 3 locules EUPHORBIACEAE 68.
 18. Ovary with 1 locule CHENOPODIACEAE 41.
 13. Leaves alternate.
 19. Large trees; fruit a large nut enclosed in a cup below (acorn) FAGACEAE 33B.
 19. Shrubs, herbs or trees; fruit not as above.
 20. Stipules more or less scarious, united into a sheath POLYGONACEAE 40.
 20. Stipules free or absent.
 21. Perianth-tube long and narrow, petal-like THYMELAEACEAE 81.
 21. Perianth-tube 0 or short and not petal-like.

KEY TO THE FAMILIES

- 22. Trees or shrubs; perianth-tube broadly campanulate, petal-like STERCULIACEAE 75.
- 22. Not usually trees; perianth not as above.
 - 23. Carpels more or less free; anthers more numerous than perianth-segments GYROSTEMONACEAE 44A.
 - 23. Carpels 1 or fused; anthers usually not more numerous than perianth-segments.
 - 24. Stipules present.
 - 25. Receptacular tube 0; fruit a capsule EUPHORBIACEAE 68.
 - 25. Perianth and stamens inserted on a receptacular tube; fruits fleshy RHAMNACEAE 72.
 - 24. Stipules absent.
 - 26. Stigma sessile SANTALACEAE 37.
 - 26. Stigma(s) borne on 1-3 styles.
 - 27. Anthers 6-15; style 1, simple SAPINDACEAE 71.
 - 27. Anthers fewer than 6; styles 2-3 or 1 and branched.
 - 28. Perianth scarious AMARANTHACEAE 42.
 - 28. Perianth herbaceous..... CHENOPODIACEAE 41.
- 9. Flowers (or at least some flowers in each inflorescence) bisexual.
 - 29. Spiny stem-succulents with numerous sepals, petals and stamens CACTACEAE 45A.
 - 29. Not as above.
 - 30. Stamens more numerous than perianth-segments.
 - 31. Perianth 0; stamens 2 OLEACEAE 90.
 - 31. Not as above.
 - 32. Perianth-segments 4 on a long tube; anthers 8..... THYMELAEACEAE 81.
 - 32. Perianth-segments usually 5-8 (petaloid staminodes sometimes numerous), if 4 then not on a long tube and anthers more than 8.
 - 33. Carpels several, free PHYTOLACCACEAE 44.
 - 33. Carpels 1 or fused.
 - 34. Leaves opposite.

- 35. Ovary 2- or more-celled, if 1-celled the leaves with dilated scarious stipule-like bases AIZOACEAE 45.
- 35. Ovary 1-celled; leaf-bases not dilated and scarious CARYOPHYLLACEAE 47.
- 34. Leaves alternate.
 - 36. Style 1, unbranched SAPINDACEAE 71.
 - 36. Styles 2 or more or single and deeply divided.
 - 37. Stipules membranous and ensheathing POLYGONACEAE 40.
 - 37. Stipules 0, minute and caducous or well-developed but not membranous and ensheathing.
 - 38. Stipules well-developed and persistent ROSACEAE 59.
 - 38. Stipules 0 or minute and caducous.
 - 39. 1 ovule in each locule AIZOACEAE 45.
 - 39. Several ovules in each cell MOLLUGINACEAE 45.
- 29. Stamens equal in number to perianth-segments or fewer.
 - 40. Ovary entirely or almost entirely inferior; stipules present.
 - 41. Perianth segments in 2 whorls of 4 ... ROSACEAE 59,
 - 41. Perianth segments 5.
 - 42. Inflorescence an umbel UMBELLIFERAE 86.
 - 42. Inflorescence cymose RUBIACEAE 108.
 - 43. Leaves opposite RUBIACEAE 108.
 - 43. Leaves alternate RHAMNACEAE 72.
 - 40. Ovary superior (or, if rarely inferior or half-inferior either stipules absent or perianth-segments and anthers not 5).
 - 44. Styles or style-branches more numerous than ovary locules.
 - 45. Leaves opposite, subulate CARYOPHYLLACEAE 47.
 - 45. Leaves alternate (if opposite then flat).
 - 46. Stipules present.
 - 47. Stipules scarious, ensheathing POLYGONACEAE 40.
 - 47. Stipules paired and not ensheathing.
 - 48. Latex produced EUPHORBIACEAE. 68.
 - 48. Latex not produced RHAMNACEAE 72.

KEY TO THE FAMILIES

- 46. Stipules 0.
 - 49. Perianth herbaceous CHENOPODIACEAE 41.
 - 49. Perianth scarious AMARANTHACEAE 42.
- 44. Styles or style-branches equal to ovary locules or fewer.
 - 50. Stipules 0.
 - 51. Ovary locules 1
 - 52. Perianth-segments 4 and anthers 2 or 8 THYMELAEACEAE 81.
 - 52. Perianth-segments 4 and anthers 4, or perianth-segments 3 or 5.
 - 53. Either ovary inferior or stigma sessile SANTALACEAE 37.
 - 53. Ovary superior and style developed.
 - 54. Perianth-segments 4 PROTEACEAE 36.
 - 54. Perianth-segments 5.
 - 55. Perianth partly petaloid, lower part persistent and hardening NYCTAGINACEAE 43.
 - 55. Perianth scarious AMARANTHACEAE 42.
 - 51. Ovary locules at least 2 AIZOACEAE 45.
 - 50. Stipules present.
 - 56. Stigma sessile URTICACEAE 35.
 - 56. Stigma on 1 or more well-developed styles.
 - 57. Ovules several in each of 3-5 locules MOLLUGINACEAE 45.
 - 57. Ovules 1 or 2 in each of 1-3 cells.
 - Leaves compound or deeply divided ROSACEAE 59.
 - Leaves entire or almost so STERCULIACEAE 75.
 - 8. Perianth consisting of a calyx and a corolla whorl.
 - 58. Flowers in a capitulum; ovary inferior; style bifid; corolla tubular COMPOSITAE 117.
 - 58. Not as above.
 - 59. Petals (or at least 1 or more of them) free GROUP A.
 - 59. Petals all fused to form a complete ring or broken on one side only GROUP B.

GROUP A

- 1. Ovary inferior.
 - 2. Inflorescence an umbel.
 - 3. Woody climbers with palmately veined leaves ARALIACEAE 86A.
 - 3. Herbs UMBELLIFERAE 86.
 - 2. Inflorescence a head, racemose or cymose.
 - 4. Stipules distinct.
 - 5. Spines along branches ROSACEAE 59.

- 5. Spineless or with branches terminating in spines . . RHAMNACEAE 72.
- 4. Stipules absent.
 - 6. Herbaceous; if slightly woody then the torus conspicuously winged.
 - 7. Styles 2-4, very short; stigma papillose or plumose HALORAGACEAE 85.
 - 7. Style 1, long; stigma capitate or lobed ONAGRACEAE 84.
 - 6. Woody shrubs or trees with aromatic oil-cells in the leaves MYRTACEAE 83.
- 1. Ovary superior or half-inferior.
 - 8. Styles 2 or more.
 - 9. Ovary locule 1 (despite carpels occasionally being incompletely fused).
 - 10. Leaves with stalked glands (insectivorous) DROSERACEAE 55.
 - 10. Leaves without stalked glands.
 - 11. Dioecious ANACARDIACEAE 73.
 - 11. Flowers bisexual.
 - 12. Sepals 2 PORTULACACEAE 46.
 - 12. Sepals 4 or 5.
 - 13. Flowers regular.
 - 14. Stamens up to 10; leaves without oil-glands CARYOPHYLLACEAE 47.
 - 14. Stamens numerous; leaves with oil-glands GUTTIFERAE 77.
 - 13. Flowers irregular RESEDACEAE 54.
 - 9. Ovary locules 2 or more or carpels free.
 - 15. Leaves opposite or whorled.
 - 16. Carpels free.
 - 17. Small herbs CRASSULACEAE 56.
 - 17. Woody shrubs RUTACEAE 65.
 - 16. Carpels fused.
 - 18. Ovary locules 2.
 - 19. Shrub with trifoliate leaves (appearing as a whorl of 6 simple leaves) BAUERACEAE 57.
 - 19. Tree with simple leaves ACERACEAE 70A.
 - 18. Ovary locules 3-5.
 - 20. Stamens 3; leaves stipulate ELATINACEAE 78.
 - 20. Stamens 4 or more; leaves exstipulate RUTACEAE 65.
 - 15. Leaves alternate or radical.
 - 21. Carpels free or largely so.
 - 22. Spiny woody plants ROSACEAE 59.
 - 22. Spineless, woody or herbaceous.
 - 23. Shrubs; leaves with conspicuous oil-glands RUTACEAE 65.
 - 23. Herbs or woody; leaves lacking oil-glands.
 - 24. Carpels several to numerous; herbs RANUNCULACEAE 49.
 - 24. Carpels 2-3; shrubs DILLENACEAE 76.
 - 21. Carpels strongly fused.
 - 25. Stipules distinct; usually with stellate hairs.
 - 26. Stamens 5; anthers 2-celled (4 locules) STERCULIACEAE 75.
 - 26. Stamens numerous; anthers 1-celled (2 locules) MALVACEAE 74.

25. Stipules 0 or minute and caducous; glabrous
or with simple hairs.
27. Anthers 5 LINACEAE 63.
27. Anthers 10 OXALIDACEAE 62.
8. Style 1 or stigmata sessile.
28. Ovary locule 1, sometimes incompletely divided.
29. Ovary half-inferior ROSACEAE 59.
29. Ovary superior.
30. Ovules along one suture of the ovary only LEGUMINOSAE 60.
30. Ovules along several parietal placentas or
basal or on a free central placenta.
31. Leaves opposite; flowers regular.
32. Stamens numerous CISTACEAE 79A.
32. Stamens 4-6 FRANKENIACEAE 79.
31. Leaves alternate or radical; if opposite (very
rarely) flowers irregular.
33. Sepals 2; petals 5 PORTULACACEAE 46.
33. Sepals 3 or more; if 2 then petals 4.
34. Stamens 5.
35. Leaves stipulate VIOLACEAE 80.
35. Leaves exstipulate PITTOSPORACEAE 58.
34. Stamens 6 or more.
36. Sepals 2 or 3.
37. Stamens 12 or more; flowers
regular PAPAVERACEAE 51.
37. Stamens 6; flowers irregular FUMARIACEAE 51A.
36. Sepals 4 CAPPARIDACEAE 52.
28. Ovary completely divided into 2 or more locules or
carpels wholly or partly free.
38. Petals 3; sepals 5 POLYGALACEAE 67.
38. Petals 4 or 5; sepals 4 or 5.
39. Anthers up to twice as many as petals.
40. Anthers 4-6.
41. Ovary with 2 locules.
42. Perianth and stamens on a tubular
receptacle-tube LYTHRACEAE 82.
42. Perianth and stamens arising at base of
ovary.
43. Sepals 4, petals 4 CRUCIFERAE 53.
43. Sepals 5, petals 5 PITTOSPORACEAE 58.
41. Ovary with 3-5 locules.
44. Leaves opposite.
45. Leaves compound; stipulate ZYGOPHYLLACEAE 64.
45. Leaves simple; exstipulate RUTACEAE 65.
44. Leaves alternate or radical.
46. Anthers 4.
47. Leaves pinnately compound MELIANTHACEAE 71A.
47. Leaves simple AQUIFOLIACEAE 73A.
46. Anthers 5.
48. Glabrous annual STACKHOUSIACEAE 70.

- 48. Various hairy (on leaves and/or calyx) perennials or annuals; if glabrous then a dioecious shrub.
- 49. 2 or more ovules in each locule STERCULIACEAE 75.
- 49. 1 ovule in each locule.
- 50. Woody glabrous dioecious shrub..... RHAMNACEAE 72.
- 50. Herbaceous hairy plants with bisexual flowers..... GERANIACEAE 61.
- 40. Anthers 8-10.
- 51. Ovary with 2 locules.
- 52. Ovules 1 or 2 in each locule.
- 53. Anthers opening by a terminal pore; glabrous or with simple hairs..... TREMANDRACEAE 66.
- 53. Anthers dehiscing longitudinally; hairs stellate..... RUTACEAE 65.
- 52. Ovules numerous in each locule; anthers dehiscing longitudinally..... LYTHRACEAE 82.
- 51. Ovary with 3-5 locules.
- 54. Stamens 8; petals 5.
- 55. Shrubs or trees, with compound leaves..... SAPINDACEAE 71.
- 55. Herbs with peltate leaves..... TROPAEOLACEAE 62A.
- 54. Stamens 10; if 8 then petals 4.
- 56. Herbaceous or softly woody; styles separating from a central column when seeds mature..... GERANIACEAE 61.
- 56. Woody shrubs or trees; style simple, not as above.
- 57. Leaves simple; ovary with 2 or 5 locules; exstipulate..... RUTACEAE 65.
- 57. Leaves compound; if simple then ovary with 3 locules.
- 58. Exstipulate..... MELIACEAE 65A.
- 58. Stipulate..... ZYGOPHYLLACEAE 64.
- 39. Anthers more than twice as many as petals.
- 59. Stamens numerous, united in a tube..... MALVACEAE 74.
- 59. Stamens up to 15, free..... ZYGOPHYLLACEAE 64.

GROUP B

- 1. Ovary inferior or half-inferior.
- 2. Flowers unisexual..... CUCURBITACEAE 112.
- 2. Flowers bisexual.
- 3. Leaves opposite, with interpetiolar stipules, or leaves whorled..... RUBIACEAE 108.
- 3. Leaves alternate or opposite but stipules 0 or not interpetiolar.
- 4. Stamens opposite petals and of the same number PRIMULACEAE 88.

4. Stamens alternating with and sometimes fewer than the petals.
5. Stamens 4 or 5, if 3 then the petals also 3.
6. Style terminated by a cup-shaped or 2-lipped indusium. GOODENIACEAE 114.
6. Style simple, notched or 2- or 3-lobed.
7. Ovary with 1 locule DIPSACACEAE 111.
7. Ovary with 2-5 locules.
8. Herbs CAMPANULACEAE 113.
8. Trees, shrubs or woody climbers CAPRIFOLIACEAE 109.
5. Stamens 1-3; petals 5.
9. Leaves alternate or radical STYLIDIACEAE 116.
9. Leaves opposite VALERIANACEAE 110.
1. Ovary superior.
10. Stamens fewer than petals.
11. Anthers and ovary-locules 1 or 2.
12. Leaves radical; small herbs LENTIBULARIACEAE 104.
12. Leaves opposite; trees, shrubs, woody climbers or large herbs.
13. Herbs; anther-lobes at different levels on the filaments ACANTHACEAE 105.
13. Woody plants; anthers normal OLEACEAE 90.
11. Anthers and/or ovary-locules more than 3.
14. Sepals 2; corolla regular, split down one side. PORTULACACEAE 46.
14. Perianth characters not as above.
15. Anthers 3; leaves alternate OLACACEAE 38.
15. Anthers 2 or 4; leaves opposite or less often alternate.
16. Style arising between the 4 ovary lobes. LABIATAE 98.
16. Style terminal.
17. Leaves compound BIGNONIACEAE 101.
17. Leaves simple.
18. Woody shrubs or small trees; fruits more or less succulent.
19. Flowers in the axils of bracts; bracteoles present CHLOANTHACEAE 97A.
19. Flowers in the axils of normal leaves; bracteoles absent MYOPORACEAE 106.
18. Herbs often large and slightly woody near the base; fruit dry.
20. Fruit with long curved beak MARTYNIACEAE 102A.
20. Fruit not beaked.
21. Fruit spiny PEDALIACEAE 102.
21. Fruit not spiny.
22. Corolla regular; fruit of 4 nutlets VERBENACEAE 97.
22. Corolla zygomorphic; fruit a capsule SCROPHULARIACEAE 100.
10. Stamens equal to or more numerous than petals.
23. Stamens numerous.
24. Stamens more conspicuous than perianth; flowers in dense globular to cylindrical spikes; trees or shrubs *LEGUMINOSAE 60.

- 24. Stamens less conspicuous than perianth; flowers racemose; herbs RANUNCULACEAE 49.
- 23. Stamens 10 or fewer.
 - 25. Stamens at least twice as numerous as petals.
 - 26. Flowers regular; leaves opposite or whorled.
 - 27. Flowers to 5 mm long ERICACEAE 86A.
 - 27. Flowers at least 10 mm long RUTACEAE 65.
 - 26. Flowers strongly irregular; leaves usually alternate.
 - 28. Petals 5 LEGUMINOSAE 60.
 - 28. Petals 3 POLYGALACEAE 67.
 - 25. Stamens equal to petals in number.
 - 29. Stamens 5, united in a tube bearing fleshy appendages (the corona); pollen consolidated into pollen-masses (the pollinia); usually producing copious latex ASCLEPIADACEAE 94.
 - 29. Stamens and pollen not as above.
 - 30. Ovary locule 1.
 - 31. Sepals 2 PORTULACACEAE 46.
 - 31. Sepals 4 or 5.
 - 32. Styles 5 PLUMBAGINACEAE 89.
 - 32. Styles 1.
 - 33. Stems slender, twining PITTOSPORACEAE 58.
 - 33. Aerial stems erect or 0, or water-plants.
 - 34. Stamens opposite petals PRIMULACEAE 88.
 - 34. Stamens alternating with petals.
 - 35. Leaves opposite.
 - 36. Herbs GENTIANACEAE 92.
 - 36. Trees (mangroves) AVICENNIACEAE 97B.
 - 35. Leaves alternate or radical.
 - 37. Leaves alternate; water plants with an open inflorescence of yellow or pink flowers .. MENYANTHACEAE 92A.
 - 37. Leaves radical; terrestrial plants with a head of blue flowers BRUNONIACEAE 115.
 - 30. Ovary locules 2-5.
 - 38. Leaves all radical; the small flowers in a dense spike on a naked peduncle; corolla scarious PLANTAGINACEAE 107.
 - 38. Leaves alternate, opposite or whorled; inflorescence not as above; corolla herbaceous.
 - 39. Ovary locules 2 or 4.
 - 40. Petals twisted in bud (i.e. aestivation contorted); flowers regular; leaves opposite.
 - 41. Leaves alternate; plants terrestrial CONVULVACEAE 95.
 - 41. Leaves opposite or basal, if alternate then plants aquatic.

KEY TO THE FAMILIES

- 42. Carpels fully united; without latex; small herbaceous annuals GENTIANACEAE 92.
- 42. Carpels free but with their styles sometimes fused; with copious latex; shrubs or perennial herbs. APOCYNACEAE 93.
- 40. Petals valvate or imbricate in bud, but not regularly twisted; flowers regular or irregular; leaves opposite or alternate.
- 43. Ovary with 2 locules.
- 44. Corolla regular.
- 45. Ovules 1 or 2 in each locule... BORAGINACEAE 96.
- 45. Ovules 3 or more in each locule.
- 46. Leaves opposite LOGANIACEAE 91.
- 46. Leaves alternate SOLANACEAE 99.
- 44. Corolla irregular SCROPHULARIACEAE 100.
- 43. Ovary with 4 locules.
- 47. Ovules 1 or 2 in each locule.
- 48. Stamens inserted on a disk at the base of the perianth ... STACKHOUSIACEAE 70.
- 48. Stamens inserted on the corolla-tube.
- 49. Fruit separating into 4 nutlets; glabrous or more often with numerous simple hairs BORAGINACEAE 96.
- 49. Fruit indehiscent, not separating; branched hairs always present CHLOANTHACEAE 97A.
- 47. Ovules 3 or more in each locule SOLANACEAE 99.
- 39. Ovary locules 3 or 5.
- 50. Perennial herbs or annuals; stigmata 3 or 5.
- 51. Leaves entire; glabrous STACKHOUSIACEAE 70.
- 51. Leaves pinnatisect; glandular-hairy POLEMONIACEAE 95A.
- 50. Shrubs; stigma simple, small EPACRIDACEAE 87.

DIVISION I.—PTERIDOPHYTA

(Prepared by R. J. Chinnock)

The Pteridophyta are vascular plants lacking flowers and reproducing by means of spores. The asexual spores of homosporous species germinate and develop into small inconspicuous sexual gametophytes, which may be green filamentous and heart-shaped or whitish tuberous bodies. These produce female archegonia containing a single egg cell and antheridia, which contain numerous sperm. After fertilisation of the egg(s), one (or more rarely a few) sporophytes (the typical fern, club moss, etc.) emerge from the gametophyte. The gametophyte usually dies after the sporophyte becomes established.

In heterosporous species the sporangia are termed microsporangia and megasporangia. In the microsporangia develop the minute microspores and these give rise to the male gametophytes, which form the sperm and in the megasporangia develop the large megaspores (up to 4) which give rise to female gametophytes and the egg cells.

There are four major pteridophyte groups living today:—

1. Psilopsida: 2 genera—*Psilotum* and *Tmesipteris*
2. Sphenopsida: 1 genus—*Equisetum*
3. Lycopsidea: 4 genera—*Lycopodium*, *Phylloglossum*, *Isoetes* and *Selaginella*
4. Pteropsida: Over 310 genera, e.g. *Ophioglossum*, *Schizaea*, *Blechnum* and *Marsilea*

The latter two are represented in S.Aust.

In the Lycopsidea the sporangia occur singly in the axils of the leaves. Those leaves associated with sporangia are generally termed sporophylls and vegetative leaves microphylls. The Lycopsidea are subdivided into two basic groups the Ligulatae and Eligulatae. The Ligulatae represented by *Isoetes* and *Selaginella* possess a ligule towards the base of the leaf and have the heterosporous condition. The Eligulatae represented by *Phylloglossum* and *Lycopodium* lack the ligule and have the homosporous condition.

The Pteropsida or ferns are much more diversified than the Lycopsidea or the two groups of pteridophytes (Psilopsida and Sphenopsida) not represented in S.Aust.

They can be divided into three basic groups (a) Eusporangiatae (b) Osmundidae (or Protoleptosporangiatae) and (c) Leptosporangiatae. The Eusporangiatae is a small group of 9 genera and about 260 species and is represented by *Ophioglossum* and *Botrychium*. They lack the typical circinate (coiled) vernation of the ferns and, in addition, their sporangia are very large and contain thousands of spores.

The Osmundidae consists of 3 genera and about 18 species and is represented by *Todea* in S.Aust. It is an intermediate group between eusporangiate and leptosporangiate ferns. The sporangia are large with many spores, but the plant is fern-like and has the typical circinate vernation of the fronds.

The Leptosporangiatae is the largest group of ferns and the most diversified and consists of over 300 genera and 9 000 species. They are variously divided into many groups on the basis of the structure of the sporangia, leaves and internal structures, but for the purposes of this treatment they can be divided into two basic groups—the homosporous and the heterosporous species. The latter group, the water ferns, is represented by *Azolla*, *Marsilea* and *Pilularia*.

The sporangia of the leptosporangiate ferns (excluding the water ferns) are very small. They contain low numbers of spores (64 or less) and have various mechanisms for ejecting the spores. The sporangia are scattered over the under surface of the frond or are aggregated together to form sori. The position, shape and structure of the sorus is very important in the classification of the groups.



Fig. 1—A, the fern plant (*Adiantum*). B-E, portions of pinnae: B, *Adiantum*, indusium false; C, *Lastreopsis*, true indusium; D, *Pteris*, indusium false; E, *Gleichenia*, exindusiate. F-I, sporangial types: F, *Todea*, annulus lateral; G, *Gleichenia*, annulus transverse; H, *Schizaea*, annulus terminal; I, *Asplenium*, annulus vertical. J, portion of spike of *Ophioglossum* showing fused sporangia dehiscent at right. K, scale from rhizome of *Adiantum*. L and M, eglandular and glandular hairs of *Hypolepis*. N and O, microphyll and sporophyll with sporangium of *Lycopodium*. P, megasporophyll with megasporangium of *Selaginella*. Q, megaspore of *Selaginella gracillima*.

CLASS LYCOPSIDA

Sporophytes consisting of true roots, stem and spirally arranged microphyllous leaves. Sporangia homosporous (*Lycopodium*, *Phylloglossum*) or heterosporous (*Isoetes*, *Selaginella*), borne either on a sporophyll or associated with it.

FAMILY 1.—LYCOPODIACEAE

Small herbaceous perennials with or without a tuber, with microphyllous leaves lacking a ligule. Sporangia homosporous, solitary, more or less (see generic description) reniform, occurring in the axils of the sporophylls which may be modified and aggregated together to form a strobilus. 2 genera.

- | | |
|--|------------------|
| 1. Leaves not fleshy, spirally imbricate | LYCOPODIUM 1. |
| 1. Leaves fleshy, radical | PHYLLOGLOSSUM 2. |

1. LYCOPODIUM L.

Sp.Pl. 1102 (1753).

(Greek *lykos*, wolf; *podion*, little foot; resemblance of leaves to claws.)

Sporophytes terrestrial or epiphytic, perennial, herbaceous, tuber absent, sporophylls (in S. Aust. species) modified, bract-like, aggregated together into strobili; sporangia solitary in the axils of the sporophylls, compressed, more or less reniform, opening by a transverse slit. Cosmopolitan; c. 450 species.

- | | |
|--|----------------------------|
| 1. Stems decumbent or erect,
not appressed to sub-
strate. | |
| 2. Strobili terminal, stems
much branched | <i>L. deuterodensum</i> 1. |
| 2. Strobili lateral, stems
simple or few
branched from near
base..... | <i>L. laterale</i> 2. |
| 1. Stems prostrate, firmly
appressed to substrate .. | <i>L. serpentinum</i> 3. |

1. *L. deuterodensum* Herter, *Index Lycopod.* 15 (1949).

Bushy clubmoss. Rhizome subterranean; aerial branches erect, much branched dichotomously; leaves small, lanceolate, 3-4 mm long; strobilus terminal, erect, 1-2.5 cm long.—*Lycopodium densum* non Lam. (1778), sensu Labill., *Nov.Holl.Pl.Sp.* 2:104; t.251, fig. 1 (1870).

Occurs in New Zealand, New Caledonia, Qld, N.S.W., Vic., Tas. and S.Aust. (known only from a few vegetative collections in the Tepper collection from Milnes Gully near Mount Lofty and Morialta Gully, Southern Lofty region, collected during the 1880's). The species is now considered extinct in this State.

2. *L. laterale* R. Br., *Prod.Fl.Nov.Holl.* 165 (1810). **Slender clubmoss.** Rhizome subterranean; aerial branches usually erect, sometimes sprawling, 10-45 cm long, simple or branched a number of times; leaves linear-subulate, 4-6(-7) mm long; strobili small (in S. Aust. populations), 8-10 mm long.

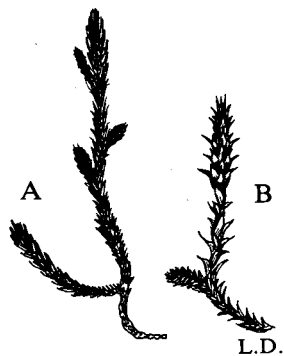


Fig. 2—*Lycopodium*. A, *L. laterale*; B, *L. serpentinum*.

Occurs in New Zealand, New Caledonia, W.Aust., Qld, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty region).

The species occurs in scattered swampy places in the vicinity of Mount Compass and Mount Lofty.

3. *L. serpentinum* Kunze in Lehm., *Pl. Preiss.* 2:108 (1846). **Bog clubmoss.** Rhizome creeping on surface, rooting at branch junctions, firmly appressed to substrate; leaves linear-subulate c. 3 mm long; strobili 1-2 cm long, solitary, on stalks 2-3 cm long.—*L. drummondii* Spring, *Mem. Acad. R. Belg.* 24:35 (1849).

Occurs in New Zealand, W.Aust., Qld, N.S.W., Vic., Tas., and S.Aust. (Southern Lofty region).

Whether or not this species is conspecific with the more widespread *L. carolinianum* L. has not been determined, and some Australian authors use this latter name. Almost extinct in S.Aust. and known only from the vicinity of Mount Compass, where it grows on continuously wet peaty soils.

2. PHYLLOGLOSSUM Kunze

Bot. Zeit. 1:721 (1843).

(Greek *phyllon*, leaf; *glōssa*, tongue.)

Tuber small, annually produced, crowned with a tuft of terete leaves; strobilus solitary, raised on a fleshy peduncle. Monotypic; Australia and New Zealand.

1. *P. drummondii* Kunze, *Bot. Zeit.* 1:721 (1843). **Pigmy clubmoss.** Tuber small, whitish, c. 4 mm diam.; leaves 0.5-1.5 cm long, terete, fleshy, acute; peduncle 1-3 cm long, white, fleshy; strobilus 4-8 mm long, sporophylls imbricate, ovate, acuminate; sporangia reniform.

Occurs in New Zealand, W.Aust., N.S.W., Vic., Tas. and S.Aust. (Southern Lofty region).

This species is found during the winter and spring months on moist sandy or clay soils in the Mount Lofty Ranges, but is uncommon. It is often overlooked because of its small size.



L.D.

Fig. 3—*Phylloglossum drummondii*.

FAMILY 2.—ISOETACEAE

Corm 2-3 (-4)-lobed, roots dichotomously branched; leaves crowning corm, quill-like, ligulate, dilated near the base and enclosing sporangia. Sporangia large, heterosporous; megasporangia occurring towards the outside, microsporangia, if present, occurring in the inner leaves; sporangia covered by a velum or naked; megaspores large, usually white when dry, variously ornamented by tubercules, spines or ridges, more rarely almost smooth; microspores minute, smooth, tuberculed or echinate. 2 genera; *Stylites*, with 2 South American species and *Isoetes*.

1. ISOETES L.

Sp. Pl. 1100 (1753).

(Greek *isos*, alike; *etos*, year; because the submerged species remain the same throughout the year.)

Corm simple, usually bilobed or trilobed; leaves crowded at apex of corm, quill-like, erect or flaccid; megasporophylls surrounding the microsporophylls; sporangia naked or partially or wholly covered by a velum; megaspores large, 0.2-0.8 mm diam., white, grey or in some cases black. About 100 aquatic or amphibious species occurring in permanent or temporary lakes, rivers, rock-holes or on wet soils in temperate and montane tropical regions throughout the world. 8 species in Australia, all but one endemic.

1. Sporangia shiny when mature, dark brown, naked *I. drummondii* 1.
 1. Sporangia whitish, usually semi-transparent; velum covering part
 or all of sporangium *I. muelleri* 2.

1. ***I. drummondii*** A. Braun, *Monatsber. K. Wiss. Berl.* 1863:593 (1864). **Plain quillwort.** Corm (2-) 3-lobed, embedded in the substrate, sporophylls spreading or erect, 5-22 cm long, terete, very dilated at the base, much imbricate and covering inner sporophyll bases; sporangia large, dark brown, shiny, naked; megaspores large, 0.3-0.6 mm diam., white, ornamented with irregular ridges; microspores usually present, dark brown.

Occurs in Vic. and S.Aust. (Southern Lofty and S.E. regions). This species occurs in wet depressions subject to flooding and may be found during the winter and spring months.

2. ***I. muelleri*** A. Braun, *Monatsber. K. Wiss. Berl.* 1868:541 (1868). Corm 2- or 3-lobed, embedded in substrate; sporophylls spreading or erect, 4-32 cm long, terete, imbricate near the base and partially covering the inner sporophyll bases; sporangia variable, orbicular to oblong; megaspores dimorphic, 0.25-0.7 mm diam., white, ornamentation variable, irregularly ridged; microspores usually absent.—*I. humilior* non F. Muell. ex A. Braun, sensu Willis, *Handbook Pl. Vic.* 1:53 (1962).

Occurs in all Australian States. In S.Aust. it is known from the Eyre Pen. (near Port Augusta and Carrappee Hill) and S.E. regions. A polymorphic species very variable in size; in S.Aust. the sporophylls are usually 5-15 cm long. The species is apomictic and often forms extensive colonies.

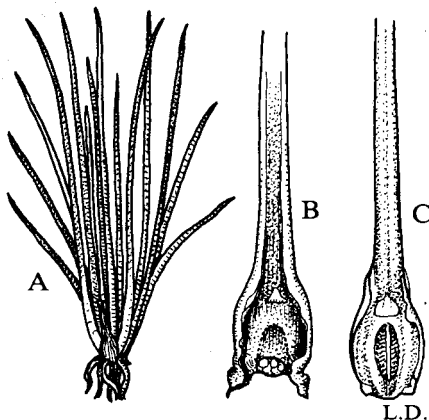


Fig. 4—Isoetes. A, habit. Sporophylls: B, *I. muelleri*; C, *I. drummondii*.

FAMILY 3.—SELAGINELLACEAE

Rhizomatous perennials (more rarely annuals) with simple microphyllous cauline, ligulate leaves. Sporangia heterosporous, solitary in the axils of the sporophylls usually aggregated together into a strobilus. One cosmopolitan genus, c. 700 species.

1. SELAGINELLA Beauv.

Mag. Encycl. 4:478 (1804).

(Diminutive of *selago*, the Latin name of a plant believed to be *Lycopodium selago*.)

Sporophytes usually terrestrial, annual or perennial, herbaceous; leaves microphyllous, spirally arranged but commonly dimorphic (e.g. *S. kraussiana*) with the lateral leaves 2 ranked and the third row much smaller and scale-like on the lower surface; sporophylls aggregated together to form strobili; sporangia variously arranged in strobilus, solitary in the bases of sporophylls, globular or compressed.

1. Leaves alike, spirally arranged; stems erect *S. gracillima* 1.
 1. Leaves dimorphic, 2-ranked; stems creeping *S. kraussiana* 2.

1. *S. gracillima* (Kunze) Alston, *J.Bot., Lond.* 69:257 (1931). **Tiny selaginella.** Sporophyte annual; stems simple or forked once or twice, erect, 2-8 cm long; leaves lanceolate, c. 1.5 mm long; sporophylls occupying most of the stem, not aggregated into a defined strobilus; microsporangia and megasporangia mixed.—*Lycopodium gracillimum* Kunze in Lehm., *Pl.Preiss.* 2:109 (1846); *S. preissiana* Spring, *Mem.Acad.R.Belg.* 24:61 (1849).

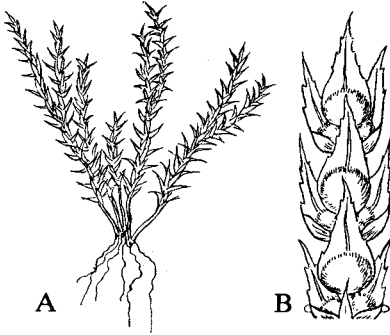


Fig. 5—*Selaginella gracillima*. A, habit; B, portion of strobilus.

Occurs in W.Aust., Qld, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty and S.E. regions). Growing in moist shaded situations near creeks and swamps. Often overlooked because of its size.

*2. *S. kraussiana* (Kunze) A. Braun, *Ind.Sem.Hort.Berol.* 22 (1859). **Garden selaginella.** Sporophyte perennial; stems prostrate, creeping, repeatedly branched; leaves dimorphic, the larger leaves in 2 rows, ovate, 2-4 mm long, the smaller leaves appressed to undersurface, 1-2 mm long; one megasporangium at the base of each strobilus, microsporangia numerous. *Lycopodium kraussianum* Kunze, *Linnaea* 18:114 (1844).

Native to Africa. A well established garden escape in Qld, N.S.W., Vic. and S.Aust. (Southern Lofty region).

CLASS FILICOPSIDA

Sporophytes herbaceous or arborescent, consisting of true roots, stem and macrophyllous leaves (fronds). Homosporous or more rarely heterosporous; sporangia scattered on the undersurface of leaves, aggregated into clusters (sori) or arranged on specialised structures or on modified leaves.

FAMILY 4.—OPHIOGLOSSACEAE

Sporophytes herbaceous, perennial, terrestrial (more rarely epiphytic); rhizome short, erect, hirsute; roots thick and fleshy; fronds simple or divided, composed of a sterile lamina and fertile spike. Sporangia aggregated into a spike, fused together or free; spores thick-walled, very numerous. 3 genera, c. 70 species; cosmopolitan.

- | | |
|--|-----------------|
| 1. Sterile lamina divided, veins free | BOTRYCHIUM 1. |
| 1. Sterile lamina simple, veins anastomosing | OPHIOGLOSSUM 2. |

1. BOTRYCHIUM Sw.

*J.Bot.(Schrader)*1800(2):8(1801).

(Greek *botrys*, a cluster of grapes; alluding to the arrangement of the sporangia.)

Perennial herbs, terrestrial; rhizome short, erect; roots thick and fleshy; fronds solitary, more rarely two, annually produced, pinnate, ternate or decompound; venation open, dichotomous; sporangia thick, free, short-stalked, transversely dehiscing. About 36 species, cosmopolitan; 2 in Australia.

1. **B. australe** R. Br., *Prod. Fl. Nov. Holl.* 164 (1810). **Moonwort.** Frond to 30 cm high, occasionally more; sterile segment spreading, tripartite, 3-pinnate to 3-pinnate-pinnatifid; fertile spike erect, 2-3-pinnate, stalk fleshy; sporangia large, thick, transversely dehiscent.

Occurs in New Zealand, Qld, N.S.W., Vic., Tas. and S.Aust. (known only from a number of sterile collections in the Tate Herbarium, collected by Tepper in 1882 and 1887 at Clarendon and Cemetery Gully near Kangarilla, Southern Lofty region; now considered extinct in S. Aust.).

2. OPHIOGLOSSUM L.

Sp. Pl. 1062 (1753).

(Greek *ophis*, a snake; *glōssa*, a tongue; alluding to the shape of the fruiting spike.)

Rhizome short, erect or prostrate, unbranched, glabrous; sterile frond segment simple, entire, more or less fleshy, glabrous, with reticulate venation, erect, spreading or pendulous; fertile segment arising from the sterile blade or below, stalk fleshy; spike with 2 rows of large embedded sporangia; sporangia opening by transverse splits. About 26 species probably 5 in Australia.

1. Stipe bases not persistent; rhizome with a few brittle dark brown roots; sterile lamina 0.8-3.5 cm long

1. Stipe bases persistent; rhizome with numerous wiry pale yellow-brown roots; sterile lamina 3.5-6 cm long

1. ***O. lusitanicum* L.**, *Sp. Pl.* 1063 (1753). **Austral adder's tongue.** Rhizome short, erect; roots few, thick, producing vegetative buds and often forming large colonies; sterile lamina variable in size and form, 0.8-3.5 cm long, narrow-elliptic or broadly elliptic to lanceolate, in small forms the base cuneate to almost truncate; fertile spike emerging from the base of the sterile lamina or some distance down the petiole; spike 5-15 mm long, 1.5-2.5 mm broad, with 6-15 pairs of sporangia borne on a stalk to 7 cm long.—*O. coriaceum* A. Cunn., *Compan. Bot. Mag.* 2:361 (1837); *O. lusitanicum* subsp. *coriaceum* (A. Cunn.) R. T. Clausen, *Mem. Torrey Bot. Cl.* 19:161 (1938).

Occurs in Europe, Asia, Africa, North and South America, New Zealand, New Caledonia and all Australian States. In S.Aust. it occurs in all regions except the Nullarbor and Gairdner-Torrens. It often forms large colonies on open clay loams, especially in the Southern Lofty, Murray and S.E. regions. It is frequently encountered in ranges where it occurs in shallow soil pockets subject to flooding or amongst rocks or along stream banks; often overlooked because of its small size.

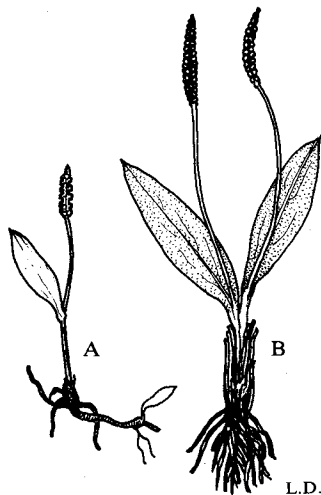


L.D.

Fig. 6—*Botrychium australe*.

O. lusitanicum 1.

O. polyphyllum 2.



L.D.

Fig. 7—*Ophioglossum*. A, *O. lusitanicum*; B, *O. polyphyllum*.

Included under this species is the Tepper specimen referred to *O. nudicaule* L.f. by Clausen (*Mem. Torrey Bot. Cl.* 19, 2:146(1938)) which is considered merely as a small form of *O. lusitanicum*.

2. *O. polyphyllum* A. Braun in Seubert, *Fl. Azor.* 17(1844). Rhizome long, taproot-like, erect; roots numerous, light yellowish-brown, wiry; sterile lamina lanceolate or broadly elliptic, 3-6 cm long, 1.2-1.5 cm broad towards the base, abruptly tapering into petiole; petiole firm, lower parts persistent and forming a brown papery sheath; fertile spikes emerging from the lower part or base of the sterile lamina; spike large, 2-2.5 cm long, 2-3 mm broad, with 12-24 pairs of sporangia, borne on a stalk to 7 cm long.

Occurs in Africa, Arabia, India, W.Aust., N.T., Qld, north-western N.S.W. and S.Aust. (N.W., Flinders Ranges, Nullarbor and Eastern regions).

A solitary species which is never found in large numbers; probably more wide-spread, but poorly collected.

FAMILY 5.—OSMUNDACEAE

Rhizome short, erect, or becoming massive (*Todea*) by development of a thick root-mantle; fronds thick (*Todea*) or membranous (*Leptopteris*), bipinnate to pinnately compound, with two stipular expansions at the base of the stipe; sporangia large, thin-walled, not arranged in sori, maturing together; annulus a small group of subapical cells. 3 genera, c. 20 species; cosmopolitan.

1. *TODEA* Willd.

Abh. Akad. Wiss. Erfurt 1:14 (1802).

(After H. J. Tode, a German cryptogamic botanist.)

Rhizome stout, often becoming large by vegetative budding and development of large root-mantle; fronds large, thick, erect, bipinnate; sporangia restricted to the lower pinnules of the primary pinnae in the lower part of the frond. Monotypic; South Africa, Australia and New Zealand.

1. *T. barbara* (L.) Moore, *Ind. Fil.* 119(1857). **King fern.** Rhizome short, erect, to 30 cm tall (in S.Aust.); fronds to 1.5 m long, lanceolate, clustered together at the top of the rhizome.—*Acrostichum barbarum* L., *Sp. Pl.* 1072 (1753); *Osmunda barbara* Thunb., *Prod. Pl. Cap.* 171(1800); *T. africana* Willd., *Abh. Akad. Wiss. Erfurt* 1:14(1802).

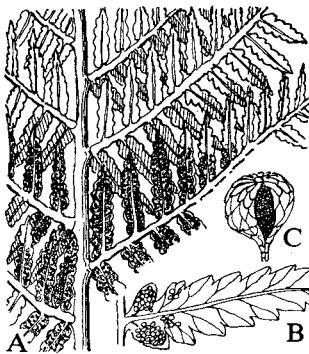


Fig. 8—*Todea barbara*. A, portion of lamina; B, pinnule; C, sporangium.

Occurs in Qld, N.S.W., Vic., Tas., and S.Aust. (Southern Lofty region). This species does not develop to the size attained in the other States. It occurs in a few scattered localities in the Mount Lofty Ranges where it survives along water courses or in swamps. Young plants are occasionally found on damp banks; on the decline in S.Aust.

FAMILY 6.—GLEICHENIACEAE

Rhizome long-creeping, branched, usually sparsely clothed with hairs or scales; fronds once or several times pinnate, often with a dormant hairy or scaly leaf apex; sori of 1-12 large sporangia, exindusiate; annulus transverse or oblique. 5 genera, c. 160 species; cosmopolitan.

1. *GLEICHENIA* Sm.

Mem. Acad. Turin 5:419 (1793).

(After F. W. Gleichen, a German botanist, 1717-1783.)

Rhizome long-creeping, much branched; fronds once forked or pseudodichotomously branched, often interlacing

and forming dense thickets; ultimate segments less than 5 mm long, flat, pouch-like or recurved, oblong to semi-orbicular; sori composed of 1-4 (-6) sporangia. About 10 species; 5 in Australia.

1. ***G. microphylla*** R. Br., *Prod. Fl. Nov. Holl.* 161 (1810). **Coral fern.** Rhizome long-creeping, paleate at first but becoming glabrous, wiry; fronds small, pinnate or bipinnate or developing 2 or more tiers of pinnae and growing to 1-2 m high; the primary pinnae forked once or twice; ultimate segments flat or slightly incurved when dry, c. 1.5 mm long, suborbicular; sori of 2-4 pale yellow sporangia.—*Gleichenia circinata* non Sw., sensu J. M. Black, *Fl. S. Aust.* 39 (1943).

Occurs in Malaya, New Zealand and all Australian States except N.T. In S. Aust. this species occurs in the Southern Lofty, Kangaroo I. and S. E. regions in swamps or along streams. It can form dense thickets to 1.5 m tall in sclerophyll forest but occurs as dense low mounds in open swamps.

FAMILY 7.—SCHIZAEACEAE

Rhizome creeping or erect, clothed with hairs or scales; fronds simple, forked or flabellately dichotomous, vernation circinate; sporangia large, sessile, obovoid or pyriform, arranged in 2-4 rows on a modified sessile or shortly pedicellate comb-like fertile lamina; annulus terminal. 4 genera, c. 150 species; cosmopolitan.

1. SCHIZAEA Sm.

Mem. Acad. Turin 4:419 (1793).

(Greek *schizō*, I split; leaves narrow.)

Rhizome creeping or ascending, covered at first with brown hairs; stipes wiry, usually indistinguishable from lamina; lamina simple, forked or flabellately dichotomous; segments 1-veined; fertile lamina lobed or comb-like; sporangia large, brown, in 2-4 rows. About 36 species; 4 in Australia.

1. Stipe of frond rough, usually divided, angular *S. bifida* 1.

1. Stipe of frond smooth, undivided, terete *S. fistulosa* 2.

1. ***S. bifida*** Willd., *Abh. Akad. Wiss. Erfurt* 1:30, t.3, fig. 3 (1802). **Forked comb-fern.** Rhizome slow-creeping, clad with glossy brown hairs; sterile fronds simple or flabellately dichotomous, the stipe and segments flattened and more or less angular, c. 0.5-1 mm broad, almost smooth to markedly asperous; fertile fronds with 1-5 (usually 2-3) soriferous heads c. 1 cm long, 4-5 mm broad at the base, 2-3 times as long as broad, with 7-10 pairs of fertile lobes.—*S. asperula* N.A. Wakefield, *Victorian Nat.* 59:89 (1942).

Occurs in New Zealand, Qld, N.S.W., Vic., Tas., and S. Aust. (Southern Lofty and S.E. regions). Occasional in swampy or moist soils amongst grasses or *Gleichenia microphylla*. Rare in S. Aust.

2. ***S. fistulosa*** Labill., *Nov. Holl. Pl. Sp.* 2:103; t.250, fig. 3 (1807). **Narrow comb-fern.** Rhizome slow-creeping, clad with glossy dark brown hairs; sterile fronds rare, simple, sub-terete, smooth, or slightly asperous; fertile fronds simple, terminated by a soriferous head 1-2 cm long, 2-4 mm broad, 5-6 times as long as broad, with 10-15 pairs of fertile lobes.

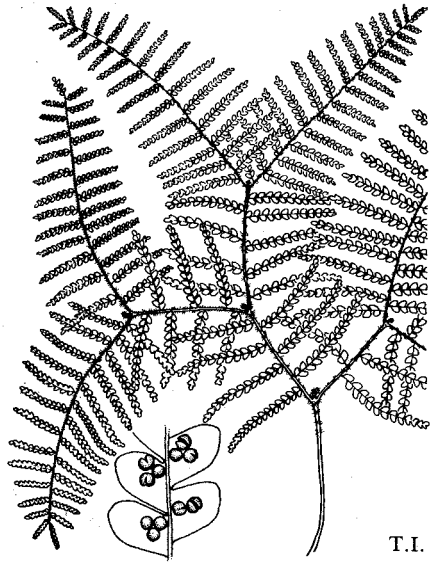


Fig. 9—*Gleichenia microphylla*.

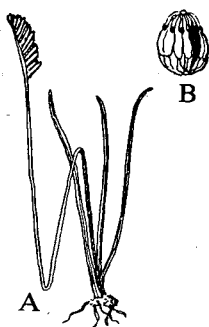


Fig. 10—*Schizaea fistulosa*. A, habit; B, sporangium.

Occurs in South America, Madagascar, New Caledonia, Fiji, Borneo, New Guinea, New Zealand, W.Aust., Qld, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty and S.E. regions).

In S.Aust. this species is usually found on raised soil mounds in swamps or under scrub in moist situations. It is often found associated with *S. bifida*. There are many intermediate forms between these two species in S.Aust. populations.

FAMILY 8.—DICKSONIACEAE

Terrestrial ferns with creeping rhizomes or tree-ferns with erect stems (caudex) often thickened by a mantle of adventitious roots; fronds usually large, decompose; sori marginal, terminal on veinlets, protected by the incurved lobes of the pinnules and an inner indusium. 5 genera, c. 50 species, S.E. Asia, Australasia, Pacific and South America.

1. DICKSONIA L'Herit.

Sert. Angl. 30 (1789).

(After James Dickson, an English botanist.)

Caudex erect and often very thick due to an adventitious root-mantle, more rarely prostrate or creeping; fronds large, decompose, veins free; sori marginal, globular, 1-2 mm diam.; indusium 2-valved, the outer false and formed by the recurved margin, the inner sub-membranous. 30 species, 2 in Australia.

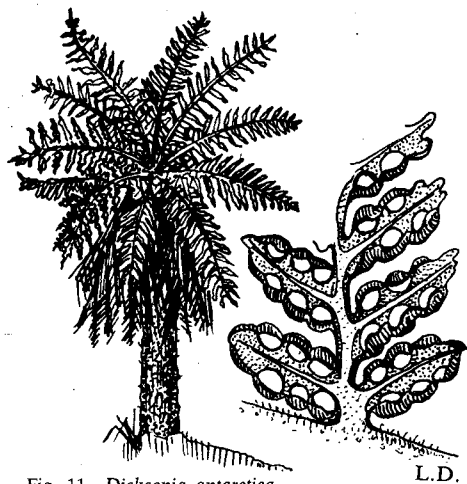


Fig. 11—*Dicksonia antarctica*.

indusium either a reflexed modified marginal flap or the reflexed modified continuous margin of the ultimate segment.

1. Sori marginal, indusium usually present.
 2. Sori discrete, reniform or oblong; pinnules dimidiate to orbicular, distinctly stalked
 2. Sori continuous along the margin or forming broken lines; pinnules oblong, lanceolate or triangular, sessile
1. Sori superficial, indusium absent.
 3. Fronds bipinnatisect, thin, glabrous
 3. Fronds pinnate, thick, scaly

ADIANTUM 1.

CHEILANTHES 3.

ANOGRAMMA 2.

PARACETERACH 4.

1. *D. antarctica* Labill., *Nov. Holl. Pl. Sp.* 2:100; t.249 (1807). **Soft tree-fern.** Aborescent fern with fronds twice to thrice pinnate; pinnules coriaceous; sori marginal, c. 1 mm diam.

Occurs in Qld, N.S.W., Vic., Tas. and S.Aust. (whether this species occurs naturally is still debatable; old records suggest that it did occur in a few scattered locations in the Southern Lofty and S.E. regions; plants were probably removed to grow in gardens.)

FAMILY 9.—ADIANTACEAE

Rhizome creeping or erect, covered with scales or bristle-like or woolly hairs; fronds small, very variable, thin or coriaceous; sori superficial or sub-marginal, exindusiate or with a false indusium, discrete or confluent and forming more or less continuous bands or extending inwards along the veins; false

1. ADIANTUM L.

Sp.Pl. 1094 (1753).(Greek *adiantos*, dry; the leaves remaining dry when dipped in water.)

Rhizome tufted or long-creeping; stipes not articulated to the rhizome, black to brown, often shining, scaly at the base; lamina 1-4-pinnate glabrous or very sparsely hairy (in Australian species); ultimate segments flabellate, cuneate or dimidiate; veins free, dichotomous; sori marginal; indusium false, oblong or reniform. Cosmopolitan; c. 200 species.

1. Sori situated in notches; pinnules flabellate-cuneate to sub-orbicular

A. aethiopicum 1.

1. Sori on the margins between the sinuses; pinnules dimidiate ...

A. capillus-veneris 2.

1. *A. aethiopicum* L., *Syst.Nat.* ed. 10,2:1329 (1759). **Common maiden-hair.** Rhizome slender, creeping, above or below ground; fronds light green, 2-3-pinnate; stipe and rhachis shining brown; pinnules flabellate-cuneate to sub-orbicular, with usually 2-4 large sori in the sinuses; indusium glabrous.

Occurs in Africa, New Zealand, W.Aust., Qld, N.S.W., Vic., Tas. and S.Aust. (Flinders Ranges, Southern Lofty, Kangaroo I. and S.E. regions).

Common on damp clay banks in sclerophyll forest or amongst rocks.

2. *A. capillus-veneris* L., *Sp. Pl.* 1096 (1753). Rhizome slow-growing, thick, covered with dark brown scales; fronds pinnate or bipinnate; stipe and rhachis dark blackish-brown, shining; pinnules dimidiate, shallowly or deeply incised; sori 2-8, oblong, on the margins between the sinuses.

Rare in Australia but widespread in tropical, subtropical and temperate countries. Occurs in W.Aust. (Hamersley Range), Qld (rare) and S.Aust. (Yorke Pen., Murray and S.E. regions). In S.Aust. this species appears to be restricted to limestone. It grows in erosion zones along the Murray River near Blanche Town and in sinkholes and wells on Yorke Pen. and the S.E. of the State.

2. ANOGRAMMA Link

Fil.Sp.Cult. 137 (1841).

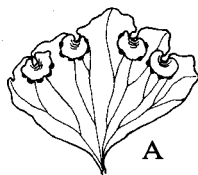
(Greek *ano*, upwards; *grammē*, a writing; alluding to the terminal position of the sori.)

Rhizome very short, erect, with scales or hairs; fronds bipinnate to tripinnate, veins free; sporangia in bands along veins; gametophyte annual or perennial. Widespread in temperate regions, with c. 7 species.

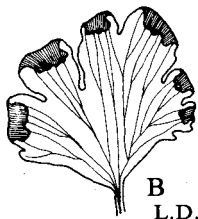
1. *A. leptophylla* (L.) Link, *Fil.Sp.Cult.* 137 (1841). **Annual fern.** Small fern; fronds thin, glabrous, bipinnatisect, ultimate segments obovate-cuneate, more or less deeply lobed; sporangia in rows along the veins; gametophyte perennial.—*Polypodium leptophyllum* L., *Sp.Pl.* 1092 (1753).

Occurs in New Zealand and widespread in the cooler temperate parts of both hemispheres. W.Aust., N.S.W., Vic., Tas. and S.Aust. (Eyre Pen., Southern Lofty and S.E. regions).

Common on damp banks amongst grasses or in rocky crevices.



A



B

L.D.

Fig. 12—*Adiantum* pinnules. A, *A. aethiopicum*; B, *A. capillus-veneris*.

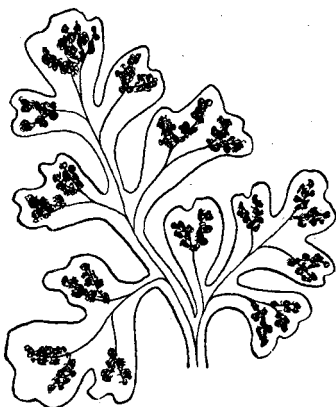


Fig. 13—*Anogramma leptophylla*.

3. CHEILANTHES Sw.

Synops. Fil. 5, 126 (1806).(Greek *cheilos*, a lip; *anthos*, flower; alluding to the lip-like indusium.)

Rhizome short or long-creeping; fronds often crowded together; bipinnatifid to decompose, glabrous, scaly or hairy; sori marginal, borne at the tips of the veins, small, often laterally spreading and becoming irregularly confluent; indusium usually present. About 180 species, at least 11 in Australia.

- | | |
|--|--------------------------|
| 1. Undersurface of lamina glabrous or with sparse scales or hairs. | |
| 2. Fronds few; rhachis and costae (undersurface) with a few scattered stramineous scales | <i>C. tenuifolia</i> 4. |
| 2. Fronds numerous; rhachis and costae (undersurface) with scattered segmented hairs | <i>C. sieberi</i> 3. |
| 1. Undersurface of lamina densely clad with scales or hairs or both. | |
| 3. Rhachis and pinnae with stramineous scales only | <i>C. distans</i> 1. |
| 3. Rhachis and pinnae with white to orange-brown or pale brown hairs with or without scales. | |
| 4. Rhachis and pinnae densely clad in white to orange-brown woolly obscurely septate hairs and scales, which obscure the costae, costules, surface and sporangia | <i>C. lasiophylla</i> 2. |
| 4. Rhachis and pinnae clad in white to pale brown septate eglandular and glandular hairs, which do not obscure the costae, costules, surface and sporangia | <i>C. vellea</i> 5. |

1. *C. distans* (R.Br.) Mett., *Abh. Senckenb. naturf. Ges.* 3:69 (1859). **Bristly cloak-fern.** Rhizome slow-creeping; fronds erect, to 40 cm long, 2-3 cm broad; stipe reddish-brown, shining, slightly grooved above, densely hairy-scaly at first, later almost glabrous; rhachis densely scaly; lamina bipinnatisect, densely scaly on undersurface.—*Notholaena distans* R.Br., *Prod. Fl. Nov. Holl.* 146 (1810).

Occurs in Polynesia, New Zealand, W.Aust., Qld, N.S.W., Vic. and S.Aust. (Flinders Ranges, Eyre Pen., Northern Lofty, Murray and Southern Lofty regions).

Common in rock crevices or on open banks in mountain ranges and smaller hills in drier parts of the State. Often associated with other species of *Cheilanthes*.

2. *C. lasiophylla* Pichi-Serm., *Webbia* 8:209, f.3-6 (1951). **Woolly cloak-fern.** Rhizome slow-creeping; fronds clustered, erect, to 25 cm long; stipe, rhachis and surfaces of lamina densely clad in pale brown scales and hairs, the hairs especially dense on the lower surface of the pinnae.—*Notholaena brownii* non Desv., sensu J. M. Black, *Fl. S. Aust.* 36 (1943).

Occurs in W.Aust., N.T., Qld, N.S.W., Vic. (rare) and S.Aust. (in all regions except the Yorke Pen., Southern Lofty, Kangaroo I. and S.E. regions). Extremely common in S.Aust. in rock crevices or rocky slopes in all mountain ranges and rocky outcrops in the more arid areas. Often associated with *Cheilanthes sieberi* and *Pleurosorus* spp.

3. *C. sieberi* Kunze in Lehm., *Pl. Preiss.* 2:112 (1846). Rhizome slow-creeping; fronds numerous, the old dead ones persisting, clustered, erect, to 40 cm long, 2-5 cm broad at the base of the lamina; stipe, rhachis and primary costae dark brown, shining; stipe scaly towards the base, rhachis and primary costae with scattered segmented hairs, many of which are appressed and

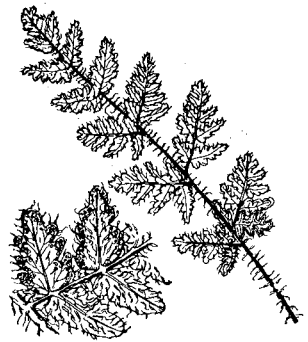


Fig. 14—*Cheilanthes distans*.

glandular; lamina oblong or narrow-lanceolate; pinnae more or less triangular, glabrous except for the primary costa.—*C. clelandii* F. Muell. & Tate, *Trans.R.Soc.S.Aust.* 10:80 (1887).

Occurs in New Zealand, New Caledonia, W.Aust., N.T., Qld, N.S.W., Vic. and S.Aust. (N.W., Lake Eyre, Nullarbor, Flinders Ranges, Eastern, Eyre Pen. and Murray regions).

Occurs in similar situations to *C. lasiophylla* and often associated with it.

4. *C. tenuifolia* (Burm.f.) Sw., *Synops.Fil.* 129, 332 (1806). **Rock fern.** Rhizome slow-creeping; fronds scattered or a few crowded at the tip, erect, drooping or prostrate, dying off during summer and not persisting, narrow-lanceolate to triangular, to 45 cm long, to 16 cm broad at base of lamina; stipe, rhachis, costae and costules brown, shining, sparsely covered with scales; stipe usually becoming glabrous; lamina (excluding costae and costules) glabrous above, and with a few scattered scales below.—*Trichomanes tenuifolia* Burm.f., *Fl.Ind.* 237 (1768).

Occurs in South East Asia, New Zealand, New Caledonia and all Australian States. In S.Aust. it occurs in the Flinders Ranges, Eyre Pen., Northern Lofty, Murray, Yorke Pen., Southern Lofty and S.E. regions; more commonly in the southern moister regions where it often forms extensive carpets on banks and along streams. In the Flinders and Gawler Ranges it overlaps with *C. sieberi* and in these regions of overlap some intermediate forms occur.



Fig. 15—*Cheilanthes tenuifolia*.

Occurs in W.Aust., N. T. and Qld. Although there are no known collections from S.Aust. it is highly likely that this species occurs in the N.W. region. It has been collected just over the border in the northern Musgrave Ranges at Yunumba Hill (Basedow 14.9.1926 AD).

4. PARACETERACH Copel.

Gen.Fil. 75 (1947).

(Greek *para*, similar to; *Ceterach*, a fern genus; alluding to the similarity of this genus to *Ceterach*.)

Rhizome prostrate, scaly; fronds oblong, scattered; stipe and rhachis dark blackish-brown, scaly; lamina pinnate, the pinnae opposite or sub-opposite, orbicular, oblong or broadly oblong, obtuse, entire, becoming glabrescent above, very densely scaly below; the scales ciliate, imbricate; veins free, obscure; sori exindusiate, submarginal, broad, forming a continuous band, obscured by scales. 2 species restricted to Australia.

1. *P. reynoldsii* (F. Muell.) Tindale*. Rhizome prostrate, long-creeping, scaly, the scales linear-subulate, margins pale brown, centre black, thickened;

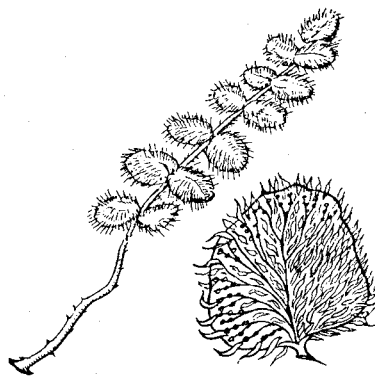


Fig. 16—*Paraceterach reynoldsii*.

*The following contribution has been made by Mary D. Tindale, Royal Botanic Gardens, Sydney:-

Paraceterach reynoldsii (F. Muell.) Tindale, comb. nov.

Basionym: *Nothochlaena* (*Notholaena*) *reynoldsii* F. Muell., *Fragm.Phyt.Aust.* 8:175 (1874).

fronds scattered, linear, to 30 cm long; stipe and rhachis dark blackish-brown, scaly, sometimes becoming glabrescent; pinnae orbicular or oblong, densely scaly especially on the undersurface; sori forming a broad submarginal continuous band, exindusiate, sporangia obscured by scales.—*Nothochlaena* (*Notholaena*) *reynoldsii* F. Muell., *Fragm. Phyt. Aust.* 8:175 (1874); *Grammitis reynoldsii* (F. Muell.) Benth., *Fl. Aust.* 7:775 (1878); *Gymnogramme* (*Gymnogramma*) *reynoldsii* (F. Muell.) J. M. Black, *Fl. S. Aust.* 40 (1922).

Occurs in W.Aust., N.T., Qld and S.Aust. (N.W., Flinders Ranges and Eastern regions).

FAMILY 10.—ASPIDIACEAE

Terrestrial ferns, with an erect or creeping rhizome; fronds uniform or dimorphic; lamina simple to pinnately decompound; stipe, rhachis and costae glabrous, papillate or densely clad with scales and/or hairs; sori usually orbicular, covered by a peltate or reniform indusium, more rarely exindusiate, terminal on veinlets, often basiscopically produced.

- | | |
|--|----------------|
| 1. Fronds pinnate; pinnae falcate..... | CYRTOMIUM 1. |
| 1. Fronds bipinnate to decompound. | |
| 2. Stipe hairy; indusium reniform | LASTREOPSIS 2. |
| 2. Stipe densely scaly; indusium peltate | POLYSTICHUM 3. |

1. CYRTOMIUM C. Presl

Tent. Pter. 86 (1836).

(Greek *kyrtos*, arched; alluding to the habit.)

Rhizome short, erect, densely scaly; fronds pinnate to pinnately compound, coriaceous; veins anastomosing; sori borne on included free veinlets, covered by a peltate indusium. About 12 species in South Africa, Asia to Hawaii; 1 adventive species in Australia.

*1. *C. falcatum* (L.f.) C. Presl, *Tent. Pter* 86 (1836). Rhizome short, erect, densely clad with dark brown scales; fronds to 1 m long; stipe pale brown, scaly; lamina pinnate; pinnule thick and coriaceous; sori scattered on undersurface, rounded, covered with a peltate indusium.—*Polypodium falcatum* L.f., *Suppl.* 446 (1781).

Occurs on shaded banks or in crevices in the Southern Lofty and S.E. regions. It is also well established in N.S.W. on coastal cliffs at Woollongong and in the Sydney region.

2. LASTREOPSIS Ching

Bull. Fan 8:157 (1938).

(From the genus *Lastrea*; Greek *opsis*, looking like.)

L.D.

Terrestrial ferns with an erect, slow- or long-creeping scaly rhizome; fronds decompound, lowermost pinnae markedly basiscopical; veins free, costae raised; rhachis with two prominent ridges; sori rounded, terminal on small veins,

indusiate or rarely exindusiate; indusium reniform to orbicular. About 30 species, cosmopolitan; 11 in Australia (Tindale, *Contr. N.S.W. natn. Herb.* 3:249-339; 1965).

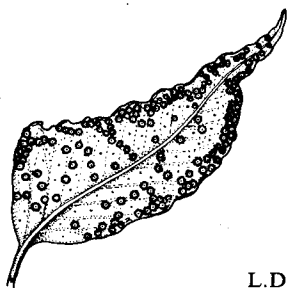


Fig. 17—*Cyrtomium falcatum*.

1. ***L. acuminata*** (Houlston) Morton, *Contr. U.S.natn.Herb.* 38:245 (1973). **Shiny shield-fern.** Rhizome short; fronds clustered, to 45 cm long, lanceolate to narrow-triangular; stipe pale brown, scaly towards the base; lamina glabrous except for rhachis, costae and costules, margins toothed; sori c. 1 mm diam., covered at first by a reniform indusium.—*Lastrea acuminata* Houlston, *Gard.Mag.Bot.* 317 (1851); *Aspidium shepherdii* Kunze ex Mett., *Fil.Hort.Lips.* 94 (1854); *Lastreopsis shepherdii* (Kunze ex Mett.) Tindale, *Victorian Nat.* 73:182 (1957).

Occurs in Qld, N.S.W., Vic., Tas. and S.Aust. (S.E. region; known only from the Yallum limestone caves near Penola).



L.D.

Fig. 18—*Lastreopsis acuminata*.

3. POLYSTICHUM Roth in Roem.

Arch.Bot. 2:106 (1800).

(Greek *polys*, many; *stichos*, a row or line; alluding to the rows of sori.)

Rhizome short, erect, scaly; fronds pin-nate to decom-pound; stipes scaly, clustered; lamina coriaceous, anadromic, pinnules often with aristate margins; veins free; sori terminal on veins, indusiate or rarely exindusiate. Cosmopolitan; c. 135 species, 4 in Australia.

1. ***P. proliferum*** (R.Br.) C. Presl, *Tent.Pter.* 83 (1836). **Mother shield-fern.** Fronds narrow, linear-triangular, to 1 m long; stipe densely clad with dark brown scales with a pale border; lamina deep green, very coriaceous; sori numerous, covered with a peltate indusium.—*Aspidium proliferum* R. Br., *Prod.Fl.Nov.Holl.* 149 (1810); *P. aculeatum* non (L.) Schott, sensu J. M. Black, *Fl.S.Aust.* 38 (1943).

Occurs in N.T., N.S.W., Vic. and Tas. Although recorded by J. M. Black for the S.E. region there are no collections of it known from the State. Its occurrence must be considered doubtful.

Fig. 19—*Polystichum proliferum*.

FAMILY 11.—ASPLENIACEAE

Terrestrial ferns with an erect or creeping scaly rhizome; stipes not articulated to the rhizome; fronds simple, pinnate or decom-pound, firm in texture; veins free or anastomosing; sori elongate along the veinlets, indusiate or rarely exindusiate; indusium the same shape and extending along the vein.

1. Sorus protected by indusium ASPLENIUM 1.
1. Sorus exindusiate..... PLEUROSORUS 2.

1. ASPLENIUM L.

Sp.Pl. 1078 (1753).

(Greek *asplenon*, name of a fern considered to be a cure for diseases of the spleen; from *a*, without; *splen*, spleen.)

Rhizome short, erect or creeping, clad in clathrate scales; fronds simple, pinnate or decompose, small to very large; sori oblong, oblique to midrib of pinnule, covered by an indusium at least when young. Cosmopolitan; c. 650 species.

1. Sori close to the margin; pinnae lanceolate *A. bulbiferum* 1.
1. Sori away from the margin; pinnae flabellate-cuneate or suborbicular-oblong.
 2. Pinnae flabellate-cuneate; rhachis greenish, usually elongating well beyond pinnae and often proliferous at its tip *A. flabellifolium* 2.
 2. Pinnae suborbicular-oblong; rhachis dark purplish-black, terminated by a pinnule *A. trichomanes* 3.

1. ***A. bulbiferum*** Forst.f., *Fl. Insul. Aust. Prod.* 80 (1786). **Mother spleenwort.** Rhizome short, thick; fronds tufted, erect but spreading, mid green, thick, soft; pinnae pinnate-pinnatisect or bipinnate, lanceolate; bulbils often on costules of upper surface; sori sub-marginal, oblong but elliptical when old, indusiate; the indusium often obscure when old.

Occurs in New Zealand, Qld, N.S.W., Vic., Tas. and S.Aust. (S.E. region). Extremely rare in S.Aust. and known only from limestone caves in Myora Forest and at Mt Graham.

2. ***A. flabellifolium*** Cav., *Descr. Plant.* 257 (1801). **Necklace fern.** Rhizome very short; fronds few, at first erect but becoming prostrate; stipe weak; lamina narrow-linear; pinnules flabellate or reniform-cuneate; rhachis glabrous, elongating beyond the pinnae and often rooting at its tip and producing a new plant.—*A. flavelifolium* Cav. (1801), in error.

Occurs in New Zealand, W.Aust., Qld, N.S.W., Vic., Tas. and S.Aust. (Flinders Ranges, Southern Lofty and S.E. regions). Common on banks or amongst rocks in moist situations. Often forming large colonies by proliferation.

3. ***A. trichomanes*** L., *Sp.Pl.* 1080 (1753). **Common spleenwort.** Rhizome short; fronds densely clustered, narrow-linear, erect or spreading, brittle; stipe and rhachis deep purplish-black, pinnae small, oblong to sub-orbicular; sori oblong, often coalescing when old and covering most of the undersurface.

Occurs in New Zealand and temperate parts of the world, N.S.W., Vic., Tas. and S.Aust. (in the extreme south of the Eyre Pen. and S.E. regions).

In S.Aust. commonly grows in crevices of limestone outcrops.

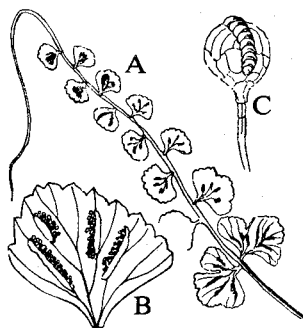


Fig. 20—*Asplenium flabellifolium*. A, frond; B, pinna; C, sporangium.

2. PLEUROSORUS Fée

Gen.Fil. 179 (1852).

(Greek *pleura*, side; *sôros*, a heap; alluding to the position of the sori along the sides of the veins.)

Small terrestrial ferns with short scaly rhizome; fronds pinnate to sub-bipinnate, covered with glandular or eglandular hairs; veins free, forked; sori elongate, exindusiate. South America, Europe, Africa and Australasia; c. 5 species, 2 in Australia.

1. Most hairs of stipe and lamina eglandular *P. rutaefolius* 1.
 1. Hairs of stipe and lamina all with glandular heads *P. subglandulosus* 2.

1. ***P. rutaefolius*** (R.Br.) Fée, *Gen.Fil.* 179 (1852). **Blanket fern.** Fronds small, rarely more than 12 cm long, pinnate, densely clad in whitish to ferruginous eglandular hairs (sometimes some with glandular heads) hairs c. 1 mm long and those of the stipe and rhachis usually with well-defined dark brown nodes (septae); pinnules flabellate-cuneate to oblong, often deeply incised; sori linear-oblong, on veins, often coalescing when old and completely covering the undersurface.—*Grammitis rutaefolia* R.Br., *Prod.Fl. Nov.Holl.* 146 (1810).

Occurs in New Zealand, W.Aust., N.T., Qld, N.S.W., Vic. and S.Aust. Occurs in all regions of S.Aust. except for Yorke Pen. and Kangaroo I. (Grows on banks and in rock crevices, often in open situations, and is particularly common in the Gawler, Flinders and Mount Lofty Ranges.

2. ***P. subglandulosus*** (Hook. & Grev.) Tindale, *Victorian Nat.* 73:169 (1957). Similar to the proceeding species except that all the frond hairs have glandular apices.—*Gymnogramma subglandulosa* Hook. & Grev., *Icon.Fil.* 1:t.91 (1828).

Occurs in W.Aust., N.T., Qld, N.S.W., Vic. (N.W.) and S.Aust. Occasional in rocky places usually in crevices in shaded situations. Often sympatric with *P. rutaefolius*.

The status of this species requires further investigation. The length and colour of the hairs and the shape of the glandular heads is quite variable. Although the shape and size of the fronds and hairs differ markedly from *P. rutaefolius* in some populations, others especially in southern areas approach more closely this species.



Fig. 21—*Pleurosorus rutaefolius*.

FAMILY 12.—BLECHNACEAE

Terrestrial or rarely epiphytic ferns with a creeping or shortly erect scaly rhizome, occasionally forming a narrow trunk; fronds pinnatifid or pinnate more rarely bipinnate, uniform or dimorphic, the spore-bearing fronds markedly narrower; stipes not articulated to the rhizome; veins free or anastomosing near the costae; sori elongated into coenosori or short and often confluent when old; indusium opening inwards towards the costa.

1. Fertile fronds much narrower than sterile ones, sori forming a continuous band along the margin BLECHNUM 1.
 1. Fertile fronds similar to sterile ones, sori small, discrete, away from the margin DOODIA 2.

1. BLECHNUM L.

Sp.Pl. 1077 (1753).

(Greek *blechnon*, the name of a fern.)

Rhizome short or long, erect or occasionally forming a narrow trunk, creeping or epiphytic on trees, covered in non-clathrate scales; fronds simple, pinnatifid or pinnate, dimorphic, the fertile ones narrower; lamina coriaceous, glabrous or with scattered scales; margins entire or serrate; sori superficial, usually confluent; indusium marginal or submarginal, linear, opening towards the costa. Cosmopolitan; more than 200 species, especially in the Southern Hemisphere, 13 species in Australia.

1. Segments of barren fronds attached to the rachis by a broad base.
2. Undersurface very pale, often glaucous; lowermost pinnae oblong or broadly oblong; tips of pinnae entire *B. nudum* 3.
2. Undersurface of frond slightly lighter than upper; lowermost pinnae reduced to auricles; tips of pinnae toothed *B. chambersii* 1.
1. Segments of barren fronds petiolate except near the apex.
3. Lowermost pinnae not reduced *B. watsii* 4.
3. Lowermost pinnae much reduced *B. minus* 2.

1. *B. chambersii* Tindale in Beadle, O.D. Evans & Carolin, *Fl. Sydney Reg.* 86 (1972). **Lance water-fern.** Frond tufted, deep green, flaccid, glabrous; pinnae alternate or sub-opposite, attached to the rachis by a broad base; fertile fronds erect, delicate, the rachis stramineous.—*Stegania lanceolata* R.Br., *Prod. Fl. Nov. Holl.* 152 (1810); *B. lanceolatum* (R.Br.) Sturm f., *Enum. Pl. Cr. Chil.* 25 (1858), non *B. lanceolatum* Raddi (1819); *B. aggregatum* non (Colenso) Tindale, sensu Hj. Eichl., *Suppl.* 28 (1965).

Occurs in New Zealand, Qld, N.S.W., Vic., Tas. and S.Aust. (S.E. region).

Very rare in the State and known only from limestone caves near the Victorian border.

2. *B. minus* (R.Br.) Ettingsh., *Denkschr. Akad. Wiss., Wien* 23:63; t.8, fig. 5 & 12 (1864). **Soft water-fern.** Rhizome slow-creeping, branching; fronds erect, to 1 m or more long; stipe and rachis stramineous, sparsely clad with concolorous brown scales except at the base of the stipe; pinnae coriaceous, frequently crisped irregularly; margins minutely serrate, slightly irregular, the lowermost pairs much reduced, oblong to almost orbicular, 0.8-2 cm long; fertile fronds with the lowermost pinna pairs sterile, similar to sterile fronds.—*Stegania minor* R.Br., *Prod. Fl. Nov. Holl.* 153 (1810); *B. capense* non (L.) Schldl., sensu J. M. Black, *Fl. S.Aust.* 37 (1943), partly.

Occurs in New Zealand, Qld, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty, and S.E. regions).

In S.Aust. this species is common in the Mount Lofty Ranges where it occurs in swamps, along streams or on banks. It often occurs with *B. watsii*.

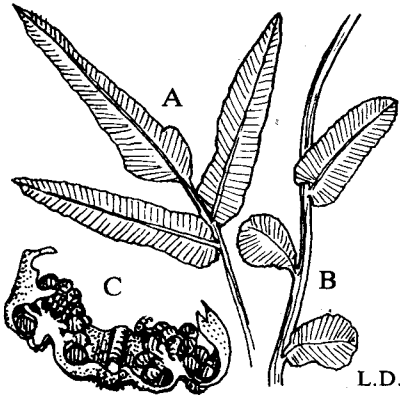


Fig. 22—*Blechnum minus*. A, frond apex; B, lowermost pinnae; C, portion of undersurface of fertile pinna.

3. *B. nudum* (Labill.) Mett. ex Luer., *Verst. Heimatfl.* 292 (1876). **Fishbone water-fern.** Rhizome short, erect or forming a short trunk; fronds erect or spreading; stipe dark purplish-black, scaly near the base; lamina rigid; undersurface much lighter in colour; often glaucous; pinnae attached by broad bases; margins entire; lowermost pinnae obtuse; middle and upper acute; fertile pinnae very firm.—*Onoclea nuda* Labill., *Nov. Holl. Pl. Sp.* 2:96, t.216 (1807); *B. discolor* non (Forst.f.) Keys, sensu J. M. Black, *Fl. S.Aust.* 37 (1943).

Occurs in Qld, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty region).

Occasional along stream banks in valleys.

4. *B. watsii* Tindale, *Contr. N.S.W. natn. Herb.* 3:247 (1963). Rhizome creeping, branching, clad with dark brown scales with lighter margins; fronds erect or drooping but firm; stipe and

rhachis stramineous or dark brown, often mottled, scaly; the scales of the rhachis stramineous, those of the lower part of the stipe dark brown with a lighter margin; pinnae coriaceous, minutely serrate, the margin slightly irregular, with light brown scales along the costa on the underside; lowermost pinnae not reduced markedly in size; fertile pinnae firm, the lowermost pairs often with an expanded sterile herbaceous base.—*B. capense* non (L.) Schltdl., sensu J. M. Black, *Fl.S.Aust.* 37 (1943) partly; *B. procerum* non (Forst.f.) Swartz, sensu Hj. Eichl., *Suppl.* 28 (1965).

Occurs in Qld, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty and S.E. regions).

2. DOODIA R. Br.

Prod.Fl.Nov.Holl. 151 (1810).

(After Samuel Doody, died 1706, a London pharmacist and student of cryptogams.)

Terrestrial ferns with short erect rhizome bearing harsh dark scales; stipe red to blackish, scaly near the base; lamina pinnate; pinnae usually harsh, toothed, uniform or slightly dimorphic; sori superficial, oblong, in 1 or 2 (3) rows parallel to the costa; indusium attached on the inner side of the costule, opening towards the midrib. Asia to Australasia and Hawaii; c. 11 species, 5 in Australia.

1. *D. caudata* (Cav.) R. Br., *Prod.Fl.Nov.Holl.* 151 (1810). **Small rasp-fern.** Rhizome short, erect, covered with brown scales; fronds pinnate, dimorphic, the sterile ones spreading, the fertile ones erect; sterile pinnae oblong, obtuse, margins minutely toothed; the pinnae in the lower half of the frond often with one or two pairs of lobes, the lobes often cut to near the midrib, rounded; stipe and rhachis clad with stramineous hairs; pinnae of fertile fronds distinctly narrower, coarsely toothed; sori small, oblong, slightly curved, one row either side of costa.—*Woodwardia caudata* Cav., *Descr.Plant.* 264 (1801).

Occurs in New Zealand; New Caledonia, Qld, N.S.W., Vic., N.T. and S.Aust. (known only from the Gammon Ranges in the northern Flinders Ranges region where it grows amongst rocks in a deep gorge).

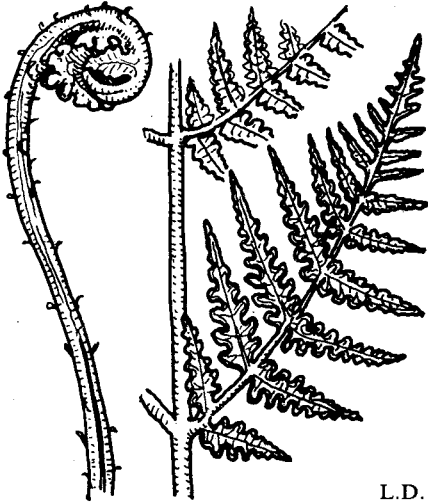


Fig. 23—*Doodia caudata*.

FAMILY 13.—DENNSTAEDTIACEAE

Terrestrial ferns with a creeping or erect hairy or scaly rhizome; lamina pinnate and decompose, not articulated to the rhizome; veins free or anastomosing; sori superficial or submarginal, terminal on free veinlets, circular or forming a submarginal coenosorus; indusium cup-shaped or 2-lipped; the outer lip false, formed by the recurved margins of the lamina; the inner lip a true indusium, usually delicate, membranous, often reduced or absent.

- | | |
|--|-----------------|
| 1. Sori orbicular | HYPOLEPIS 2. |
| 1. Sori linear, usually forming a band along the margin. | |
| 2. Fronds very coriaceous, ultimate segments 2 mm broad; rhizome hairy | PTERIDIUM 3. |
| 2. Fronds herbaceous, ultimate segments greater than 8 mm broad; rhizome scaly | HISTIOPTERIS 1. |

Fig. 24—*Histiopteris incisa*.1. *HISTIOPTERIS* Agardh ex J. Sm.*Hist.Fil.* 294 (1875).(Greek, *histian*, tissue; *pteris*, a fern.)

Terrestrial ferns with long-creeping rhizome, covered in dark brown scales; fronds large; pinnae opposite, sessile, glabrous, often glaucous below; veins anastomosing; sorus continuous along the margin or occasionally interrupted, protected by a marginal false indusium; true indusium absent. 8 species; 1 in Australia.

1. *H. incisa* (Thunb.) J. Sm., *Hist.Fil.* 295 (1875). **Bat's wing fern.** Rhizome thick, scaly; fronds bipinnate to tripinnate, pinnatisect, pale green, glaucous green below; pinnae and ultimate segments sessile; sori linear, protected by the reflexed margin of the pinnule.—*Pteris incisa* Thunb., *Prod.Pl.Cap.* 171 (1800).

Occurs in Africa, Asia, New Zealand, Norfolk I., N.T., Qld, N.S.W., Vic., Tas. and S.Aust. Very rare in S.Aust. (S.E. region).

2. *HYPOLEPIS* Bernh.*J.Bot. (Schrader)* 1:34 (1806).(Greek *hypo*, below; *lepis*, a scale; alluding to the scale-like indusium.)

Terrestrial ferns with a creeping rhizome clad with hairs; fronds small to very large, decompose, finely dissected; pinnae and pinnules usually oblique to midrib; veins free; sori orbicular, superficial and lacking an indusium or close to the margin and protected, at least when young, by a false indusium formed by the reflexed margin. About 50 species; 6 in Australia.

- | | |
|--|-----------------------|
| 1. Rhizome 7-10 mm thick; young frond densely white glandular hairy, sticky; young sorus covered by a well-developed indusium | <i>H. punctata</i> 1. |
| 1. Rhizome 3-5 mm thick; young frond sparsely pale brown glandular hairy; young sorus partially covered by an indusium or indusium not developed | <i>H. rugosula</i> 2. |

1. *H. punctata* (Thunb.) Mett. ex Kuhn, *Fil.Afr.* 120 (1868). **Downy ground-fern.** Rhizome long-creeping, 7-10 mm thick, densely clad with hairs; fronds to 2 m long, erect but drooping in the upper part; young developing fronds and the tips of the primary pinnae densely clad in white glandular and eglandular hairs; stipe c. 1 cm thick near its base; lamina tripinnate, soft and membranous, light green; rachis, costae and costules densely clad with stramineous crisped

hairs; sori protected by a well developed false indusium but this obscured on old fronds.—*Polypodium punctatum* Thunb., *Fl.Jap.* 337 (1784).

Occurs widely in Asia, Polynesia, New Zealand, Qld, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty region). This species is known from a few localities in the Mount Lofty Ranges where it grows in moist open situations or along stream banks.

2. *H. rugosula* (Labill.) J. Sm., *Curtis's Bot.Mag.* 72, *Compan.* 8 (1846). **Ruddy ground-fern.** Rhizome long-creeping, 3-5 mm thick, clad in dark brown hairs; fronds to 1 m long, erect or flaccid, stipe c. 5 mm thick near the base; lamina tripinnate, firm, deep green; the rhachis and usually the primary costae muricate; hairs brown, with distinct dark brown septae; sori exindusiate or partially protected by a false indusium.—*Polypodium rugosulum* Labill. *Nov.Holl.Pl.Sp.* 2:92, t.241 (1807).

Occurs in New Zealand, Qld, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty, Kangaroo I. and S.E. regions).



Fig. 25—*Hypolepis rugosula*.

3. PTERIDIUM Scop.

Fl.Carniolica 169 (1760).

(Name formed from *Pteris*.)

Terrestrial ferns with long-creeping rhizome covered with hairs; fronds pinnately compound, stiff and coriaceous, glabrous to densely hairy; nectaries at the base of most pinnae; sorus continuous along the margin; indusium two-valved, consisting of an inner membranous valve, and an outer false valve formed by the reflexed modified margin. About 6 species, 3 in Australia.

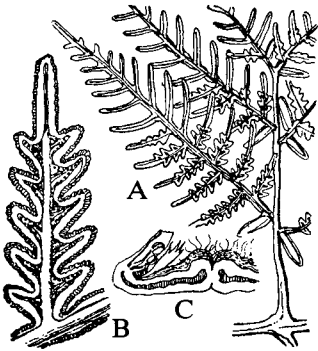


Fig. 26—*Pteridium esculentum*. A, portion of lamina; B, pinna; C, portion of undersurface of pinna.

1. *P. esculentum* (Forst.f.) Nakai *Bot.Mag.*, Tokyo 39:108 (1925). **Austral bracken.** Rhizome long-creeping, black, subterranean; fronds large 1-2 m long, 3-4 -pinnate in the lower part, stiff and coriaceous, brown to dark green; circular nectaries at the base of the primary pinnae; sori linear, running along the margins, protected by an outer false and inner membranous indusium.—*Pteris esculenta* Forst.f., *Plant.Oscul* 74 (1786); *P. aquilinum* non (L.) Kuhn, sensu J.M. Black, *Fl.S.Aust.* 36 (1943).

Occurs in Qld, N.S.W., Vic., Tas., S.Aust. (Eyre Pen. Southern Lofty, Kangaroo I. and S.E. regions). Common to abundant.

FAMILY 14.—LINDSAEACEAE

Terrestrial ferns or more rarely epiphytic or climbing, with a creeping rhizome covered with scales; fronds simple, pinnate to decompound, usually uniform; pinnae and pinnules not articulate, dimidiate or equilateral, cuneate or rhomboidal; sori indusiate, submarginal, terminal on veins; indusium usually delicate, opening towards the margin.

1. LINDSAEA Dryand. ex Sm.

Mem. Acad. Turin 5:413 (1793).

(After John Lindsay, a surgeon in Jamaica.)

Terrestrial ferns or rarely epiphytic; rhizome short- or long-creeping, clad with scales; fronds uniform or more rarely dimorphic, pinnate to pinnately decompose; stipes not articulated to the rhizome; pinnae and pinnules glabrous, flabellate, dimidiate or cuneate; veins usually free; sori submarginal, terminal on veins, sometimes continuous; indusium opening towards the margin. About 200 species especially in the tropics; 14 in Australia.

1. *L. linearis* Sw., *J. Bot. (Schrader)* 1800 (2):78 (1801). **Screw fern.** Rhizome creeping, subterranean; fronds dimorphic, the fertile ones erect, the vegetative ones spreading, pinnate; pinnae flabellate but fertile ones much narrower, often obliquely deflexed and close-set to the rachis.

Occurs in New Zealand, New Caledonia and all Australian States. Occasional in the Southern Lofty, Kangaroo I. and S.E. regions in shaded situations under scrub.

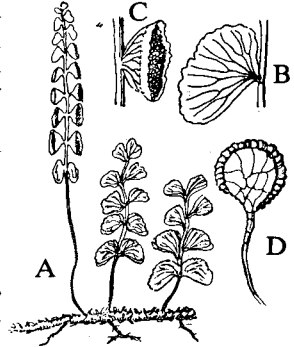


Fig. 27—*Lindsaea linearis*. A, habit; B, pinna; C, fertile pinna; D, sporangium.

FAMILY 15.—PTERIDACEAE

Terrestrial ferns with a creeping or short erect rhizome; stipes not articulated to the rhizome; lamina pinnate to decompose, herbaceous to coriaceous; veins free or anastomosing; sori linear, submarginal, intramarginal or rarely superficial, borne on a continuous vascular commissure connecting the vein endings; indusium false, formed by the reflexed, often scarious leaf-margin.

1. PTERIS L.

Sp. Pl. 1073 (1753).(Greek *pteris*, a fern.)

Rhizome short or slow-creeping, scaly; fronds clustered, pinnate to decompose, herbaceous to coriaceous, glabrous or rarely hairy; veins free or anastomosing; sori continuous along the margin or sometimes broken; indusium false, consisting of the recurved margin, opening inwards. Cosmopolitan; c. 280 species, 7 in Australia.



Fig. 28—*Pteris tremula*.

1. *P. tremula* R. Br., *Prod. Fl. Nov. Holl.* 154 (1810). **Tender brake.** Rhizome short, erect, scaly; fronds variable, to 1 m tall, light green, membranous or sub-membranous, glabrous; veins free, dichotomous; margins of sterile pinnae serrate; fertile pinnae entire; sori forming a broken or continuous band along the margin.

Occurs in Norfolk Island, New Zealand, N.T., Qld, N.S.W., Vic., Tas. and S.Aust. In S.Aust. is known from wet shaded gullies and gorges, sinkholes and caves in the Flinders Ranges (Gammons), Eyre Pen., Yorke Pen., Southern Lofty and S.E. regions. It is, however, rare in all areas.

FAMILY 16.—THELYPTERIDACEAE

Terrestrial ferns with an erect, short-, or long-creeping rhizome, sparsely clad with scales; fronds uniform; pinnate-pinnatifid, rarely more compound, clustered together or

distant; stipe usually scaly near the base, often hairy above; lamina oblong-elliptic, submembranous to coriaceous, usually clothed with simple whitish eglandular and rounded glandular hairs; lowermost pinnae often reduced; veins free although veinlets of adjacent lobes usually becoming confluent and running into the sinus; sori normally orbicular, borne dorsally on the veins, rarely terminal; indusium reniform or occasionally absent, usually hairy.

1. *CHRISTELLA* H. Lév.

Fl. de Koy-ichéou 472 (1915).

(Named after Hermann Christ, a Swiss pteridologist.)

Rhizome short, erect, slow-, or long-creeping, scaly; scales narrow, extending to the lowermost part of the stipe; fronds pinnate to pinnatifid, submembranous; the lamina, costae and costules usually clothed in pilose hairs on the undersurface and occasionally short capitate hairs; thick orange-red glandular hairs more or less appressed occasionally present on the costae and costules; sori indusiate. Cosmopolitan; c. 40 species, 5 in Australia.

1. *C. dentata* (Forsk.) Brownsey & Jermy. *Brit. Fern Gaz.* 10:338 (1973). **Binung.** Rhizome slow-creeping; stipes clustered; base of stipe and rhizome clad with narrow brown setose scales; fronds pinnate, submembranous; stipe and rachis stramineous, pilose; lamina, costae and costules pilose, pinnae pinnatifid, the lobes obliquely cut about half to two-thirds to the midrib, the lowermost pairs becoming reduced and distant; sori orbicular, indusium pilose.—*Polypodium dentatum* Forsk., *Fl. Aegypt-Arab.* 185 (1775); *Dryopteris parasitica* non (L.) Kuntze, sensu J. M. Black, *Fl. S. Aust.* 38 (1943); *Cyclosorus parasiticus* non (L.) Farwell, sensu Hj. Eichler, *Suppl.* 29 (1965).

Widespread throughout the tropics and subtropics of the old world and occurs in Qld, N.S.W., Vic. and S. Aust. (Murray region). This species occurs along the Murray River on damp banks or in hollows in the limestone cliffs.

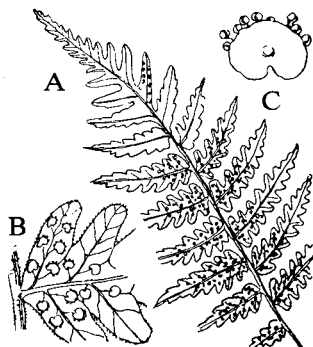


Fig. 29—*Christella dentata*. A, frond; B, portion of pinna; C, sorus.

FAMILY 17.—AZOLLACEAE

Small floating ferns or growing on margins of seeps and pools on wet soil; rhizome horizontal, flexuose, rooting at nodes, free hanging in water; fronds small, in 2 alternate rows; sori consisting of megasporangia and microsporangia enclosed by an indusium borne on the submerged lower lobes. 1 genus.

1. *AZOLLA* Lam.

Encycl. 1:343 (1783).

(Greek *azō*, to dry; *olloyo*, to kill; plants killed by drought.)

Plants triangular, usually 2-3 cm long, increasing by fragmentation; fronds in 2 rows, numerous c. 1.5 mm long, imbricate, bright red-brown to rose in open situations or green in more shaded places; sporangia borne on submerged lobes and bearing in the axils 2-4 megasporocarps or microsporocarps. Cosmopolitan; 6 species, 2 in Australia.

- | | |
|-------------------------|---------------------------|
| 1. Roots simple..... | <i>A. filiculoides</i> 1. |
| 1. Roots feathery | <i>A. pinnata</i> 2. |

1. *A. filiculoides* Lam., *Encycl.* 1:343 (1783). **Pacific azolla.** Plant irregularly pinnate, roots simple.—*Azolla rubra* R.Br., *Prod. Fl. Nov. Holl.* 167 (1810); *A. filiculoides* var. *rubra* (R.Br.) Strasburger, *Ueber Azolla* 78 (1873).

Occurs in America, New Zealand, W.Aust., Qld, N.S.W., Vic., Tas. and S.Aust. (Lake Eyre, Murray, Southern Lofty and S.E. regions). On ponds and along rivers; often covering extensive areas on non-moving waters.

2. *A. pinnata* R.Br., *Prod.Fl.Nov.Holl.* 167 (1810). **Ferny azolla.** Plant regularly pinnate, roots feathery.

Occurs in New Zealand, New Guinea, Asia, Africa, Qld, N.S.W., Vic. and S.Aust. (Murray and S.E. regions).

FAMILY 18.—MARSILEACEAE

Small aquatic or subaquatic plants; rhizome creeping; fronds simple and grass-like or with (2 or) 4 opposite leaflets borne on a long stipe; sporocarps sessile or pedunculate, oblong to globose, containing numerous megasporangia and microsporangia in the same sporocarp; sporangia extruded in a gelatinous mucilage on rupturing of the sporocarp. 3 genera, including the monotypic *Regnellidium* in Brazil.

- | | |
|--|--------------|
| 1. Sterile fronds with 4 leaflets | MARSILEA 1. |
| 1. Sterile fronds simple, grass-like | PILULARIA 2. |

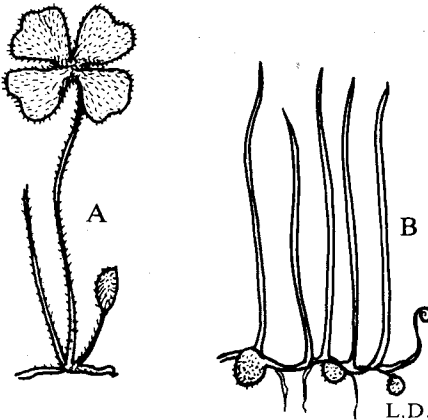


Fig. 31—A, *Marsilea*, habit; B, *Pilularia*, habit.

In most species the fronds are variable as regards to the length of the stipe, size and shape of the leaflets and hairiness. Aquatic floating leaves of *M. drummondii* are, for example, almost glabrous while plants from dry areas are densely hairy. Vegetative parts of most species are similar and are unreliable for positive identification.

1. Fronds and stem glabrous except for a few occasional hairs at the base of the leaflets; peduncles of sporocarps larger than the conceptacle, solitary or fused together near their base; conceptacle spherical, lacking teeth
1. Fronds and stem hairy at least in the young parts; peduncles of sporophytes shorter or longer than the conceptacle, solitary; conceptacle distinctly compressed, possessing teeth.

M. mutica 5.

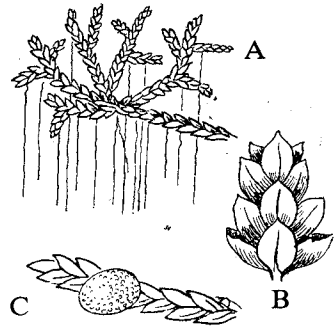


Fig. 30—*Azolla filiculoides*. A, habit, natural size; B, portion of branch; C, microsporangium on branch.

1. MARSILEA L.

Sp.Pl. 1099 (1753).

(After L. F. Marsigli, an Italian naturalist whose name was latinised as Marsilius.)

Rhizome long-creeping, fronds scattered along it; lamina of two pairs of opposite leaflets, the leaflets narrow to broadly obovate, glabrous or hairy; margins entire or shallowly or deeply crenate; sporocarps solitary or in groups at the base or along the stipes, hard and woody, oblong to globose, ellipsoid, hairy, ribbed or smooth, with 1 or 2 basal teeth; sori attached to a gelatinous ring which is extruded. About 60 species, cosmopolitan, 7 in Australia.

Most species of *Marsilea* are widespread throughout Australia. They occur in a wide range of habitats from permanent water to ephemeral streams and flood plains. In most

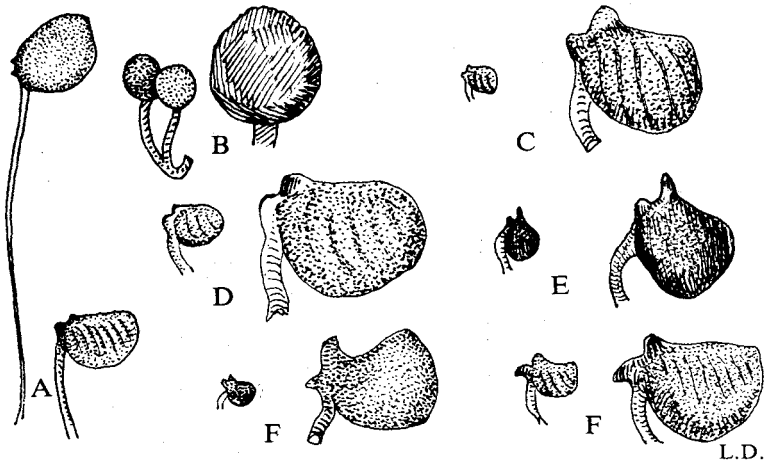


Fig. 32—*Marsilea* sporocarps. A, *M. drummondii*; B, *M. mutica*; C, *M. sp.*; D, *M. hirsuta*; E, *M. crenata*; F, *M. exarata*, 2 forms. (A, natural size; B-F, natural size on left, enlarged on right.)

Note: hairs are not indicated.

2. Peduncle of sporocarp 1.5-10 times the length of the conceptacle *M. drummondii* 2.
2. Peduncle of sporocarp shorter than the conceptacle.
3. Conceptacles c. 2.5 mm long, sparsely hairy and soon becoming glabrous, un-ribbed, surface microscopically reticulate; teeth unequal, the upper one spinose *M. crenata* 1.
3. Conceptacles 3-6 mm long, densely hairy, distinctly or obscurely ribbed, sometimes un-ribbed, surface smooth; teeth equal or unequal, not spinose.
4. Upper side of conceptacle flat or concave, apex pointed; lower tooth longer, usually recurved *M. exarata* 3.
4. Upper side of conceptacle flat or convex, apex rounded; teeth 1 or 2, the lower one not recurved.
5. Leaflets narrowly oblanceolate, 3-5 mm broad, unequally arranged and more or less paired, conceptacle with a single tooth (and a second false tooth formed by the apex of the peduncle) *M. sp.* 6.
5. Leaflets narrowly to very broadly obovate-cuneate, 5-13 mm broad, equally arranged, teeth of conceptacle equal in length *M. hirsuta* 4.

1. *M. crenata* C. Presl, *Rel. Haenk.* 1:84 (1825). This species is not known in S.Aust. but may possibly occur in the northernmost parts of the State. It occurs in the Philippines, N.T. and Qld.

2. *M. drummondii* A. Braun, *Linnaea* 25:721 (1853). **Common nardoo.** Rhizome much branched, densely orange-brown hairy or almost glabrous except towards the tips; fronds very variable in size, 2-30 cm long; leaflets broadly obovate-cuneate, glabrous to densely hairy, entire or shallowly to deeply crenate; sporocarps solitary, distinctly stalked, the stalks 2-10 times the length of the conceptacle; conceptacle 4-9 mm long, smooth, faintly or distinctly ribbed; upper basal tooth triangular, acute, lower tooth usually longer, obtuse.—*M. elata* var. *crenata* A. Braun, *Monatsber.K. Wiss.Berl.* 739 (1870).

Occurs in W.Aust., N.T., Qld, N.S.W., Vic. and S.Aust. (widespread throughout the State except for the N.W., Nullarbor, Yorke Pen. and Kangaroo I. regions).

An extremely polymorphic species. Plants from more arid regions are frequently more densely hairy in all parts.

3. ***M. exarata*** A. Braun, *Monatsber.K.Wiss.Berl.* 732 (1870). Rhizome branched, becoming glabrous; fronds becoming glabrescent, obovate or obliquely obovate 6-10 mm long, 6-8 mm broad, sometimes unequally arranged and more or less paired; conceptacles solitary, 3.5-4 mm long, faintly or distinctly ribbed, concave or flat on the upperside, apex pointed; teeth 2, the upper one broadly triangular, the lower one, narrowly triangular, recurved.

Occurs in W.Aust., Qld, N.T., and S.Aust. (N.W., Lake Eyre and Gairdner-Torrens regions).

4. ***M. hirsuta*** R. Br., *Prod.Fl.Nov.Holl.* 167 (1810). **Short-fruit nardoo**. Rhizome branched, becoming glabrous; fronds densely or sparsely hairy or glabrescent; leaflets broadly obovate-cuneate, entire or irregularly crenate, equally or unequally arranged; sporocarps solitary or in groups at the base of the frond; conceptacle 4-7 mm long, upper surface flat or curved, apex rounded; teeth 2, equal.

Occurs in W.Aust., N.T., Qld, N.S.W., Vic. and S.Aust. (widespread throughout the State except the N.W., Nullarbor, Kangaroo I. and S.E. regions).

5. ***M. mutica*** Mett., *Annls Sci.Nat.ser.* 4, 15:88 (1861). Although J.M. Black, *Fl.S.Aust.* (1943) recorded this species for S.Aust. I am very doubtful of its occurring here. All but one of the specimens previously identified as *M. mutica* have been reidentified as belonging to other species, especially *M. drummondii*. This latter species becomes almost glabrous when growing in aquatic situations. One sterile specimen collected by Dodd near Morgan on the River Murray in 1894 has exceedingly large leaflets and may be correctly identified as *M. mutica*.

6. ***Marsilea* sp. Narrow-leaf nardoo**. Rhizome much branched, 0.3-0.4 mm diam., glabrous except for growing tips; fronds small, rarely exceeding 7 cm tall; leaflets narrowly oblanceolate, glabrous or sparsely hairy; sporocarps on short peduncles, clustered along the rhizome, sub-orbicular, ribbed, with one basal tooth rarely two.—*M. angustifolia* non R.Br., sensu Willis, *Handbook to plants in Victoria* 1:47 (1962), sensu Tindale in Beadle, O.D. Evans & Carolin, *Flora Sydney Region* ed. 2:89 (1972).

Occurs in N.T., Qld, N.S.W., Vic. and S.Aust. (Lake Eyre, Murray and S.E. regions—probably more widespread).

Marsilea angustifolia R.Br. was described from material collected in tropical northern Australia. It differs from the abovementioned un-named species in being much more robust with fronds to 30 cm long; with longer leaflets, with entire or irregularly toothed apices, a larger unribbed (in the specimen seen) spherical, stalked, conceptacle, with a vestigial tooth.

2. PILULARIA L.

Sp.Pl. 1100 (1753).

(Latin *pilula*, a pill; alluding to the shape of the fruits.)

Rhizome long-creeping, filiform; sterile fronds scattered along rhizome, simple and grasslike; sporocarps spherical, hard, solitary in the axils of the sterile fronds, sessile or shortly pedunculate, divided into 2 or 4 loculi containing microsporangia and megasporangia. 6 temperate species, 1 in Australia.

1. ***P. novae-hollandiae*** A. Braun, *Monatsber.K.Wiss.Berl.* 1863:435 (1864). Small grass-like plant often forming dense tufts; rhizome long-creeping, glabrous, green; fronds scattered, simple, gradually tapering, deep green, 2-6 cm long; sporocarps sessile at the base of sterile fronds, globular, 2-4 mm diam.

Occurs in W.Aust., N.S.W., Vic., Tas. and S.Aust. (Southern Lofty and S.E. regions).

DIVISION 2.—SPERMATOPHYTA

The Spermatophyta or seedplants have complete or incomplete flowers, sometimes only consisting of stamens and ovules, or lack flowers, and effect sexual reproduction by means of pollen-grains which fertilise the egg-cell in the ovule. The pollen-grains form within a microsporangium on the scale of a cone or within an anther, and the ovule is formed within a megasporangium on the scale of a cone or within an ovary. After fertilisation the ovule develops into a seed on the scale of the cone or within a fruit derived principally from the ovary wall.

While it is convenient to retain the Division Spermatophyta here, few modern authors consider it be a major natural group and either include it in a broader grouping together with some of the Pteridophyta, or subdivide it to form two or more smaller Divisions.

SUBDIVISION 1.—GYMNOSPERMAE

Seeds naked (that is, not enclosed in a pericarp); ovule not enclosed in an ovary; hence there is no style or stigma; cotyledons 2 or more. Flowers lacking; the reproductive structures consisting of microsporangia and ovules, usually borne in unisexual cones, without ovary, style, or floral envelope.

Like the Spermatophyta, the Gymnospermae are treated in a range of ways by modern authors, some even treating its main subdivisions as Divisions in their own right.

FAMILY 19.—PINACEAE

Trees; leaves alternate but often in groups of 2 or a few on short shoots, needle-like. Cones usually monoecious, with spirally arranged scales; male cone scales bearing 2 sporangia; female cone scales bearing 2 ovules. Fruiting cone woody; seeds winged. 10 genera with c. 250 species; mostly in the Northern Hemisphere, none in Australia.

This family includes many economically important trees, including *Abies* (fir), *Picea* and *Tsuga* (spruces) and *Larix* (larch). The 5 species of *Pinus* treated below include the members of the family most likely to be mistaken for S.Aust. natives.

1. PINUS L.

Sp.Pl. 1000 (1753).

(The Latin name for a pine.)

Resinous trees; leaves in groups of 2—few on short shoots, needle like; monoecious; cones with numerous spirally arranged scales; male cones lateral, cone scales each with 2 sporangia on the upper surface; female cones terminal, persistent and becoming woody; cotyledons several. At least 70 species in the Northern Hemisphere. (W. Dallimore & A. B. Jackson (1966) *A handbook of Coniferae and Ginkgoaceae*.) Distribution stated for the species treated here is for the very few specimens in AD, and is likely to be very inadequately recorded.

- | | |
|--|-------------------------|
| 1. Leaves in threes. | |
| 2. leaves 8-15 cm long grass-green; cones asymmetrical, ovoid | <i>P. radiata</i> 5. |
| 2. Leaves 12-25 cm long, dark green; cones symmetrical, oblong to ovoid | <i>P. ponderosa</i> 4. |
| 1. Leaves in pairs. | |
| 3. Leaves greyish-green, 5-8 cm long; winter buds c. 8 mm long. | <i>P. halepensis</i> 1. |
| 3. Leaves dark green, more than 10 cm long; winter buds 12-25 mm long. | |
| 4. Leaves more than 15 cm long; cones bright brown; scales of winter buds recurved | <i>P. pinaster</i> 3. |
| 4. Leaves less than 15 cm long; cones yellowish-brown; scales of winter buds appressed | <i>P. nigra</i> 2. |

*1. *P. halepensis* Mill., *Gard.Dict.* ed.8 (1768). **Aleppo pine.** Tree to 20 m high; bark smooth and silvery-grey at first, becoming reddish-brown, fissured and scaly; winter buds c. 8 mm long,

the scales fringed and often reflexed at the tips; leaves in pairs, 5-8 cm long, 1 mm diam., greyish-green; female cones 1-3 together, on thick scaly stalks, reddish, ovoid-conic, 5-11 cm long, more or less symmetrical.

Native to the Mediterranean region and western Asia.

Recorded in S.Aust. from the Eyre Pen. region.

*2. *P. nigra* Arnold, *Reise nach Mariazell in Steyermark* 8 (1785) var. *maritima* (Ait.) Melville, *Kew Bull.* 1958:534 (1959). **Corsican pine.** Tree to 40 m or more high; bark rough, greyish-brown to dark brown; buds 12-25 mm long, resinous, the scales fringed, appressed; leaves in pairs, 10-15 cm long, 2-2.5 mm diam., dark green; female cones solitary or in clusters, subsessile, yellowish-brown, ovoid-conic, 6-8.5 cm long—*P. sylvestris* L. var. *maritima* Ait., *Hort.Kew.* 3:366 (1789).

Native to Europe.

Recorded in S.Aust. from the Southern Lofty region, but perhaps not truly naturalised.

*3. *P. pinaster* Ait., *Hort.Kew.* 3:367 (1789). **Cluster pine.** Tree to 30(-40) m high; bark reddish-brown, deeply fissured; winter buds 18-25 mm long, not resinous, the scales fringed and recurved; leaves in pairs, 15-30 cm long, dark green, female cones 1-3 (-many) together, sessile, bright brown, ovoid-conic, 12-25 cm long, asymmetrical at base.

Native to the Mediterranean region.

Recorded in S.Aust. from the Southern Lofty region, but perhaps not truly naturalised.

*4. *P. ponderosa* Dougl. in Loud., *Arboret.frut.Britt.* 4:2243 (1838). **Ponderosa pine.** Tree to 20 m or more high; bark yellowish or dark reddish-brown, breaking up into large irregular scaly plates; winter buds c. 18 mm long, resinous, the scales closely appressed; leaves in threes, 12-25 cm long, 1.5-2.5 mm diam., dark green; female cones solitary or in clusters, sessile or subsessile, light reddish-brown, ovoid, 7.5-20 cm long, symmetrical.

Native to North America.

Recorded in S.Aust. from the Southern Lofty region, but perhaps not truly naturalised.

*5. *P. radiata* D. Don, *Trans.Linn.Soc.London* 17:442 (1837). **Monterey pine.** Tree to 30 m or more high; bark dark brown and divided into deep ridges on old trees; winter buds 12-18 mm long; resinous, the scales closely appressed; leaves in threes, 8-15 cm long, slender, grass-green; female cones solitary or in clusters, shortly stalked, greyish-brown, asymmetrically ovoid, 7.5-15 cm long.

Native to North America.

Extensively grown in southern Australia and escaping into bushland in Victoria. Recorded in S.Aust. from the Southern Lofty and S.E. regions.

FAMILY 20.—CUPRESSACEAE

Trees or shrubs; leaves opposite or whorled, usually needle-like on very young plants but scale-like with decurrent bases on older plants. Cones monoecious or dioecious, with opposite or whorled scales; male cone scales bearing 3-6 sporangia; female cone scales bearing 1-many ovules. Fruiting cone usually woody; seeds winged or not. 19 genera with c. 130 species; cosmopolitan, including Australia.

1. *CALLITRIS* Vent.

Dec.Gen.Nov. 10 (1808).

(Greek *kalos*, beautiful; *treis*, three; on account of the symmetrical arrangement of the leaves.)

Resinous trees or shrubs; leaves usually becoming adherent to, or decurrent on the stem or branch, so that only the scale-like tip of the linear leaf remains free; monoecious; male cones cylindrical, with 2-4 sporangia; female cones usually of 6 scales arranged in 2 whorls, with several erect ovules on each scale; fruiting cone consisting of the 6 enlarged and hardened scales (valves) shortly united at the base and apparently arranged in 1 whorl; a small column, the *columella*, on the inside at the base of the cones; seeds compressed, hard, with usually 2 small wings; cotyledons

2, rarely 3. 16 species in Australia and New Caledonia. (J. Garden (1956) *Contr.N.S.W. natn.Herb.* 2(5):363-392.)

1. Dorsal surface of leaf rounded.
 2. Cones smooth or with more or less scattered tubercles.
 3. Female cones 2-3.5 cm long, ovoid; cone scales thick, failing to separate near the base in the mature cone *C. preissii* 3.
 3. Female cones 1.5-2 cm long, globular; cone scales thin, separating almost to the base in the mature cone *C. columellaris* 2.
 2. Cones densely warted all over *C. verrucosa* 5.
1. Dorsal surface of leaf keeled.
 4. Cone-scales with a short broad conical dorsal protuberance *C. rhomboidea* 4.
 4. Cone-scales smooth or with small vestigial dorsal point *C. canescens* 1.

1. *C. canescens* (Parl.) S. T. Blake, *Proc.R.Soc.Qld* 70:39 (1959). Tree or shrub; leaves light green, keeled on dorsal surface; fruiting cones often clustered, almost tapering into the peduncles which are often rather long, globular or ovoid, to 2 cm long, smooth and shining; the scales thick, large and smaller scales alternating, sometimes bearing a minute protuberance or spur on the back; columella simple.—*Frenela canescens* Parl. in DC., *Prod.* 16(2):448 (1868); *C. morrisonii* R. T. Bak., *Proc.Linn. Soc.N.S.W.* 31:717 (1907); *C. drummondii* sensu J. M. Black, *Fl.S.Aust.* 45 (1943).

Occurs in W.Aust. and S.Aust. (Nullarbor, Eyre Pen., Murray, Yorke Pen. and Southern Lofty regions).

2. *C. columellaris* F. Muell., *Fragm.Phyt.Aust.* 5:198 (1866). **Murray-pine, slender native cypress pine.** Large (to 13 m high) or small tree with spreading branches; leaves dark green, rounded on dorsal surface; fruiting cones solitary, on slender often rather long peduncles, globular, 1.5-2 cm long; the scales thin, finely wrinkled on back, large and narrower scales alternating, separating almost to the base when mature, sometimes bearing a minute protuberance on the back; columella simple.—*C. glauca* R. Br. ex R. T. Bak. & H.G.Sm., *Proc. R. Soc. N.S.W.* 42:146 (1908), nom. illegit; *C. hugelii* non (Carriere) Franco, sensu J. Garden, *Contr.N.S.W.natn.Herb.* 2:368 (1956).

Occurs in all mainland Australian States; recorded in S.Aust. from the North West, Gairdner-Torrens, Flinders Ranges, Eastern, Eyre Pen., Northern Lofty, Murray, Yorke Pen. and Southern Lofty regions.

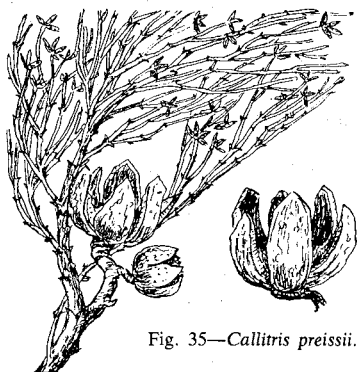
3. *C. preissii* Miq. in Lehm., *Pl.Preiss.* 1:643 (1845). **Native or Black cypress pine.** Large tree, to 17 m high; leaves dark green, rounded on dorsal surface; fruiting cones solitary or clustered, sessile or on short thick peduncles, ovoid, 2-3.5 cm long; the scales thick, smooth and black when quite ripe, but sometimes becoming coarsely wrinkled and sometimes more or less warted on back, failing to separate near the base when mature, large and smaller scales alternating



Fig. 33—*Callitris canescens*.



Fig. 34—*Callitris columellaris*.

Fig. 35—*Callitris preissii*.

occasionally bearing a minute protuberance on the back; columella simple.—*Frenela hugelii* Carriere, *Conif.* 73 (1855); *C. hugelii* (Carriere) Franco, *Anais Inst. Sup. Agron.* 19:12 (1952); *C. propinqua* R. Br. ex R. T. Bak. & H. G. Sm., *Pines of Australia* 112 (1910); *C. preissii* subsp. *murrayensis* J. Garden, *Contr. N.S.W.natn.Herb.* 2:373 (1956).

Occurs in W.Aust., N.S.W., Vic. and S.Aust. (Flinders Ranges, Eastern, Eyre Pen., Northern Lofty, Murray, Yorke Pen., Southern Lofty and Kangaroo I. regions).

J. Garden (1956) recognised three subspecies, all occurring in S. Aust. Subsp. *verrucosa* is treated here as a distinct species. The following key is taken from her paper:—

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|--|---------------------------|
| 1. Cones usually broadly ovoid when immature, shorter than broad after maturity | subsp. <i>preissii</i> |
| 1. Cones usually ovoid when immature, tending to be longer than broad after maturity | subsp. <i>murrayensis</i> |

These varieties have not received general acceptance in S.Aust. and further evidence of their distinctiveness is needed.

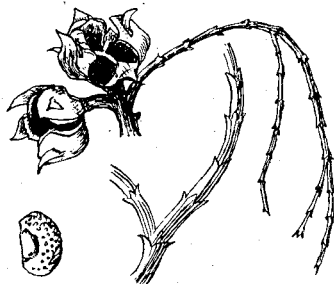
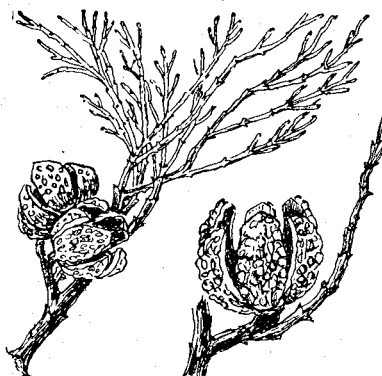
4. *C. rhomboidea* R. Br. ex L. C. Rich., *Comment. bot.Conif.Cycad.* 47 (1826). **Oyster Bay pine** (in Vic.). Shrub or small tree, with usually spreading branches; branchlets deeply furrowed between the leaves; leaves dark green, keeled on dorsal surface; fruiting cones clustered, sessile, globular, less than 1.5 cm long; the scales usually wrinkled and each provided with a spur surpassing the summit proper; columella 3-lobed.—*C. cupressiformis* Vent. var. *tasmanica* Benth., *Fl.Aust.* 6:238 (1873); *C. tasmanica* (Benth.) R. T. Bak. & H. G. Sm., *Pines of Australia* 233 (1910).

Occurs in Qld, N.S.W., Vic., Tas. and localised in S.Aust. (Slapes Gully near Adelaide and the Kangaroo I. and S.E. regions).

5. *C. verrucosa* (A. Cunn. ex Endl.) F. Muell., *Ess.Pl.coll.Fitzalan* 19 (1860). **Scrub cypress pine** (in Vic.). Shrub, single- or several-stemmed, sometimes under 2 m high; leaves dark green, rounded on dorsal surface; fruiting cones solitary or clustered, subglobular or ovoid, to 2.5 cm long; the scales densely warted; columella simple.—*Frenela verrucosa* A. Cunn. ex Endl., *Syn. Conif.* 37 (1847); *C. preissii* subsp. *verrucosa* (A. Cunn. ex Endl.) J. Garden, *Contr. N.S.W.natn.Herb.* 2(5):375 (1956).

Occurs in W.Aust., N.S.W., Vic. and S.Aust. (Nullarbor, Eyre Pen., Murray, Yorke Pen. and S.E. regions).

Intermediate forms have been observed between *C. verrucosa* and *C. preissii*.

Fig. 36—*Callitris rhomboidea*.Fig. 37—*Callitris verrucosa*.

SUBDIVISION 2.—ANGIOSPERMAE

Plants which have the ovules enclosed in an ovary and later the seeds enclosed in a seed vessel or pericarp. The pollen-grains (micro-spores) produced in the anther-cell, are conveyed to the stigma or receptive summit of the ovary, penetrate the stigma and style by means of a pollen-tube, which pushes its way downwards into the cavity of the ovary and enters the ovule usually through the micropyle at its summit. The ovule contains within its coverings the embryo-sac (macrospore). One of the 2 spermatid nuclei which have descended the pollen-tube fertilises the nucleus of the egg-cell within the embryo-sac, and the egg-cell develops into the embryo or young plant. About 220 000 species.

CLASS 1.—MONOCOTYLEDONAE

Plants in which the germinating seed produces only 1 cotyledon or seed-leaf; stems with closed vascular bundles scattered irregularly throughout the fundamental tissue; leaves usually with parallel nerves; parts of the flower usually arranged in whorls of 3; radicle soon ceasing to grow and never becoming a taproot. About 55 000 species.

Both the rank to which this group is allocated and its name vary from author to author.

FAMILY 21.—TYPHACEAE

Large water plants with perennial rhizomes and erect often 1-2 m high aerial stems. Leaves concentrated towards the base of the stem, distichous, long and linear, exstipulate. Flowers monoecious, without perianth, arranged in dense cylindrical spikes, the upper male, the lower female; stamens 2-5, often united towards base; ovary of 1 carpel, stalked, with 1 persistent style and unilateral stigma; flower-stalk with several long simple hairs towards the base; fruit a small nut with 1 pendulous albuminous seed. One cosmopolitan genus with c. 25 species including 3 species in Australia (B. G. Briggs & L. A. S. Johnson (1968) *Contr.N.S.W.natn.Herb.* 4:57-69; H. I. Aston (1973) *Aquatic plants of Australia*).

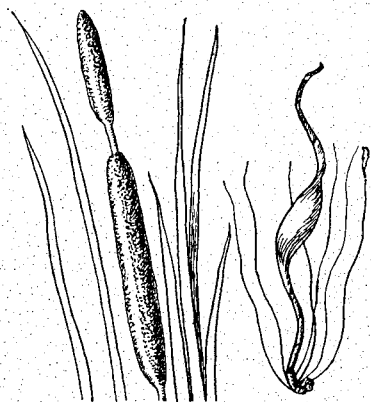
1. TYPHA L.

Sp.Pl. 97 (1753).

(Greek *tuphos*, a marsh and *typhē*, the bulrush.)

The species are difficult to distinguish. Great care must be taken in distinguishing the styles and bracts (both of which may be lost in old spikes). Vegetative characters and identification in the field cannot be relied on. There are insufficient data available to draw up complete descriptions of the species.

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| 1. Female spike with numerous broadly spathulate bracts; stigmas linear; female spikes usually 5-15 mm diam. | <i>T. domingensis</i> 1. |
| 1. Female spike with few (sometimes apparently 0) narrowly spathulate bracts; stigmas narrow-ovate; female spikes usually 15-20 mm diam. | <i>T. orientalis</i> 2. |

Fig. 38—*Typha* sp.

1. *T. domingensis* Pers., *Syn.Pl.* 2:532 (1807). **Bulrush, cumbungi.** Stems to 2(-3) m high; leaves usually 4-10 mm broad; spikes usually separated by 2-5 cm; the female spike usually 5-15 mm diam., 11-24 cm long.—*T. angustifolia* non L., partly sensu J. M. Black, *Fl.S.Aust.* 45 (1943); *T. brownii* Kunth, *Enum.Pl.* 3:92 (1841); *T. angustifolia* L. var. *brownii* (Kunth) Kronf., *Verh. zool.-bot. Ges. Wien* 39:89 (1889).

Widespread; including North Africa, South-East Asia and all Australian States. In S.Aust. from Kangaroo I. and most areas east of 138°E.

2. *T. orientalis* C. Presl, *Abh.Konigl.-Boehm.Ges. Wiss.*, ser.5, 6:599 (1851). **Bulrush, cumbungi.** Stems to 2(-4.5) m high; leaves usually 6-20 mm broad; spikes confluent or separated by usually less than 2 cm; the female spike usually 15-20 mm diam., 7-31 cm long.—*T. angustifolia* non L., partly sensu J. M. Black, *Fl.S.Aust.* 45 (1943); *T. muelleri* Rohrb., *Verh.bot.Ver.Prov.Brandenb.* 11:95 (1869).

Widespread in South-East Asia, New Zealand and all Australian States except N.T. In S.Aust. in most areas east of 138°E, but not as common as *T. domingensis*.

The identity of *T. basedowii* Graebner, *Reprim nov.Spec.Regni veg.* 13:497 (1915), which was originally described from S.Aust., has not been established.

FAMILY 22.—ZOSTERACEAE

Marine submerged plants with perennial rhizomes. Leaves along the rhizomes, distichous, sheathing at the base. Flowers monoecious or dioecious, without perianth, arranged on one side of a flat spike enveloped in a spathe; stamen 1; ovary with a single style with 2 long branches; fruit a nut with 1 pendulous exendospermous seed. Cosmopolitan, with 3 genera and 18 species. (Hartog (1970) *Verh.K.ned.Akad.Wet.,Afd.Natuurk.*, ser.2, 59(1):114 (*The sea grasses of the world*); H. I. Aston (1973) *Aquatic plants of Australia*.) The key to genera and species is from Aston.

- | | |
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| 1. Rhizome sympodial, lignified, the internodes in transverse section showing 4-12 vascular bundles in the cortex; vegetative stems erect, unbranched, comparatively long (20-30 cm), with up to 15 internodes | HETEROZOSTERA 1. |
| 1. Rhizome monopodial, herbaceous, the internodes in transverse section showing 2 vascular bundles in the cortex; vegetative stems short and lateral at each node | ZOSTERA 2. |

1. HETEROZOSTERA Hartog

Verh.K.ned.Akad.Wet.,Afd.Natuurk., ser.2, 59(1): 114 (1970).

(Greek *heteros*, different; *Zostera*—the related genus.)

For diagnostic characters see generic key. The number of vascular bundles in the cortex of the rhizome is the best character on which to distinguish *Heterozostera* from *Zostera*. Monotypic.

1. **H. tasmanica** (Martens ex Aschers.) Hartog, *Verh.K.ned.Akad.Wet.,Afd.Natuurk.*, ser.2,59(1):116 (1970). **Tasman grasswrack, eel-grass.** Leaf-sheath 1-4 cm long; leaf-blade 5-25 cm long, 1-2.5 mm broad; flowering stems usually branched; spathe stalk 8-28 mm long; spathe sheath 12-25 mm long, 3.5-4 mm broad; spike on a 5 mm long stalk within the spathe, lanceolate, elliptic or spatulate; male and female flowers each 3-6 per spike; ovary 2.5-3 mm long; fruit 3-4 mm long.—*Zostera tasmanica* Martens ex Aschers., *Sber.Ges.naturf.Freunde Berl.* 1867:15 (1868).

Australian coasts from just above low-tide level to 5(-20) m deep, off W.Aust., N.S.W., Vic., Tas. and S.Aust. (generally around the coast in calm water areas, including Kangaroo I.). One doubtful record from Chile.

2. ZOSTERA L.

Sp.Pl. 968 (1753).

(Greek *zōstēr*, a girdle; alluding to the ribbon-like leaves.)

For diagnostic characters see generic key. Cosmopolitan, 12 species.

1. Main nerves 3-5; rhizome with 2 groups of roots at each node; leaf-tip rounded-truncate, rarely emarginate and then only with a shallow notch, sometimes with a few fine irregular denticulations *Z. capricorni* 1.
1. Main nerves 3; rhizome with 2-3 roots at each node.
 2. Roots 2-3 at each node; leaf-tip more or less truncate but with three distinct teeth and sometimes also a few fine irregular denticulations, the central tooth containing a prolongation of the midrib, the 2 lateral ones sometimes obtuse or not well developed; teeth of the leaf-tip visible even on very young leaves *Z. mucronata* 2.
 2. Roots at each node leaf-tip obtuse to rounded or rounded-truncate, mostly deeply emarginate, sometimes with a few fine irregular denticulations *Z. muelleri* 3.

1. **Z. capricorni** Aschers., *Sber.Ges.naturf.Freunde Berl.* 1876: 11 (1876). Leaf-sheaf 1.5-11 cm long; leaf-blade 7-50 cm long, 2-5 mm broad; flowering stems usually unbranched; spathe stalk 10-160 mm long; spathe sheath 16-55 mm long, 1.5-2.5 mm broad; spike sessile within the spathe, linear-lanceolate; male and female flowers each 7-10 per spike; ovary c. 1.5 mm long; fruit 2-3 mm long.

Occurs within 6 m depth below low-tide level off the coasts of New Zealand (North Island), Lord Howe I., the east coast of Australia (Qld and N.S.W.) and recorded by H. I. Aston from Kangaroo I. (no specimen in AD).

2. **Z. mucronata** Hartog, *Verh.K.ned.Akad.Wet., Afd.Natuurk.*, ser.2, 59 (1):91 (1970). Leaf-sheaf 1.5-11 cm long; leaf-blade 7-50 cm long; 0.75-1.75 mm broad; floral and fruiting characters unknown. H. I. Aston stated that the 3-toothed leaf-tip seems distinctive.

Restricted to the coasts of W.Aust. and S.Aust. (Spencer Gulf and Adelaide) (no specimen in AD).

3. **Z. muelleri** Irmisch ex Aschers., *Sber.Ges.naturf.Freunde Berl.* 1867:15 (1867). **Dwarf grasswrack, eel-grass.** Leaf-sheath 1.5-11 cm long; leaf-blade 5-30 cm long, usually 1-2 mm broad; flowering stems usually unbranched; spathe stalk 10-160 mm long; spathe sheath 16-55 mm long, 1.5-2.5 mm broad; spike sessile within the spathe, linear-lanceolate; male and female flowers each 4-12 per spike; ovary c. 1.5 mm long; fruit 2-3 mm long.

Occurs in intertidal zones and estuaries along the coasts of Vic., Tas. and S.Aust. (Southern Lofty region). A specimen from Pearson I. (west coast of Eyre Pen.) tentatively identified as *Z. muelleri*, was collected at about 30 m depth.

FAMILY 23.—ZANNICHELLIACEAE

Herbs submerged in fresh or salt water, with annual or perennial rhizomes. Leaves along the branches, alternate, opposite or ternate, usually sheathing at the base, stipulate. Flowers monoecious or dioecious, without perianth or with a perianth consisting of 3 small free scales, solitary or in cymes; stamens 1-3; carpels 1-9, free, with simple or 2—4-lobed styles; fruiting carpels each with 1 pendulous seed. Cosmopolitan, with c. 7 genera and ? 25 species. (Keys largely from H. I. Aston (1973) *Aquatic plants of Australia*.)

1. Leaf-sheaf absent, but possessing a stipular sheath; (fresh water) ZANNICHELLIA 3.
1. Leaf comprising a distinct blade and ensheathing base.
 2. Leaf-blade more than 2 mm broad, perianth of female flowers of 0 or 4 or more segments; male flower without perianth; marine AMPHIBOLIS 1.
 2. Leaf-blade less than 1 mm broad; perianth of female flowers of 3 segments; male flowers with a cup-shaped perianth or 3 small scales; fresh or brackish water LEPILAENA 2.

1. AMPHIBOLIS Agardh

Sp. Alg. 1 (2): 474 (1822).

(Perhaps Greek *amphibolos*—throw on both sides; referring to its habitat in air and water, or to the distichous leaves.)

Submerged marine plants; stems segmented, much-branched, 10-90 cm long; leaves alternate, flattened, sheathing at base; flowers dioecious; solitary and terminal on short side shoots; male flower without a perianth, consisting of 2 anthers inserted on a common stalk, producing thread-like pollen, female flowers with 4 or more scales, with 2 free carpels, each carpel with 3 slender stigmas; fruit of only 1 carpel surrounded by a 4-lobed 'comb' arising from near its base (Ducker, Foord & Knox (1970) *Aust. J. Bot.* 25: 67-95). 2 species from southern and western coasts of Australia.

1. Leaf-blade 2.5-10 times as long as wide; female flower surrounded by scales *A. antarctica* 1.
1. Leaf-blade 12-15 times as long as wide; female flower without scales *A. griffithii* 2.

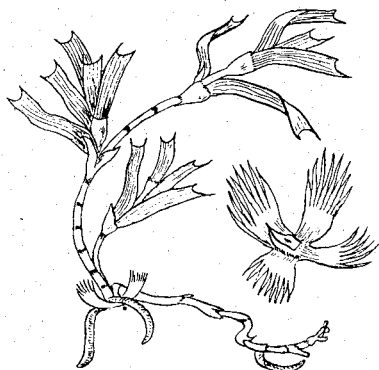


Fig. 39—*Amphibolis antarctica*.

1. *A. antarctica* (Labill.) Sond. & Aschers. ex Aschers., *Linnaea* 35:164 (1867). *Sea nymph*. Leaf-sheaf 1.2-1.8 times as long as wide; auricles acute, longer than the crescentic ligule; incurved sheath margins narrow, overlapping near the base only; leaf-blade 2.5-10 times as long as broad usually 3-7 mm broad; female flower surrounded by an involucre of scarious scales; ovary wall within the 'comb' showing some irregular protuberances, especially adjacent to the 2 wide lobes of the 'comb'; narrow lobes of the 'comb' with 7-11 bristles, wide lobes with 13-18.—*Ruppia antarctica* Labill., *Nov. Holl. Pl. Sp.* 2:116 (1806); *Cymodocea antarctica* (Labill.) Endl., *Gen. Pl.* 230 (1837); *Pectinella antarctica* (Labill.) J. M. Black, *Trans. R. Soc. S. Aust.* 37:1 (1913).

Occurs along the coast from W. Aust. to Vic. and Tas. below low-tide level. In S. Aust. from the

Nuyts Archipelago, The Pages, and the Eyre Pen., Yorke Pen., Southern Lofty and S.E. regions.

Generally in sandy-mud bottom or as patches on rock under conditions of moderate to fairly strong water movement.

2. **A. griffithii** (J. M. Black) Hartog, *K.ned.Akad.Wet.,Afd.Natuurk.*, ser.2,59(1):208 (1970). Leaf-sheath 2.5-3.6 times as long as wide; auricles broadly obtuse, shorter than the obtuse ligule; incurved sheath margins wide, overlapping over their whole length; leaf-blade 12-15 times as long as broad, usually 3.5-5 mm broad; female flower without an involucre of scales; ovary wall within the "comb" smooth and without protuberances; narrow lobes of the "comb" with 11-15 bristles, wide lobes with 19-26.—*Pectinella griffithii* J. M. Black, *Trans.R.Soc.S.Aust.* 39:94 (1915); *Cymodocea griffithii* (J. M. Black) J. M. Black, *Fl.S.Aust.* 664 (1929).

Restricted to the coast of W.Aust. and S.Aust. (Yorke Pen. and Southern Lofty regions).

2. LEPILAENA Drumm. ex Harv.

Hooker's J.Bot. Kew Gard.Misc. 7:57 (1855).

(Greek *lepis*, a scale; *chlaina*, a cloak.)

Stems much branched; leaves alternate, crowded towards the apex of the stems, very narrow-linear, sheathing at the base; flowers usually unisexual, dioecious or monoecious, solitary, axillary and at first enclosed in the leaf-sheath; female flower with 3 perianth-segments and 3 free carpels, each carpel with a peltate or fringed stigma; male flower with 3 minute perianth-segments or a cup-shaped perianth, with 1 or 3 fused anthers, producing globose pollen; fruit of 3 1-seeded nutlets. Submerged fresh to salt water plants. 4 species all in Australia and New Zealand.

1. Leaf tip \pm truncate with 3 mucros; stigmas deeply laciniate. *L. bilocularis* 2.

1. Leaf tip acute to obtuse; stigmas not laciniate.

2. Leaves gradually tapering towards the apex, very minutely serrulate at least over the upper portion *L. australis* 1.

2. Leaves linear, tapering only at the apex, not serrulate.

3. Female flowers clustered several together amongst close-set leaf sheaths, remaining near sessile even in fruit *L. preissii* 4.

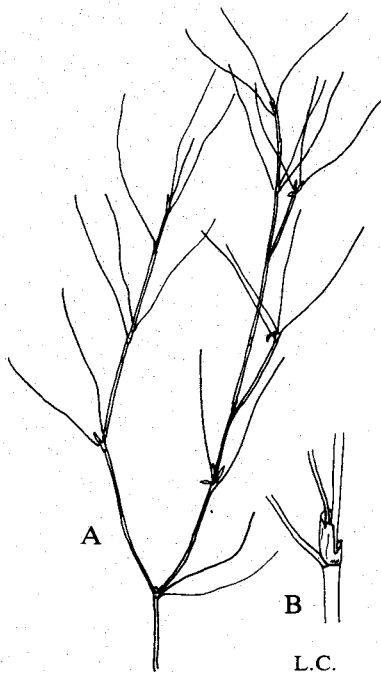
3. Female flowers not clustered, usually extended (at least in fruit) on elongated pedicels well beyond the leaf sheaths *L. cylindrocarpa* 3.

1. **L. australis** Drumm. ex Harv., *Hooker's J.Bot.Kew Gard. Misc.* 7:58 (1855). **Austral water-mat.** Leaves to 7 cm long, gradually tapering and minutely serrulate; female flowers on pedicels usually 0.2-8 cm long; perianth segments 1.2-2 mm long; stigma asymmetrically peltate or funnel-shaped; male flowers with 3 perianth-segments or lobes; anthers 3, fused to form a 6-celled anther mass; fruiting carpel dorsally 3-keeled; fruiting pedicel reflexing at the base; carpel stalk often carrying fruit beyond perianth.—*Aithenia australis* (Drumm. ex Harv.)Aschers., *Naturl.Pflanzenfam.* 2:214 (1887).

Occurs in fresh standing water less than 40 cm deep. W.Aust., N.S.W., Vic., Tas. and S.Aust. (Eyre Pen., Southern Lofty and S.E. regions).

2. **L. bilocularis** T. Kirk, *Trans.N.Z. Inst.* 28:500 (1896). **Small-fruit water-mat, feather-style water-mat.** Leaves usually under 2 cm long, not tapering above, margins entire, female flowers on pedicels 1-8 mm long; perianth-segments c. 2 mm long; stigma very asymmetrically funnel-shaped; male flowers with a small cup-shaped perianth; anther 1; fruiting carpel sometimes ribbed, but not dorsally keeled; carpel stalk very short, retaining the fruits in the perianth.

Occurs in fresh water to 1 m deep in large lakes and occasionally along the edges of slow streams. W.Aust., Qld, N.S.W., Vic., New Zealand and S.Aust. (a few records only from the Murray and S.E. regions).

Fig. 40—*Lepilaena preissii*.Fig. 41—*Zannichellia palustris*. A, habit, x $\frac{1}{2}$; B, ligule, x 2.

3. *L. cylindrocarpa* (Koern. ex Walp.) Benth., *Fl. Aust.* 7:180 (1878). **Long-fruit water-mat.** Leaves 1-8 cm long, linear, entire; female flowers on pedicels usually 3-17 mm long; perianth-segments usually 2-3 mm long; stigma asymmetrically funnel-shaped; male flowers with 3 minute perianth-segments or lobes; anthers 3; fused to form a 6-celled anther mass; fruiting carpel sometimes slightly ridged; carpel stalk mostly retaining fruits partly in perianth.—*Zannichellia cylindrocarpa* Koern. ex Walp., *Ann. Bot. Syst.* 6:3 (1861).

Usually occurs in brackish to saline water from very shallow to 120 cm deep. W.Aust., Vic., Tas. and S.Aust. (Stoney Well I. and the Eyre Pen., Southern Lofty and S.E. regions).

4. *L. preissii* (Lehm.) F.Muell., *Fragm. Phyt. Aust.* 8:217 (1874). **Slender water-mat.** Leaves 1-8 cm long, linear, entire; female flowers on pedicels less than 1 mm long; perianth-segments 2.5-3 mm long; stigma very asymmetrically funnel-shaped; male flowers with 3 minute perianth-segments or lobes; anthers 3, fused to form a 6-celled anther mass; fruiting carpels smooth; carpel stalk less than 0.5 mm long.—*Zannichellia preissii* Lehm., *Pl. Preiss.* 2:3 (1846); *Althenia preissii* (Lehm.) Aschers. & Graebn., *Pflanzenreich* 4(11):160 (1907).

Occurs in brackish to saline water to 15 cm deep. W.Aust., Vic., Tas. and S.Aust. (Eyre Pen., Southern Lofty and S.E. regions).

3. ZANNICHELLIA L.

Sp. Pl. 969 (1753).

(After G. G. Zannichelli, an Italian botanist, 1662-1729.)

Stems much branched; leaves mostly opposite, very narrow-linear, not sheathing at the base but with a sheathing membranous stipule free of the leaf; flowers usually unisexual, monoecious, axillary; female flower with a cup-shaped perianth and 2-8 free carpels, each carpel with a short style and large asymmetrical funnel-shaped stigma; male flower consisting only of a single anther inserted at the base of the female flower.

One species in South Africa and 1 cosmopolitan.

1. *Zannichellia palustris* L., *Sp. Pl.* 969 (1753). Leaves 2-5 cm long, linear, entire; female flowers usually subsessile; fruiting carpel not keeled; carpel stalk very short.

Occurs in fresh and brackish water. Cosmopolitan, including New Zealand but in Australia recorded only in S.Aust. along the Murray Valley and at Meningie in the S.E. region.

FAMILY 24.—POSIDONIACEAE

Rhizomatous perennials growing submerged in sea water. Stems and rhizomes densely covered with long persistent fibres. Leaves alternate, sheathing at the base, linear, exstipulate. Flowers usually bisexual, without perianth or with 3 caducous segments (in European species), in axillary spikes; stamens 3 or 4; carpel 1 with a sessile stigma; fruit with 1 ventral seed. One genus with 1 species in the Mediterranean and 2 in Australia. (H. I. Aston (1973) *Aquatic plants of Australia*.)

1. POSIDONIA Koen.

Ann.Bot. 2:95 (1805).

(Greek *Poseidon*, Neptune, god of the sea.)

- | | |
|--|--------------------------|
| 1. Leaves 6-14 mm wide, with flat faces | <i>P. australis</i> 1. |
| 1. Leaves 1-3.5(-5) mm wide, with convex faces | <i>P. ostenfeldii</i> 2. |

1. *P. australis* Hook.f., *Fl.Tasm.* 2:43 (1858). **Fibre-ball plant, marine-fibre plant.** Leaves flat, 6-14 mm wide, (9-)11-21-nerved, with an open sheath, the sheath margins overlapping only near the base; ligule 0.5-1 mm high, well distinguished from the auricles; inflorescence spikes 2-7; fruit oblong-ellipsoid, often somewhat curved near the apex.

Occurs chiefly on sandy bottoms from about 20 cm below low-tide level to at least 10 m; from W.Aust., N.S.W., Vic., Tas. and S.Aust. (Eyre Pen., Yorke Pen., Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Sept.-Nov.; J. M. Black (1943) recorded flowers in May-Sept. Occurs in a range of habitats from very calm situations to moderately rough.

2. *P. ostenfeldii* Hartog, *Verh.K.ned.Akad. Wet., Afd. Natuurk.*, ser.2,59(1):139 (1970). Leaves elliptic in section, 1-3.5(-5) mm wide, 5-7(-9)-nerved, the sheath margins overlapping over their whole length; ligule to 2 mm high, not clearly distinguished from the auricles; inflorescence spikes 6-14; fruit falcate.

Occurs off the coast of W.Aust. and S.Aust. (Southern Lofty, Kangaroo I. and S.E. regions).

Mostly grows on rough-water coasts, but patches in Gulf St Vincent.

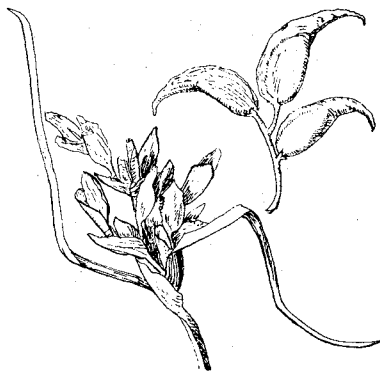


Fig. 42—*Posidonia australis*.

FAMILY 25.—POTAMOGETONACEAE

Herbs submerged (except for the spikes) or the upper leaves floating, in fresh or less often brackish water, usually with annual or perennial rhizomes. Leaves along the branches, alternate and/or opposite, with an axillary stipular sheath. Flowers bisexual, with 4 perianth-segments, in few- to many-flowered spikes; stamens 4, carpels 1-4, free, with stigma along the ventral suture or on a beak; fruiting carpels each with 1 basal-ventral seed. Cosmopolitan, with 2 genera and c.100 species.

1. POTAMOGETON L.

Sp. Pl. 126 (1753).(Greek *potamos*, a river; *geiton*, neighbour.)(Key taken from H. I. Aston (1973) *Aquatic plants of Australia*.)

1. Plants wholly submerged (except for the inflorescence), the leaves all sessile and \pm similar.
 2. Stipular sheath adnate below to the leaf base, the upper portion free and forming a distinct ligule; leaves very narrow-linear, less than 2 mm wide *P. pectinatus* 4.
 2. Stipular sheath almost completely free from the leaf; leaves, if linear, mostly more than 3 mm wide.
 3. Leaves narrow-lanceolate to linear-oblong, (3-)5-nerved without fine intermediate nerves, the margins serrulate and usually also undulate to strongly crisped *P. crispus* 2.
 3. Leaves linear, (3-)5-nerved with numerous fine, longitudinal, intermediate nerves, the margins entire, flat *P. ochreatus* 3.
1. Plants with the upper leaves emergent and floating, petiolate, and dissimilar to the submerged foliage (the 'broad-leafed' species).
 4. Floating leaves opaque, \pm leathery, with inconspicuous secondary venation.
 5. Floating leaves with 18-25 nerves *P. tepperi* 5.
 5. Floating leaves usually with 11-17 nerves *P. tricarinatus* 6.
 4. Floating leaves often \pm translucent, glossy, membranous, with conspicuous secondary venation *P. australiensis* 1.

1. ***P. australiensis*** A.Benn., *J.Bot., Lond.* 48:149 (1910). **Thin pondweed.** Perennial, with stems to 2.7 m long; emergent leaves floating, long-petiolate, somewhat membranous, translucent and shining, often quite glossy, prominently cross-veined between the primary parallel veins, and sometimes with finely undulate margins, broadly elliptic or ovate to almost round, 1.5-9.5 cm long; submerged leaves narrow elliptic or linear-lanceolate to broadly ovate, 5-23 cm long; stipular sheath free; spike (in fruit) 1.5-4.5 cm long; fruiting carpel 2-2.5 mm long, with 3 low, smooth keels.

Occurs in N.S.W., Vic., Tas., King I., Clarke I. and S.Aust. (Mt Gambier and near Millicent in the S.E. region).

2. ***P. crispus*** L., *Sp.Pl.* 126 (1753). **Curly pondweed.** Perennial, with stems to 4 m or more long; leaves all submerged, green to red-brownish, thin and translucent, serrulate and mostly gently to strongly crisped at the margins, usually narrowly lanceolate to linear-oblong, to 7 cm long; stipular sheath free; spike (in fruit) 1-2 cm long, fruiting carpel 5-7 mm long (including beak) with a conspicuous, thick, tapered, erect or somewhat curved beak up to almost as long as the body of the carpel, with a \pm crenulate dorsal keel and with sides smooth to strongly tuberculate.

Occurs in still or flowing water to 4.5 m deep in Europe, Africa, Asia, New Zealand, W.Aust., N.T., Qld, N.S.W., Vic. and S.Aust. (Northern and Southern Lofty and Murray regions). Flowers Nov.-May.

3. ***P. ochreatus*** Raoul, *Annls Sci.nat.*, ser. 3, 2:117 (1844). **Blunt pondweed.** Perennial, with stems to 4.5 m long; leaves all submerged, green to brown, translucent, with entire and flat margins, linear, 2.5-9(-13) cm long; stipular sheath free; spike (in fruit) 1.5-2.5 cm long; fruiting carpel 4-4.5 mm long (including beak), smooth or with faintly crenulate dorsal ridges.

Occurs in still or flowing water to 4.5 m deep in all States except N.T., and in New Zealand. In S.Aust from the Flinders Ranges, Southern Lofty, Kangaroo I. and S.E. regions.

Flowers principally in Nov. and Dec., but less often from Aug. to March.

4. ***P. pectinatus* L., *Sp.Pl.* 127 (1753). Fennel pondweed, sago pondweed.** Perennial, with stems to 3 m long; leaves all submerged, green or brownish, translucent, entire, narrowly linear, 1.5-15 cm long; stipular sheath adnate to the base of the leaf (the basal part forming a leaf sheath, the distal part forming a ligule); spike (in fruit) 1.5-4(-6) cm long; fruiting carpel 2.4-4 mm long, with a very short beak, smooth but usually with 3 obscure dorsal keels.

Cosmopolitan, occurring in fresh to saline, still or flowing water to 3 m deep. Not reported from N.T. or Qld. In S.Aust. from the Lake Eyre, Eyre Pen., Northern and Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers have been recorded from Sept. to May.

Distinguishable from *Ruppia maritima* by the stipules.

5. ***P. tepperi* A. Benn., *J.Bot., Lond.* 25:178 (1887).** Perennial; emergent leaves petiolate, ovate or orbicular, with (18-)19-25 nerves; spike (in fruit) 2.5-4 cm long; fruiting carpels 2-3 mm long, beak very short, with 3 almost smooth acute ribs.

Restricted to N.S.W. (cf. J. M. Black (1943), but not mentioned by Thompson (1961) *Contr.N.S.W.natn.Herb.*, Fl.ser. 9), and S.Aust. (Southern Lofty, Murray and S.E. regions).

Flowers Nov.-March.

The justification for separating this species from *P. tricarinatus* is doubted by both H. I. Aston (1973) and H.J. Eichler (1965).

6. ***P. tricarinatus* F. Muell. & A. Benn. ex A. Benn., *J.Bot.Lond.* 30:229 (1892). Floating pondweed.** Perennial, with stems to 2.7 m long; emergent leaves floating, long-petiolate, \pm thick and leathery, green, with inconspicuous secondary venation, broadly elliptic or ovate to round, 1.5-9.5 cm long; submerged leaves narrowly elliptic to broadly ovate, 5-23 cm long; stipular sheath free; spike (in fruit) 1.5-4.5 cm long; fruiting carpel 2.5-4 mm long, smooth or conspicuously sculptured, with 3 inconspicuous or crenulate or tuberculate dorsal ridges.—*P. cheesemanii* non A. Benn. (1883), sensu some Australian authors; *P. natans* non L. (1753), sensu R. Br., *Prod.Fl. Nov.Holl.* 343 (1810); *P. sulcatus* A. Benn., *Annln naturh.Mus.Wien* 7:294 (1892).

Occurs in still or gently flowing fresh water and on mud beside receding water in all States. In S.Aust. from the Eyre Pen., Flinders Ranges, Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers have been recorded from Sept. to April and in July.

P. acutifolius Link ex Roem. & Schult., *Syst.Veg.* 3:513 (1818). This is indigenous to Europe and Asia, but was recorded by F. Mueller from the Murray River. H. I. Aston (1973) considered this to be likely to be a Victoria or N.S.W. locality. She described it as similar to *P. ochreatus* but

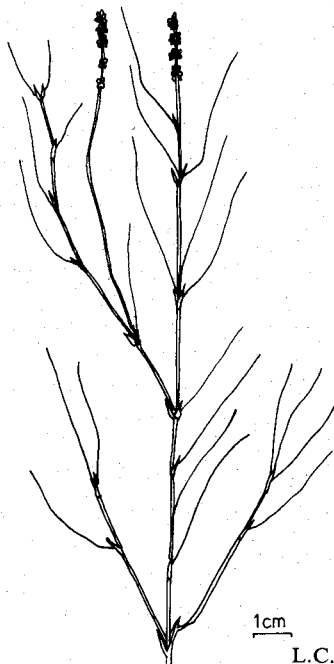


Fig. 43.—*Potamogeton pectinatus*.



Fig. 44.—*Potamogeton tricarinatus*.

distinguished by having an acute to acuminate leaf apex compared with the obtuse apex of *P. ochreatus*.

FAMILY 26.—RUPPIACEAE

Herbs submerged in brackish water, with perennial rhizomes. Stems absent or to 2 cm long. Leaves attached to stems or rhizomes, alternate or sub-opposite, with a basal sheath. Flowers bisexual, without perianth, in small spikes (but appearing sub-umbellate in fruit); stamens 2; carpels 4 or more, free, with sessile, peltate stigma; fruiting carpels long, stipitate in fruit, each with 1 pendulous seed.

Cosmopolitan, with 1 genus and, according to most authors, 2 or 3 species.

1. RUPPIA L.

Sp.Pl. 127 (1753).

(After H. B. Ruppius, a German botanist, 1689-1719.)

(Key after H. I. Aston (1973) *Aquatic plants of Australia*.)

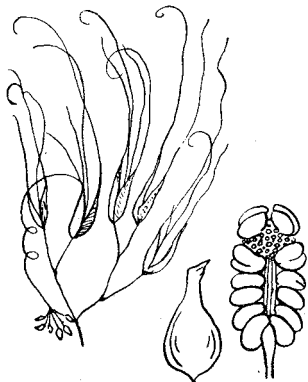


Fig. 45.—*Ruppia* sp.

1. Fruiting peduncle 0.5-5 cm long, shorter than to twice as long as the fruit stalks, not coiled; fruit very asymmetrical, ventral side convex, ending in a long beak, dorsal side strongly gibbous at the base

R. maritima 1.

1. Fruiting peduncle elongated, usually more than 10 cm long, several times as long as the fruit stalks, usually spirally coiled; fruit nearly symmetrical, ovoid with a slightly oblique beak

R. spiralis 2.

1. *R. maritima* L., *Sp.Pl.* 127(1753). **Sea tassel.** Leaf blade 2-20 cm long, \pm concave-convex in section, obtuse or ? emarginate, very finely serrulate; leaf sheath 1.5-5 cm long

with 2 small auricles above; inflorescence at first 4-7 mm long and enclosed within the bases of 2 sub-opposite leaves; flowers 2 per spike; fruiting carpels 2.5-3 (-5) mm long.

Cosmopolitan. Occurs in water with a salinity higher than sea water but rarely also in fresh water. It is possible that most or all of the S.Aust. material should be placed in *R. spiralis*. The distinction between these species is not resolved and it is possible that they will in future be combined.

2. *R. spiralis* L. ex Dumort., *Fl.Belg.* 164 (1827). This species is not definitely distinguishable from the older *R. maritima*. The characters cited by H. I. Aston (1973) for separating these species are indicated in the key. Obermeyer (1966) *Flora of Southern Africa*, vol. 1, believed that *R. spiralis* required a higher salinity. Hj. Eichler (1965) considered *R. spiralis* to be the principal (if not the only) species in S.Aust.

In S.Aust. the genus probably occurs in all regions, but has been collected most frequently in the south of the State.

R. tuberosa J. S. Davis and Tomlinson, *J.Arn.Arb.* 55:60 (1974). This species was described from W.Aust., characterised by having sessile fruits and turions (modified shoots which serve for storage and possibly propagation). These features have been observed in S.Aust. material of *Ruppia* and it is possible that 1 or both S.Aust. spp. should be referred to *R. tuberosa*.

FAMILY 27.—NAJADACEAE

Herbaceous annuals or perennials, submerged in fresh water. Stems much-branched. Leaves sub-opposite, with a sheathing base. Flowers monoecious or dioecious, with or without a simple

perianth, solitary or aggregated; stamen 1; ovary of 1 carpel, with a filiform style with 2-3 stigmatic branches; fruit a nut with 1 basal, exendospermous seed. One cosmopolitan genus with c. 50 species (H. I. Aston (1973) *Aquatic plants of Australia*).

1. *NAJAS* L.

Sp.Pl. 1015 (1753).

(Greek *naïas*, naiad or water-nymph.)

1. *N. tenuifolia* R.Br., *Prod.Fl.Nov.Holl.* 345 (1810). **Water nymph.** Main stems erect to c. 45 cm long; leaves narrowly linear, usually 2-4 cm long, finely toothed on the margins; leaf-sheath with auricles and with 2 minute sheath-scales in its axil; flowers axillary, solitary or 2-3 together, monoecious; male flower of 1 anther tightly clasped by a 2 lobed perianth; and an almost closed spathe; female flower without a perianth or spathe; fruiting carpel c. 3-4 mm long.

Occurs usually in fresh water in all States, except Tas., and in Malaysia and New Caledonia. In S.Aust. occurs in the Murray region.

Flowers are usually produced between Jan. and March.

J. M. Black (1943) recorded *N. major* All. as well and Hj. Eichler (1965) corrected that name to *N. marina* L. However, H. I. Aston (1973) does not report this species for S.Aust. *N. marina* is dioecious with large spines on the thicker leaves and lacking the leaf-sheath auricles. There is no material of *N. marina* in the State Herbarium. J. M. Black (1943) reported *N. major* from the Murray River where *N. tenuifolia* has been collected. It is, therefore, uncertain whether *N. marina* occurs in S.Aust.

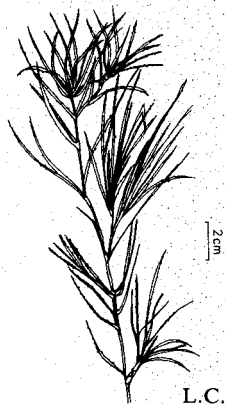


Fig. 46—*Najas tenuifolia*.

FAMILY 28.—APONOGETONACEAE

Fresh water plants, usually with a tuberous rhizome. Leaves submerged, aerial or with a floating lamina, linear to elliptic, petiolate. Flowers bisexual or female, with 1-3 perianth-segments (? = bracts), arranged in simple or forked spikes enclosed within a usually caducous spathe; stamens 6-16, free; carpels 3-6, free, with a simple style and stigma along ventral surface of style, with 2-8 basal ovules in each carpel; fruiting carpels membranous. One genus in Africa, Asia and Australia with c. 25 species. (H. I. Aston (1973) *Aquatic plants of Australia*.)

1. APONOGETON L.f.

Suppl. 32 (1781).

(*Aponus*, the Latin name of the town of Albano, and Greek *geitōn*, near.)

*1. *A. distachyos* L.f., *Suppl.* 215 (1781). **Cape pond lily, Cape water-hawthorn.** Tubers to 6 cm diam.; leaves all basal; leaf lamina floating, lanceolate to oblong, 6-20 cm long; peduncle emergent, bearing two terminal diverging spikes—each to 6 cm long; spathe enclosing bud but early caducous; flowers c. 12-14 per spike, fragrant; perianth-segment 1, white or pink, c. 15 mm long; anthers conspicuous, purplish.

Introduced from South Africa; naturalised in Europe, South America, New Zealand, Vic. and S.Aust. (Southern Lofty region).

Flowers in winter and spring.



Fig. 47—*Aponogeton distachyos*.

FAMILY 29.—JUNCAGINACEAE

Annual or perennial plants often in wet (fresh or salt water) places, with a tuberous or non-swollen root-stock, and distichous, erect, basal, with a basal sheath. Flowers bisexual or unisexual and dioecious, with 2-6 perianth-segments arranged in a simple ebracteate raceme or spike; stamens 4-6, with sessile or subsessile anthers; carpels 3-6, free or connate, with subsessile, more or less plumose stigma, with 1 erect or pendulous ovule in each; fruit dry, with exendospermous seeds. = Scheuchzeriaceae sensu J. M. Black (1943). Three genera; cosmopolitan, but predominantly Australian (2 monotypic).

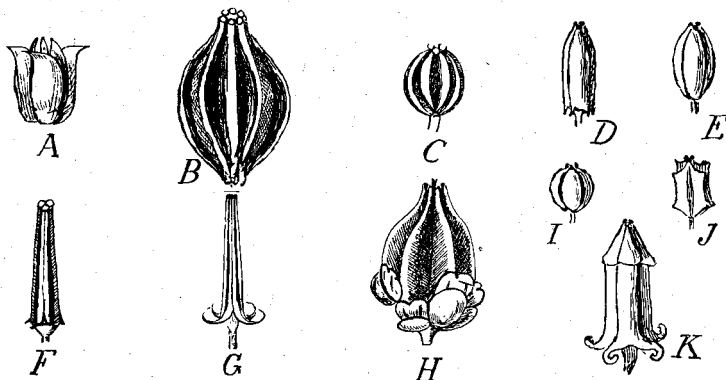


Fig. 48—*Triglochin*. Fruits: A, *T. mucronatum*; B, *T. procerum*; C, *T. striatum*; D, *T. trichophorum*; E, *T. muelleri*; F, *T. centrocarpum*; G, *T. calcitrapum*; I, *T. ovoideum*; J, *T. hexagonum*; K, *T. turiferum*. H, flower of *T. procerum*.

1. TRIGLOCHIN L.

Sp.Pl. 338 (1753).

(Greek *treis*, three; *glōchis*, a point, alluding to the points of the carpels.)

1. Fertile carpels 3, alternating with 3 barren persistent carpels.
2. Perennial; leaves 1-3 mm broad; stoloniferous *T. striatum* 8.
2. Annuals; leaves up to 1 mm broad; lacking stolon.
3. Fruit truncate; carpels with a spreading point, but not winged *T. mucronatum* 4.
3. Fruit pointed or rounded or, if truncate, then carpels winged.
4. Fruit contracting gradually towards the apex, sublinear, with spreading spurs at the base.
5. Carpels with conspicuous incurved basal spurs *T. calcitrapum* 1.
5. Carpels with short inconspicuous spurs *T. centrocarpum* 2.
4. Fruit truncate or rounded at apex, if sublinear then with minute downwardly pointed spurs or no spurs.
6. Fruit truncate, winged *T. hexagonum* 3.
6. Fruit obtuse to acute at the apex, without wings
7. Fruit with minute basal spurs *T. trichophorum* 9.
7. Fruit lacking basal spurs.
8. Fruit oblong, c. 2 mm long; racemes loose *T. muelleri* 5.
8. Fruit ovoid, c. 1 mm long; racemes dense *T. ovoideum* 6.
1. Fertile carpels 3 or 6, all fertile.
9. Raceme usually with fewer than 10 flowers; carpels 3 *T. turiferum* 10.
9. Raceme usually with more than 50 flowers; carpels 6 *T. procerum* 7.

1. ***T. calcitrapum*** Hook., *Icon.Pl.* 8:t.371 (1845). **Spurred arrowgrass.** Slender annual with filiform leaves shorter than the erect or ascending scape, which is 5-15 cm high; racemes 2-6 cm long, 6-23-flowered; fruits pyramidal-linear, 5-6 mm long, c. 1 mm thick near base, subsessile or on slender pedicels to 4 mm long; each fertile carpel keeled down back when dry and with 2 prominent incurved basal spurs, often with 2 minute deflexed spurs connected by a membrane between the long incurved spurs.—*T. elongatum* Ising, *Trans.R.Soc.S.Aust.* 56:183 (1933), *nom.illegit.*, non Buch., *Pflanzenreich* 4(14):10 (1903); *T. calcitrapum* var. *isingianum* J. M. Black, *Fl.S.Aust.* 50 (1943).

Occurs in all Australian mainland States in temporarily wet places. Recorded in S.Aust. from all regions except Yorke Pen. and Kangaroo I. The short deflexed spurs on the fruit are too variable to justify retention of var. *isingianum*.

2. ***T. centrocarpum*** Hook., *Icon.Pl.* 8:t.728 (1845). **Dwarf arrowgrass.** Slender annual with filiform leaves shorter than the erect or ascending scape, which is 5-15 cm high; racemes 2-6 cm long, 6-23-flowered; fruits pyramidal-linear, 3-5 mm long, c. 1 mm thick near base, on slender pedicels 1-3 mm long; each fertile carpel keeled down the back when dry, with no prominent spurs, but only 2 short acute protuberances at the base of each carpel.

Recorded from all States, growing in damp soil but not in permanent water. Occurs throughout S.Aust.

3. ***T. hexagonum*** J. M. Black, *Trans.R.Soc.S.Aust.* 49:270 (1925). **Six-point arrowgrass.** Small, weak annual with flaccid filiform leaves and scapes; leaves usually longer than scapes, which are 2-8 cm long; racemes dense, 5-25 mm long, almost truncate at top and base, 10-25-flowered; fruits subsessile, angular-oblong, 1-75 mm long, the 3 fertile carpels 1 mm broad, flat on back, acute at summit and base, with 2 scarious 2-angled wings, so that the whole carpel is 6-angled on its back, no basal spurs.

Rare and local in Vic., N.T. and S.Aust. The only records for S.Aust. are two from the Eyre Pen. and Murray regions. Habitat unknown.

4. ***T. mucronatum*** R.Br., *Prod.Fl.Nov.Holl.* 343 (1810). **Prickly arrowgrass.** Small annual with filiform leaves shorter than the scape, which is 2-10 cm high; racemes to 1-5 cm long, few-flowered, sometimes with only 1 terminal flower; fruits almost sessile or shortly pedicellate, top-shaped, truncate and free at summit, c. 3 mm long, the 3 fertile carpels each with a conspicuous horizontal mucro at the upper angle.

Occurs on saline soils in W.Aust., Vic. and S.Aust. (Eyre Pen., Yorke Pen., Southern Lofty, Kangaroo I. and S.E. regions).

5. ***T. muelleri*** Buch., *Pflanzenreich* 4(14):10 (1903). Small annual; leaves filiform, mostly shorter than the scapes, which are c. 10 cm long; racemes 1-4 cm long, with 3-15 rather distant flowers; fruits subsessile or on very short pedicels, oblong, obtusely narrowed at summit and base, 2 mm long by 1 mm thick, the 3 fertile carpels subcylindrical, rounded on back, no basal spurs.

Recorded from W.Aust. and S.Aust. (Eyre Pen. and S.E. regions).

6. ***T. ovoideum*** J. M. Black, *Trans.R.Soc.S.Aust.* 64:371 (1940). Small weak annual with flaccid filiform leaves and scapes; leaves usually longer than scapes, which are 2-8 cm long; racemes dense, 8-12 cm long, 10-35-flowered; fruits ovoid or ovoid-oblong, 1-1.25 mm long by 0.75 mm thick, the 3 fertile carpels rounded on back; no spurs.

Only known from S.Aust. along the River Murray. Habitat unknown.

7. ***T. procerum*** R.Br., *Prod.Fl.Nov.Holl.* 343 (1810). **Water-ribbons.** Robust perennial; leaves long (to 2 m or more long), flat, 5-35 mm broad, the upper part often floating; scape stout, the dense terminal racemes 10-30 cm long, 60-100-flowered, the 6 stigmas prominent and recurved after flowering; fruits shortly pedicellate, from subglobular to broadly ellipsoid,

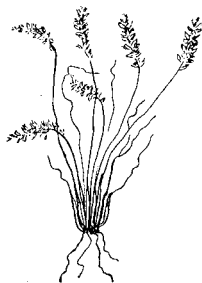


Fig. 49—*Triglochin hexagonum*.

c. 10 mm long by 8 mm thick, all the 6 carpels usually fertile, connate below middle, 3-nerved and rounded on back, compressed laterally; no carpophore or spurs.

Grows in fresh water to 1.5 m deep. In swift-flowing streams the leaves float; in shallow still water they are erect.

Occurs in all States. Recorded in S.Aust. from the Southern Lofty, Murray, Kangaroo I. and S.E. regions. A critical revision of the forms in this species is needed.

8. ***T. striatum*** Ruiz & Pavon, *Fl. Peruv. et Chil.* 3:72 (1802). **Streaked arrowgrass.** Stolonerous perennial with narrow-linear leaves 1-3 mm broad, shorter or longer than the scape; scape 3-25 cm high, racemes 2-15 cm long, usually many-flowered (10-100), the lower flowers rather distant; fruit almost globular, c. 2 mm long, the 3 fertile carpels streaked on the rounded back; sterile carpels broad.

Grows in fresh to saline water of swamps, lakes, river edges and mangroves in the Americas, South Africa, New Zealand and all Australian States except the N.T. In S.Aust. recorded from the Flinders Ranges, Eyre Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions.

9. ***T. trichophorum*** Nees ex Endl. in Lehm., *Pl. Preiss* 2:54 (1846). Small annual with filiform leaves shorter than scape, which is 4-8 cm long; racemes 1-2 cm long, 2-12-flowered; fruits oblong, 2-2.5 mm long by 1.25-1.5 mm thick on pedicels of 1-2 mm, 3 fertile carpels almost cylindrical, narrowed towards summit, obtuse and not tapering at base, with 2 minute basal spurs pointing downwards and united by a membrane.

?W.Aust and S.Aust. (Eyre Pen., Yorke Pen., Southern Lofty and S.E. regions).

10. ***T. turriterum*** Ewart, *Victorian Nat.* 23:43 (1906). **Turret arrowgrass.** Small annual; leaves filiform-linear, c. 1 mm broad, often longer than the slender scapes, which are c. 6 cm long; racemes 2-4 cm long, with 5-8 rather distant flowers; fruits shortly pedicellate, c. 4 mm long by 1.5 mm thick, cylindrical with a short conical summit, the 3 carpels rounded on back, rigid, connate in all their length, each with 2 short thick spreading basal spurs, usually hooked at the extremity; no carpophore.

Known principally from Vic. but a single record from S.Aust. (S.E. region).

FAMILY 30.—ALISMATACEAE

Perennial or less often annual lactiferous aquatic or marsh plants, with a rhizome. Leaves basal, subdistichous, petiolate, erect (in S.Aust. species). Flowers bisexual or unisexual (then usually monoecious), with 3 sepals and 3 petals, arranged in tall pedunculate usually trimerous racemes or panicles; stamens 3-numerous; ovary of 2-numerous free or rarely united carpels, with a single style and usually a single (rarely several) basal or ventral ovule; fruit a follicle, drupe or achene with exendospermous seed(s). Thirteen genera and 70-90 species, cosmopolitan. (H. I. Aston (1973) *Aquatic plants of Australia*.)

1. Flowers mostly unisexual; stamens numerous; carpels numerous... SAGITTARIA 3.
1. Flowers bisexual; stamens 6; carpels c. 6-20.
 2. Ripe carpels c. 20, 1-seeded, rounded at summit... ALISMA 1.
 2. Ripe carpels 6-10, 2-seeded, tapering into a long pointed beak... DAMASONIUM 2.

1. ALISMA L.

Sp. Pl. 342 (1753).

(Greek and Latin name of the plant.)

Aquatic plants with a woody rhizome; leaf blade linear-lanceolate to elliptic, cordate to cuneate at base; flowers bisexual; inflorescence a verticillate, pyramidal usually compound panicle; stamens 6 in pairs opposite the petals; filaments filiform; carpels 10-20, free, situated in a whorl; style ventral, filiform; fruit and 1-seeded achene.

Cosmopolitan with c. 10 species.

*1. *A. lanceolatum* With., *Bot. Arr. Brit. Pl.* ed. 3, 2:362 (1796). Rhizome tuberous; leaves on petioles often 12-50 cm long; blade lanceolate, cuneate at the base, usually 12-30 cm long; inflorescence much branched, to 1 m high; flowers pink, to 9 mm diam.; petals acute; anthers little longer than broad—*A. plantago* non L., sensu J. M. Black *Fl. S. Aust.* 52 (1943).

Native to Europe, North Africa and Western Asia. Introduced into Vic. and S. Aust. (Southern Lofty and Murray regions). Grows in damp ground or shallow water.

Flowers Dec.-Feb.

Close to *A. plantago-aquatica* L., which is indigenous to the eastern states; incorrectly called *A. plantago* by J. M. Black.

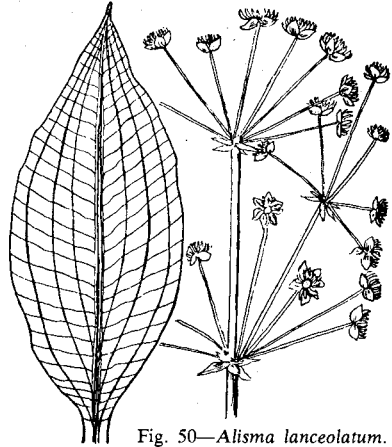


Fig. 50—*Alisma lanceolatum*.

2. DAMASONIUM Mill.

Gard. Dict. Abr. ed. 4 (1754).

(Greek *damazo*, to subdue, because one species was said to overcome poison.)

Aquatic plants; leaf blade lanceolate to ovate or elliptic, often cordate at base; flowers bisexual; inflorescence a verticillate, pyramidal usually compound panicle; stamens 6 in pairs opposite the petals; filaments filiform; carpels 6-10, in 1 whorl, connate at base; style apical, narrowly conical; fruit spreading 2-seeded achenes. Five species from Europe, North Africa, Asia, North America and Australia.

1. *D. minus* (R.Br.) Buchen, *Abh. naturw. Ver. Bremen* 2:20 (1868). **Star-fruit.** Leaves on long petioles; blade lanceolate to ovate, obtuse to cordate at the base, to 10 cm long; inflorescence a panicle 20-50 cm high; flowers pale pink, 6 mm diam.; petals ovate.—*Actinocarpus minor* R.Br., *Prod. Fl. Nov. Holl.* 343 (1810); *D. australe* Salisb., *Trans. Hort. Soc. Lond.* 1:268 (1812).

Occurs in shallow and semi-permanent water in all States, but not N.T. Collected near Mannum (Murray region) in 1883 and in the S.E. in 1971.

Flowers throughout the year.

3. SAGITTARIA L.

Sp. Pl. 993 (1753).

(Latin *sagittarius*, appertaining to an arrow, referring to the shape of the leaf.)

Aquatic plants; leaf blade linear to ovate, sometimes sagittate; flowers unisexual, some bisexual; inflorescence of several simple or rarely slightly branched whorls, with the upper flowers male; stamens numerous; filaments broad; carpels numerous, free, spirally arranged; style conical, fruit 1-seeded. Cosmopolitan, with c. 20 species, none native to Australia.



Fig. 51—*Damasonium minus*.

*1. *S. graminea* Michx., *Fl. Bor. Am.* 2:396 (1803). *Sagittaria*. Base perennial with stolons, corm and/or rhizome; emergent leaves with petiole to 55 cm long and blade linear to ovate, 10-25 cm long; submerged leaves strap-shaped or tapered-terete, to 50 cm long; inflorescence 5-120 cm long, erect or bending at about half its length, bearing 2-12 whorls of flowers; flowers white or pink.

Occurs in fresh water to 45 cm deep. Native to North America, introduced into the eastern States of Australia and recorded in S. Aust. from the Murray region (near Mannum).

Flowers have been sporadically recorded from Jan. to June.

H. I. Aston (1973) states that the variety in Australia is *S. graminea* var. *weatherbiana* (Fern.) Bogin, *Mem. New York Bot. Gard.* 9:209 (1955) (*S. weatherbiana* Fern., *Rhodora* 37:387 (1935)).

FAMILY 31.—HYDROCHARITACEAE

Fresh water or marine partially or completely submerged herbs, rarely free-floating. Leaves basal or along the stems, with scales in their axils. Flowers monoecious or dioecious, rarely bisexual, perianth often in 2 whorls of 3, usually axillary; stamens usually 3-numerous; ovary inferior, 1-celled with usually 3-6 parietal placentas, with usually 3-6 styles which are simple or bifid; fruit often fleshy or leathery, the walls becoming mucilaginous, less often dry and dehiscent. Cosmopolitan, with c. 16 genera and 80 species. (H. I. Aston (1973) *Aquatic plants of Australia*.)

- | | |
|--|----------------|
| 1. Fresh water plants. | |
| 2. Leaves on a distinct stem, in whorls | HYDRILLA 2. |
| 2. Leaves all basal, in tufts. | |
| 3. Leaves linear | VALLISNERIA 4. |
| 3. Leaves petiolate, the blade elliptic to ovate (linear in juveniles) | OTTIELIA 3. |
| 1. Marine Plants | HALOPHILA 1. |

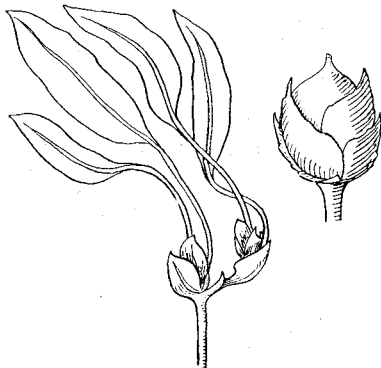


Fig. 53—*Halophila ovalis*.



Fig. 52—*Sagittaria graminea*.

1. *HALOPHILA* Thou.

Gen. Nov. Madag. 2 (1806).

(Greek *hals*, *halos*, salt or the sea; *philos*, loving.)

Marine, with creeping perennial rhizome, with an abbreviated shoot and a pair of leaves at each node; leaves opposite, sessile or petiolate, glabrous or pubescent; flowers monoecious or dioecious, usually solitary in the axil of a secondary shoot; male flowers shortly pedicelled, with 3 perianth-segments and 3 anthers; female flowers sessile, with 3 perianth-segments and 2-5 styles; fruit ovoid, thin-walled; seeds few to many. 8 species from America, Africa, Asia and Australia.

1. *H. ovalis* (R.Br.) Hook.f., *Fl. Tasm.* 2:45 (1858). *Sea-wrack*. Submerged, little branched, lateral shoots not developed; dioecious; leaves with

petiole 1-7 cm long, blade entire, glabrous, linear to ovate, 2-7 cm long, with a central nerve, 2 fine marginal nerves and several oblique lateral nerves; male flowers with perianth-segments deeply concave and 4-5 mm long; female flowers with segments less than 1 mm long—*Caulinia? ovalis* R.Br., *Prod.Fl.Nov.Holl.* 339 (1810); *H. australis* Doty & Stone, *Brittonia* 18:306 (1967).

Occurs on the coasts of Africa and Asia; in Australia known from all States. In S.Aust. from the Eyre Pen., Yorke Pen., Southern Lofty and Kangaroo I. regions. Grows on sandy or muddy bottoms usually below low-tide level to 11 m or more below low-tide.

Flowers have been recorded from Oct. to Jan.

Generally in fairly calm areas but especially along sides of channels.

S.Aust. material should probably be placed in subsp. *australis* (Doty & Stone) Den Hartog (1970) *Verh.K.ned.Akad.Wet.,Afd.Natuurk.*, ser. 2, 59(1):251, but further work on the species is needed.

2. HYDRILLA L. C. Rich.

Mem.Cl.Sci.Math.Inst.Natl.France 12 (2):9,61,76 (1814).

(A diminutive of *Hydra*, the water serpent slain by Hercules.)

Fresh water; leaves in whorls of usually 4-6 mostly well-spaced along the stems, sessile, glabrous; flowers usually dioecious, arising from spathes in the leaf axils; male flowers released as a bud and opening as a free-floating flower on the water surface, with 3 sepals, 3 petals and 3 stamens; female flowers pedicellate, with 3 sepals, 3 petals, 3 placentas and a single style with 3 stigmas; fruit more or less cylindrical, seeds 2-6. 1 species from Europe, Africa, Asia and Australia.

1. *H. verticillata* (L.f.) Royle, *Ill.Bot.Himal. Mount.* 1:376 (1839). **Waterhyme, hydrilla.** Submerged, much-branched; usually dioecious; leaves strongly serrulate, linear to lanceolate, 6-40 mm long, 1-nerved; male flower with perianth-segments 1.2-3 mm long, the sepals broad ovate-elliptic, the petals narrow linear; female flowers on pedicel to 10 cm long and similar perianth to the male.—*Serpicula verticillata* L.f., *Suppl.* 416 (1781).

Recorded from all Australian States except Tas. Recorded in S.Aust. from the Murray river. Grows in still or slow-flowing water to at least 3.5 m deep.

Flowers in April and May. Wind-pollinated; the male flower becomes detached and free-floating, the female flower opens on the surface but remains attached.

3. OTTELLIA Pers.

Syn.Pl. 1:400 (1805).

(From *ottel-ambel*, the native name of an Indian species.)

Fresh water, rooted perennials; leaves all basal, emergent or floating, sessile or petiolate, glabrous; flowers monoecious, dioecious or bisexual, enclosed within spathes at the ends of peduncles; sepals 3, petals 3, larger, white or yellow, sometimes with a reddish base; stamens 6-15; ovary with 3-9 placentas, styles 3-15, each with a 2-branched stigma; fruit flask-shaped or ellipsoid, with a beak formed by the lower part of the perianth, the wall disintegrating; seeds numerous. About 40 species in the tropics and subtropics.

1. *O. ovalifolia* (R.Br.) L.C. Rich., *Mem.Cl.Sci.Math.Inst.Natl.France* 12(2): 27, 78 (1814). **Swamp lily.** Perennial, with floating leaves and bisexual flowers; leaves with petioles 60-120 cm long, blade elliptic to ovate, 2-16 cm long, with 5-7 longitudinal nerves and



L.C.

Fig. 54—*Hydrilla verticillata*.

numerous transverse connecting veins; flowers solitary at the end of each peduncle, c. 5 cm across, emergent, sessile within a 2-lobed green to purplish spathe 3-6 cm long; petals cream-white with dark reddish-purple base; Cleistogamous flowers in which the flower remains within the spathe also occur.—*Damasonium ovalifolium* R.Br., *Prod.Fl.Nov.Holl.* 344 (1810).

Occurs mainly in still water usually to 60 cm in all mainland Australian States. recorded in S. Aust. from the Eyre Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions. Also in New Caledonia and introduced into New Zealand.

Flowers Nov.-March.

4. VALLISNERIA L.

Sp.Pl. 1015 (1753).

(After Antonio Vallisneri, an Italian doctor and botanist, 1661-1730.)

Fresh water, submerged perennials with a stolon; leaves in tufts along the stolons or alternate or opposite along them, linear, strap-shaped, glabrous; flowers dioecious, within a spathe; male flowers small and numerous in a head, becoming detached and free-floating, with 3 sepals and no petals; female flowers solitary, with 3 sepals and 3 petals; stamens 2 or 3, the filaments partly united; ovary with 3 placentas, which are often obscure, and 3 sessile stigmas; fruit narrow cylindrical, many-seeded. 6-10 species from the tropics and subtropics.

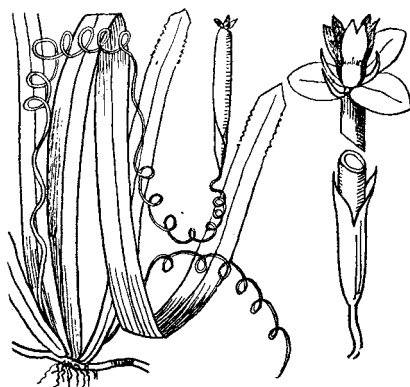


Fig. 55—*Vallisneria spiralis*.

1. *V. spiralis* L., *Sp.Pl.* 1015 (1753). **Ribbon-weed, eel-grass.** Perennial, submerged, with stolon; leaves in tufts along the stolons, long, linear, usually minutely toothed towards the apex, to 2 (rarely 6) m long, with 5-9 main longitudinal veins; male flowers less than 1 mm long, many within a spathe 1-2 cm long, anthers 2 or 3; female flowers 1.5-2.5 cm long, sessile and solitary within a spathe 1.5-2 cm long, at the end of a long peduncle, after pollination the female peduncles coil spirally, petals minute.—*V. nana* R.Br., *Prod.Fl.Nov.Holl.* 345 (1810); *V. gigantea* Graebner, *Bot.Jb.* 49:68 (1913).

If the species is correctly identified it occurs in Europe, Africa, Asia and all Australian States in still to fast flowing fresh water. However, Den Hartog (1957) in *Fl.Males.* 5:381-413 considered the Australian material belonged to *V. gigantea* which he separated from *V. spiralis*. H. I. Aston (1973) did not accept this and her decision is tentatively followed here. Recorded in S.Aust. from the Southern Lofty and Murray regions.

Flowers Nov.-May. The female flowers are carried to the surface by the elongation of the peduncles so that only the stigmas emerge. The pollen is carried by the male flowers which drift free on the surface.

FAMILY 32.—GRAMINEAE (POACEAE)

Herbs "grasses" with alternate linear leaves, embracing the stem with long sheaths, which are slit at maturity on the side opposite to the blade and are usually convolute (i.e. one margin is rolled over the other); sheath ending at the base of the blade in a tongue-like membrane (*ligule*), sometimes very short or reduced to hairs; stems usually hollow between the nodes. When the blades are narrow the margins are usually involute. Most of the stem (or sometimes all of it) is usually concealed by the leafsheaths; the nodes are the swollen bases of the sheaths. Flowers small, bisexual, rarely unisexual, naked in the axil of a concave bract (the *lemma*), opposite to

and enclosed in which is another usually 2-nerved bract (the *palea*). The palea envelops the flower, which consists of a 1-celled carpel with one ovule and 2 styles with feathery stigmas and usually 3 stamens with versatile anthers. (The term "flower" is generally understood to include the lemma and palea.) At the base of the ovary are 2 (rarely 1, 3 or 0) minute delicate scales (the *lodicules*) usually regarded as the perianth. Below the lemma and palea, and enclosing them more or less, are 2 (rarely 3 or 4) empty bracts (the *glumes*). All these together form a 1-flowered *spikelet*, but there may be several flowers arranged alternatively on opposite sides of a common axis (the *rhachilla*)—so that the upper flowers often appear to be stalked—with the glumes at the base, the whole forming a several-flowered spikelet; spikelets arranged in a spike, raceme or panicle. The fruit (grain or caryopsis) consists of the single albuminous seed and the thin pericarp, which are usually inseparable. At the base of the fruit, and on its anterior or outer side (i.e. that which faces the lemma), is a small protuberance showing the position of the embryo; on the posterior or inner side (that facing the palea) is either a punctiform or linear mark (the *hilum*), which indicates the spot where the ovule was attached to the wall of the ovary; the hilum often lies in a furrow.

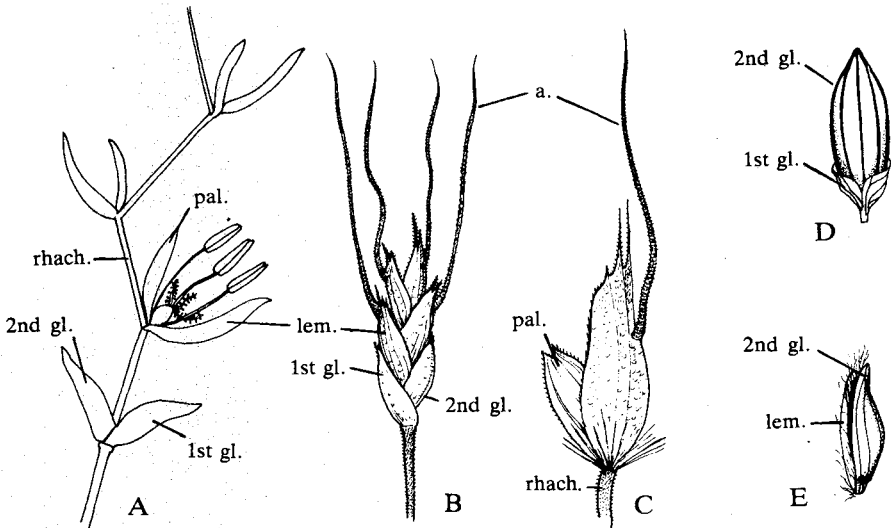


Fig. 56—Spikelet morphology in the Gramineae. A, diagrammatic representation of the principal parts. B, *Amphibromus archeri* spikelet; C, *A. archeri* single flower. D, *Brachiaria miliiformis* (1-flowered, awnless). E, *Paspalum dilatatum* (1-flowered, awnless, 1st glume lacking). (1st gl.; lower glume. 2nd gl.; upper glume. lem; lemma. pal; palea; a; awn. rhach.; rhachilla.)

Genera are grouped into tribes to bring related genera together. The allocation of genera to tribes is, however, controversial and many of the placings used here may prove to be unsatisfactory.

1. Inflorescence of a group of 1-4 spikelets enclosed within the upper leaf-sheaths (*kikuyu*) PENNISETUM 98.
1. Inflorescence not enclosed within leaf-sheaths or, if partly so then of more than 4 spikelets.
2. Inflorescence an umbel, digitate or subdigitate.
3. 1 or more glumes and/or lemmas awned GROUP A

3. Glumes and lemmas not awned (awns or bristles may arise from other parts of the inflorescence).
4. Plants dioecious.
 5. Rhachis of inflorescence branches continued beyond spikelets as an awn SPINIFEX 102.
 5. Rhachis of inflorescence branches not forming an awn ZYGLOCHLOA 104.
4. Plants monoecious.
 6. Bisexual floret single; lemmas 1 or 2 GROUP B
 6. Bisexual florets 2-7; lemmas 3 or more GROUP C
2. Inflorescence a raceme, spike or panicle.
7. Inflorescence a raceme or spike.
 8. 1 or more glumes and/or lemmas awned.
 9. Lemmas 1 or 2 GROUP D
 9. Lemmas 3 or more GROUP E
 8. Glumes and lemmas awnless.
 10. Lemma single.
 11. Glume single.
 12. Spikelet 7 mm long MONERMA 67.
 12. Spikelets 2-3 mm long ZOYSIA 88.
 11. Glumes 2.
 13. Spikelets surrounded by conspicuous bristles or spines CENCHRUS 90.
 13. Spikelets lacking bristles or spines PARAPHOLIS 68.
 10. Lemmas 2 or more GROUP F
7. Inflorescence a panicle (sometimes spike-like).
14. 1 or more glumes and/or lemmas awned.
 15. Lemma single GROUP G
 15. Lemmas 2 or more.
 16. Bisexual florets 2 or more per spikelet GROUP H
 16. Bisexual floret single GROUP I
14. Glumes and lemmas not awned
 17. Lemma single GROUP J
 17. Lemmas 2 or more.
 18. Bisexual floret 1 per spikelet, or spikelets all unisexual GROUP K
 18. Bisexual florets 2 or more GROUP L

GROUP A

1. Spikelets in pairs or threes (1 sessile in each group).
2. Both spikelets in each pair fertile EULALIA 112.
2. Only one spikelet fertile.
 3. Spathes supporting the pairs of racemes.
 4. Awn glabrous CYMBOPOGON 110.
 4. Awn hairy on lower part HYPARRHENIA 114.
 3. Groups of racemes far exceeding any bracts at their base .. DICHANTHIUM 111.
1. Spikelets singly arranged in 2 rows along the rhachis.
 5. Lemma laterally compressed CHLORIS 81.
 5. Lemma dorsally compressed ENTEROPOGON 83.

GROUP B

1. 1st glume 0 or minute PASPALUM 97.
1. 1st glume well-developed.

- 2. Spikelets in pairs DIGITARIA 91.
- 2. Spikelets single arranged in 2 rows along the rachis.
 - 3. Lemma longer than glumes CYNODON 82.
 - 3. Lemma shorter than glumes BRACHYACHNE 80.

GROUP C

- 1. Rhachis of spike ending in a rigid point DACTYLOCTENIUM 72.
- 1. Rhachis of spike not ending in a point.
 - 2. Spikes 2-5; lemma c. 3-4 mm long; glumes and lemmas prominently keeled ELEUSINE 74.
 - 2. Spikes 6-20; lemma c. 2 mm long LEPTOCHLOA 77.

GROUP D

- 1. Spikelets reflexed PEROTIS 86.
- 1. Spikelets erect.
 - 2. Spikelets with 2 bisexual florets SECALE 26.
 - 2. Spikelets with 1 bisexual floret.
 - 3. Spikelets in 3's; glumes 2 HORDEUM 25.
 - 3. Spikelets solitary; glume-single (minute) PSILURUS 70.

GROUP E

- 1. Spikelets with 1 bisexual floret EHRHARTA 1.
- 1. Spikelets with 2 or more bisexual florets.
 - 2. Lemma entire
 - 3. Spikelets shortly pedicellate BRACHYPODIUM 19.
 - 3. Spikelets sessile.
 - 4. Spikelets 2 or 3 together ELYMUS 24.
 - 4. Spikelets solitary along rhachis.
 - 5. Spikes cylindrical TRITICUM 27.
 - 5. Spikes compressed.
 - 6. Glume 1; spikelets appressed to rhachis by their edges LOLIUM 36.
 - 6. Glumes 2; spikelets appressed to rhachis by one of their flattened faces AGROPYRON 23.
 - 2. Lemma distinctly lobed.
 - 7. Spikelets shortly pedicellate in a symmetrical raceme.
 - 8. Lower sheaths woolly around the more or less swollen base of the plant MONACHATHER 12.
 - 8. Lower sheaths not woolly DANTHONIA 10.
 - 7. Spikelets sessile in a unilateral spike.
 - 9. Lateral lobes of lemma long, rigid, acute ASTREBLA 9.
 - 9. Lateral lobes of lemma short, membranous, rather obtuse TRIPOGON 78.

GROUP F

- 1. Plants dioecious; leaves strongly distichous; lemmas keeled DISTICHLIS 32.
- 1. Spikelets bisexual; leaves often basal; lemmas often rounded.
 - 2. Spikelets all distinctly pedicellate (the pedicels at least one-quarter the length of the spikelet).
 - 3. Spikelets with 1 bisexual floret EHRHARTA 1.
 - 3. Spikelets with several bisexual florets BRIZA 28.
 - 2. Spikelets (or at least one if arranged in pairs) sessile or very shortly pedicellate.

- 4. Spikelets solitary.
- 5. Spikelet with 1 bisexual floret.
 - 6. Pedicel not articulated below the glumes, which remain when the rest of the spikelet has fallen.
 - 7. Spikelet sessile; 1st glume much shorter than the second. STENOTAPHRUM 103.
 - 7. Spikelet shortly pedicellate; glumes subequal TETRARRHENA 3.
 - 6. Pedicel articulated below the glumes, which fall with the rest of the spikelet.
 - 8. 1st glume with a hyaline window in the lower part THYRIDOLEPIS 107.
 - 8. 1st glume variously thickened but without a hyaline window.
 - 9. 1st glume thin, 2nd hardened below; 2nd lemma cartilaginous below PARANEURACHNE 106.
 - 9. Glumes similar to one another; 2nd lemma entirely membranous or hyaline NEURACHNE 105.
- 5. Spikelet with 2 or more bisexual florets.
 - 10. Spikelets distichous in notches of the rhachis.
 - 11. Spikelets with 1 glume, except the terminal spikelet which has 2. LOLIUM 36.
 - 11. Spikelets with 2 glumes PHOLIURUS 69.
 - 10. Spikes cylindrical; spikelets all round the rhachis TRITICUM 27.
- 4. Spikelets paired HEMARTHRIA 113.

GROUP G

- 1. Awn 3-branched (with or without a common column above the lemma) ARISTIDA 17.
- 1. Awns simple (sometimes more than 1 from separate lobes of the lemma).
 - 2. Lemma 3-5-lobed.
 - 3. Lemma 3-lobed.
 - 4. All 3 lobes ending in awns AMPHIPOGON 58.
 - 4. Central lobe with a long awn ECHINOPOGON 61.
 - 3. Lemma 5-lobed, the central lobes conspicuously awned PENTAPOGON 64.
 - 2. Lemma entire or slightly bilobed.
 - 5. Articulation above the glumes.
 - 6. Glumes and lemma awned; panicle dense, ovoid LAGURUS 63
 - 6. Glumes not awned.
 - 7. Lemma with a short straight awn.
 - 8. Awn terminal; panicle loose; perennial ORYZOPSIS 4.
 - 8. Awn dorsal; panicle spike-like; annual GASTRIDIMUM 62.
 - 7. Lemma with a twisted awn; panicle loose or dense; perennials.
 - 9. Awn dorsal; glumes 1-nerved.
 - 10. Awn arising near middle or base of lemma.
 - 11. Lemma broad, truncate, hyaline AGROSTIS 55.
 - 11. Lemma narrower, hardened DEYEUXIA 59.
 - 10. Awn arising near summit of lemma DICHELACHNE 60.
 - 9. Awn terminal, long; panicle loose; glumes 3-5-nerved. STIPA 5.
 - 5. Articulation below the glumes.
 - 12. Glumes awnless, 3-nerved.

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|----------------------------------|----------------|
| 13. Lemma awned | ALOPECURUS 56. |
| 13. Lemma awnless | PHLEUM 65. |
| 12. Glumes awned, 1-nerved | POLYPOGON 66. |

GROUP H

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|---|-------------------|
| 1. Tall ornamental grasses over 2 m high; leaves mostly basal; panicles usually more than 50 cm long; glumes 1-nerved (<i>pampas grass</i>) | CORTADERIA 7. |
| 1. Smaller grasses; if over 2 m high then the glumes 3-5-nerved. | |
| 2. Spikelets with 2 bisexual florets. | |
| 3. Awn dorsal. | |
| 4. Lemmas acute or bifid. | |
| 5. Glumes 1-nerved; spikelet less than 5 mm long | AIRA 43. |
| 5. Glumes 7-9-nerved; spikelet more than 10 mm long | AVENA 48. |
| 4. Lemmas truncate | DESCHAMPSIA 49. |
| 3. Awn terminal. | |
| 6. Glumes 5-11-nerved | ERIACHNE 11. |
| 6. Glumes 1-nerved | PENTASCHISTIS 13. |
| 2. Spikelets with 3 or more bisexual florets (if with 2 bisexual florets then in addition 1 or more reduced florets and the awn terminal). | |
| 7. Flowers enveloped in long hairs; reeds 1-3 m high with large plumose panicles | PHRAGMITES 8. |
| 7. Flowers not enveloped in long hairs; mostly medium to small grasses. | |
| 8. Lemma entire, usually shortly awned; awn usually terminal. | |
| 9. Spikelet sessile in a terminal spike-like panicle composed of globular clusters of spikelets | ELYTROPHORUS 75. |
| 9. Spikelets in a loose panicle or, if the panicle is spike-like, spikelets pedicellate. | |
| 10. Lemma rounded on back at least in the lower part. | |
| 11. Annuals; awn longer than lemma | VULPIA 42. |
| 11. Perennials; awn shorter than lemma | FESTUCA 33. |
| 10. Lemma keeled on back by a prominent midnerve. | |
| 12. Inflorescence spike-like; spikelets less than 10 mm long | PLAGIOCHLOA 37. |
| 12. Inflorescence open; spikelets more than 20 mm long | CERATOCHLOA 21. |
| 8. Lemma 2-3-lobed, bifid, or notched. | |
| 13. Lemma bifid, with a dorsal awn. | |
| 14. Glumes enclosing the florets; awn bent and twisted | AVENA 48. |
| 14. Glumes shorter than the florets; awn usually straight. | |
| 15. 1st glume 1-nerved, 2nd 3-5-nerved | BROMUS 20. |
| 15. 1st glume 3-7-nerved; 2nd 7-9-nerved. | |
| 16. 1st glume 7-nerved | CERATOCHLOA 21. |
| 16. 1st glume 3-5-nerved | SERRAFALCUS 22. |
| 13. Lemma 2-3-lobed or notched, the midnerve produced into an awn within the notch (lemma denticulate and awn dorsal in <i>Amphibromus</i>). | |
| 17. Spikelets of 2 kinds, the fertile surrounded by sterile ones | CYNOSURUS 30. |

17. Spikelets of 1 kind.
 18. Glumes as long as the florets.
 19. Lower sheaths woolly around the more or less swollen base of the plant MONACHATHER 12.
 19. Lower sheaths not woolly DANTHONIA 10.
 18. Glumes shorter than the florets.
 20. Lemmas 5-nerved.
 21. Lemma bifid, with a slender straight awn... TRISETUM 53.
 21. Lemma denticulate, with a bent dorsal awn AMPHIBROMUS 44.
 20. Lemmas 1-3-nerved.
 22. Lemma with 1 awn.
 23. Glumes slightly unequal KOELERIA 51.
 23. 1st glume less than half the length of the 2nd glume AVELLINIA 47.
 22. Lemma with 3 awns.
 24. The 3 awns rising from the same level... PLECTRACHNE 14.
 24. The central awn rising from a bifid central lobe TRIRAPHIS 79.

GROUP I

1. Inflorescence comprising both bisexual and male or sterile spikelets.
 2. Spikelets arranged singly along the rhachis; 1st lemma bisexual LAMARCKIA 35.
 2. Spikelets in groups of 2 or 3 along and/or terminating the rhachis; 1st lemma sterile or male.
 3. Spikelets in triplets (1 bisexual spikelet in each), surrounded by 4 sterile spikelets.
 4. Triplet disarticulating below callus, leaving the 4 sterile spikelets THEMEDA 118.
 4. Triplet falling off with the 4 sterile spikelets ISEILEMA 116.
 3. Spikelets in pairs or triplets (1 bisexual spikelet in each), not surrounded by sterile spikelets.
 5. Racemes in pairs at the end of short branches, with a spathe or long sheathing bract permanently supporting each pair.
 6. Awn glabrous CYMBOPOGON 110.
 6. Awn hairy on lower part HYPARRHENIA 114.
 5. Racemes not in pairs supported by a common spathe.
 7. Spikelets several, usually in pairs at least towards the base of the raceme.
 8. Glumes of fertile often pitted spikelets 2-keeled... BOTHRIOCHLOA 108.
 8. Glumes of fertile spikelets not keeled, lacking pits, the 1st becoming smooth and shining SORGHUM 117.
 7. Spikelets restricted to triplets at the ends of the inflorescence branches CHRYSOPOGON 109.
 1. Inflorescence of bisexual spikelets only.
 9. Sterile or male lemmas 0 or below the bisexual floret.
 10. Spikelets subsessile.
 11. Sterile or male lemmas 1 ECHINOCHLOA 92.
 11. Sterile or male lemmas 2 ANTHOXANTHUM 45.
 10. Spikelets distinctly pedicellate.
 12. Awn 1, dorsal on 1st lemma, bent ARRHENATHERUM 46.

- 12. Awns 2, terminal on 1st two lemmas, straight.
 - 13. Stamens 4-6; panicle loose EHRHARTA 1.
 - 13. Stamens 4; panicle contracted MICROLAENA 2.
- 9. Sterile or male lemma 1, above bisexual floret.
 - 14. Lemma with 9 stiff plumose awns ENNEAPOGON 71.
 - 14. Lemma with 1 slender awn HOLCUS 50.

GROUP J

- 1. Spikelets furnished with hooked spines TRAGUS 87.
- 1. Spikelets without spines.
 - 2. Articulation above glumes.
 - 3. 1st glume much shorter than the lemma SPOROBOLUS 85.
 - 3. 1st glume about as long as or longer than the lemma.
 - 4. Lemma toothed at summit.
 - 5. Panicle loose AGROSTIS 55.
 - 5. Panicle spike-like
 - 6. Glumes less than 8 mm long; lemma pubescent GASTRIDIMUM 62.
 - 6. Glumes more than 8 mm long; lemma glabrous AMMOPHILA 57.
 - 4. Lemma more or less acuminate ERIACHNE 11.
 - 2. Articulation below the glumes.
 - 7. Spikelets in several 1-sided spikes SPARTINA 84.
 - 7. Spikelets in a spike-like panicle.
 - 8. Glumes 1-nerved POLYPOGON 66.
 - 8. Glumes 3-nerved PHALARIS 54.

GROUP K

- 1. Stiff and often scabrid or hairy bristles on inflorescence.
- 2. At least 1 bristle at the base of every spikelet.
 - 3. Panicle-branches (spikes) disarticulating at their base, falling off with spikelets PARACTAENUM 95.
 - 3. Panicle usually spike-like; spikelets individually articulated or, if the panicle-branches falling off with the spikelets, then the spikelets pedicellate.
 - 4. Bristles persistent SETARIA 101.
 - 4. Bristles deciduous with spikelets.
 - 5. Bristles slender, often plumose, surrounding spikelets PENNISETUM 98.
 - 5. Bristles unilateral, terminating flattened panicle-branches PLAGIOSETUM 99.
- 2. Bristles along peduncles or at base of some spikelets only.
 - 6. Single bristle at base of terminal spikelet on each branch PSEUDORAPHIS 100.
 - 6. Bristles not restricted to 1 at base of terminal spikelets.
 - 7. Rhachis of racemes persistent PASPALIDIUM 96.
 - 7. Rhachis of racemes disarticulating at base and falling with the spikelets PARACTAENUM 95.
- 1. Bristles not present, but often softly or shortly hairy.
 - 8. Panicle spike-like.
 - 9. Spikelets sunk in notches in the flat rhachis STENOTAPHRUM 103.
 - 9. Spikelets not sunk in notches in the rhachis.
 - 10. Glumes villous IMPERATA 115.
 - 10. Glumes glabrous or shortly hairy on veins.
 - 11. Bisexual floret 1 in each spikelet PHALARIS 54.
 - 11. Bisexual florets 2 in each spikelet ERIACHNE 11.

8. Panicle open or with conspicuous branches.
 12. Sterile lemmas 2 EHRHARTA 1.
 12. Sterile lemma 1.
 13. Glumes more or less of equal length ISACHNE 18.
 13. 1st glume distinctly shorter than the 2nd, or 0.
 14. Inflorescence branches not forming well-defined spikes or racemes.
 15. Spikelets in pairs; margins of fertile lemma thinner than the body of the lemma DIGITARIA 91.
 15. Spikelets solitary along the rhachis of the branches; margins of fertile lemma of the same texture as the body of the lemma PANICUM 94.
 14. Inflorescence branches forming well-defined spikes or racemes along the axis.
 16. Fertile lemma with flat translucent margins which are thinner than the body of the lemma DIGITARIA 91.
 16. Fertile lemma with narrowly inrolled margin of the same texture as the body of the lemma.
 17. 1st glume absent or vestigial.
 18. Spikelets with a disk-like swelling of the callus ERIOCHLOA 93.
 18. Spikelets without a swelling of the callus.
 19. Backs of 1st glume and 1st lemma adaxial (facing the rhachis of the raceme) BRACHIARIA 89.
 19. Backs of 1st glume and 1st lemma abaxial (turned away from the rhachis).
 20. Spikelets in 2 rows PASPALIDIUM 96.
 20. Spikelets in 3-4 rows ECHINOCHLOA 92.

GROUP L

1. Plants over 2 m high, with silky-hairy panicles more than 30 cm long.
 2. Glumes 3-5-nerved; leaves along the stem ARUNDO 6.
 2. Glumes 1-nerved; leaves mainly at the base CORTADERIA 7.
1. Plants smaller; panicle usually not silky-hairy, usually less than 30 cm long.
 3. Lemma 3-lobed, notched or toothed.
 4. Leaves subulate, spine-tipped TRIODIA 16.
 4. Leaves flat or inrolled, never spine-tipped.
 5. Glumes 5-7-nerved, longer than the lemmas SCHISMUS 15.
 5. Glumes 1-3-nerved, shorter than the lemmas.
 6. Spikelet 2-flowered; lemma truncate, toothed PERIBALLIA 52,
 6. Spikelet several-flowered; lemma notched, or obtuse and minutely denticulate.
 7. Lemma notched and usually with a short mucro in the notch DIPLACHNE 73.
 7. Lemma obtuse, minutely denticulate PUCCINELLIA 39.
 3. Lemma entire.
 8. Spikelet 2-flowered.

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| 9. Lemma thick and hard | ISACHNE 18. |
| 9. Lemma thin. | |
| 10. Glumes 1-3-nerved | POA 38. |
| 10. Glumes 7-15-nerved. | |
| 11. Spikelets drooping and quivering | BRIZA 28. |
| 11. Spikelets erect | ERIACHNE 11. |
| 8. Spikelet 3-several-flowered. | |
| 12. Lemmas rounded on back. | |
| 13. Spikelets drooping and quivering | BRIZA 28. |
| 13. Spikelets erect. | |
| 14. Lemma acute | FESTUCA 33. |
| 14. Lemma obtuse. | |
| 15. Glumes 1-3-nerved, subequal | CATAPODIUM 29. |
| 15. Glumes 5-9-nerved, unequal. | |
| 16. Lemma nerves prominent, 7-9 | GLYCERIA 34. |
| 16. Lemma nerves obscure, 5 | PUCCINELLIA 39. |
| 12. Lemmas keeled. | |
| 17. Spikelets sessile, in scattered spikes | LEPTOCHLOA 77. |
| 17. Spikelets in a loose or contracted panicle. | |
| 18. Spikelets in compact clusters | DACTYLIS 31. |
| 18. Spikelets not clustered. | |
| 19. Ligule membranous. | |
| 20. Lemma hard, glabrous, 5-nerved; panicle spike-like | SCLEROCHLOA 40. |
| 20. Lemma thin; panicle loose. | |
| 21. Lemma woolly near base, 5-9-nerved | POA 38. |
| 21. Lemma glabrous, 3-nerved | SPHENOPUS 41. |
| 19. Ligule of hairs. | |
| 22. Glumes 1-nerved; lemmas 3-nerved | ERAGROSTIS 76. |
| 22. Glumes 4-7 nerved; lemmas 7-9-nerved | PLAGIOCHLOA 37. |

TRIBE 1.—EHRHARTEAE

1. EHRHARTA Thunb.

Kongl. Vetensk. Acad. Handl. 40:216 (1779).

(After F. Ehrhart, a Swiss botanist.)

Annuals or perennials; spikelets with 1 bisexual flower, usually paniculate; rachilla articulated above the glumes; glumes thin, as long as or shorter than the lemmas and overlapping them; sterile lemmas hardened, sometimes awned, glabrous or variously hairy; fertile lemma shorter than the sterile lemmas, less hardened, without an awn; palea with 2 nerves close together; stamens usually 6. About 27 species in Africa (1 in India). (Meredith (1955) *The grasses and pastures of South Africa*.)

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| 1. Sterile lemmas with long soft hairs. | |
| 2. Spikelets 4-8 mm long | <i>E. calycina</i> 1. |
| 2. Spikelets 12-15 mm long | <i>E. villosa</i> 4. |
| 1. Sterile lemmas glabrous with short bristles or bearded at the base. | |
| 3. Awns on the lemmas | <i>E. longiflora</i> 3. |
| 3. Awns totally lacking | <i>E. erecta</i> 2. |

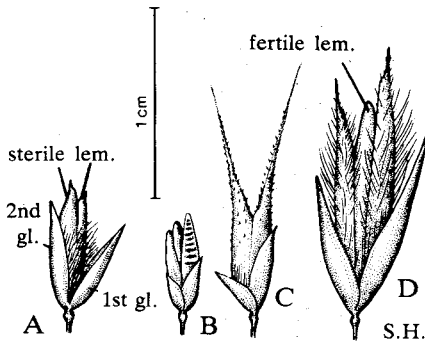


Fig. 57—*Ehrharta*. A, *E. calycina*; B, *E. erecta*; C, *E. longiflora*; D, *E. villosa*.

*1. *E. calycina* Sm., *Pl. Icon.* t.32 (1789). **Perennial veld grass.** (Ill. N.T. Burbidge (1970) *Australian grasses* 3, pl. 23). Perennial, with often creeping branched rhizome; culms 30-70 cm high; leaf-blades usually flat, variable in size; panicle lax, narrow, often less than 15 cm long; spikelets 4-8 mm long; glumes a little shorter than the spikelet, about equal, turning purple; sterile lemmas slightly longer, the 1st shorter and narrower, not corrugated, both softly hairy and the first bearded at the base, the 2nd shortly awned and with 2 small scales at the base; fertile lemma slightly shorter than the sterile lemmas, obtuse; palea hyaline; stamens 6.

Native to southern Africa; naturalised in W.Aust., N.S.W., Vic. and S.Aust., (Yorke Pen., Southern Lofty, Kangaroo I. and S.E. regions).

Flowers mainly in Oct.-Nov.

*2. *E. erecta* Lam., *Encycl.* 2:347 (1786). **Panic veld grass.** (Ill. Meredith (1955) fig. 9). Perennial, with creeping rhizome; culms to 90 cm high; leaf-blades flat, 1.5-13 mm broad; panicle open or contracted (rarely a raceme) usually less than 15 cm long; spikelets 3-5 mm long; glumes much shorter than the spikelet (the 2nd longer and just over half the length of the spikelet), green; sterile lemmas awnless, nearly as long as the spikelet, at least the 2nd corrugated, glabrous, the 2nd with 2 small scales at the base; fertile lemma almost as long as the 2nd sterile lemma, obtuse.

Native to southern Africa; naturalised in W.Aust., N.S.W., Vic. and S.Aust. (Southern Lofty and S.E. regions).

Flowers have been recorded in Aug. and Jan.

*3. *E. longiflora* Sm., *Pl. Icon.* t.32 (1789). **Annual veld grass.** Annual, with leaves in tufts; culms to 90 cm high; leaf-blades flat, to 11 mm broad; panicle open but often narrow, to 20 cm long; spikelets usually 10-18 mm long; glumes less than half the length of the spikelet, the 1st shorter, purplish; sterile lemmas the 1st slightly shorter, both often corrugated towards the base, scabrid, bearded at the base, both awned; fertile lemma shorter than the sterile lemmas; stamens usually 6.

Native to southern Africa; naturalised in W.Aust., N.S.W., Vic., Qld and S.Aust. (Eyre Pen., Yorke Pen., Southern Lofty, Murray and S.E. regions).

Flowers have been recorded from Aug.-Nov.

*4. *E. villosa* (L.f.) Schult.f.ex Schult. & Schult.f., *Syst. Veg.* 7:1374 (1830). **Pyp grass.** Perennial, often with a robust creeping rhizome; culms to 120 cm high; leaf-blades flat or rolled, to 4 mm broad; inflorescence a narrow panicle or a raceme 4-20 cm long, often 1-sided; spikelets 12-15 mm long; glumes more than half to almost as long as the spikelet, about equal, glabrous or slightly hairy, straw-coloured; sterile lemmas about equal, both long and softly hairy and bearded at the base, both awned; fertile lemma slightly shorter than the sterile lemmas; palea hyaline; stamens 6.—*Aira villosa* L.f., *Suppl.* 109 (1781).

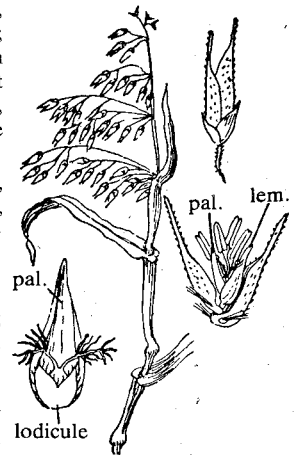


Fig. 58—*Ehrharta longiflora*.

Native to southern Africa; naturalised in W.Aust., Vic. and S.Aust. (Southern Lofty and S.E. regions).

Flowers have been recorded from Nov.-Jan.

Only var. **maxima** Stapf, *Fl.Cap.* 7:681 (1900) occurs in Australia.

2. MICROLAENA R.Br.

Prod.Fl.Nov.Holl. 210 (1810).

(Greek *mikros*, small; *laina* or *chlaina*, cloak; alluding to the 2 minute outer glumes.)

Perennials; spikelets with 1 bisexual flower, in a raceme or paniculate; rhachilla articulated above the glumes; glumes very small, not reaching the lemmas and separated from them by a section of rhachilla covered by a dense tuft of hairs; sterile lemmas hardened, awned, scabrous; fertile lemma shorter than the sterile lemmas, less hardened, acuminate; palea 1-nerved; stamens 4 (or 2). About 10 species in South-East Asia, New Zealand and Australia.

1. **M. stipoides** (Labill.) R.Br., *Prod.Fl.Nov.Holl.* 210 (1810). **Weeping grass, meadow rice grass.** (Ill. N. T. Burbidge (1970) *Australian grasses* 3:pl.5). Perennial, with creeping rhizome and often prostrate stems; culms to 60 cm high; leaf-blades flat, usually 2-8 cm long; panicle narrow, raceme-like, nodding, 8-20 cm long; spikelets c. 30 mm long (incl. awns which are c. 20 mm); glumes less than 1 mm long, separated from the lemmas by a section of hairy rhachilla; 1st sterile lemma slightly shorter than the 2nd, both scabrous, not corrugated, with awns longer than the body of the lemma; fertile lemma about as long as the bodies of the sterile lemmas, mucronate but not awned; palea hyaline; stamens 4.—*Ehrharta stipoides* Labill., *Nov.Holl.Pl.Sp.* 1:91 (1805).

Occurs in New Zealand and all Australian States; in S.Aust. occurs in the Southern Lofty, Kangaroo I. and S.E. regions.

Flowers in Nov., Dec. 1 record for May.

S.Aust. plants belong to var. **stipoides**.

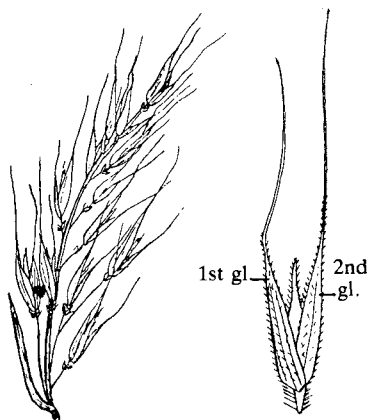


Fig. 59—*Microlaena stipoides*.

3. TETRARRHENA R.Br.

Prod.Fl.Nov.Holl. 209 (1810).

(Derivation not explained, but probably from the Greek *tetra*, four, referring to the anthers.)

Perennials; spikelets with 1 bisexual flower, few in a usually unbranched raceme; rhachilla articulated above the glumes; glumes small, much shorter than the lemmas; sterile lemmas hardened, not awned, usually pubescent; fertile lemma similar to the upper sterile lemma in size, shape and texture; palea faintly 1-nerved; stamens 4. 4 species confined to Australia.

1. **T. distichophylla** (Labill.) R.Br., *Prod.Fl.Nov.Holl.* 210 (1810). **Hairy rice-grass.** Perennial, with decumbent pubescent stems, sometimes mat-forming; culms to 60 cm high; leaves usually distichous, flat or involute, with paler upper surface, blades to 6 cm but often less than 3 cm long; raceme erect, usually less than 2 cm long; spikelets usually fewer than 10, less than 6 mm long, usually pubescent; glumes c. 1 mm long; sterile lemmas obtuse or truncate, mucronate; the 1st sterile lemma about half as long as the 2nd; the 2nd sterile lemma similar to the fertile lemma.—*Ehrharta distichophylla* Labill., *Nov.Holl.Pl.Sp.* 1:90 (1805).

Occurs in Vic., Tas. and S.Aust. (1 record from near Mount Gambier in the S.E. region).

TRIBE 2.—STIPEAE

4. ORYZOPSIS Michx.

Fl. Bor. Am. 1:51 (1803).(Greek *oryza*, rice; *opsis*, resemblance.)

Perennials; spikelets with 1 bisexual flower, paniculate; rhachilla articulated above the glumes, glumes membranous, longer than the lemma, becoming shiny in fruit; lemma hardened, cylindric-ovoid, with an almost straight deciduous awn less than 1 cm long; palea with 2 nerves; stamens 3. About 50 species widespread in the tropics and northern temperate areas.

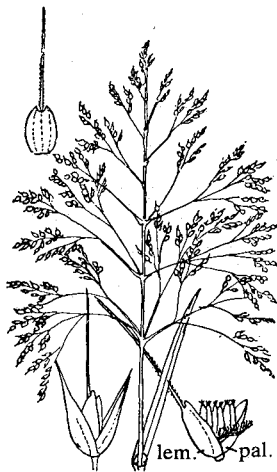


Fig. 60—*Oryzopsis miliacea*.

*1. *O. miliacea* (L.) Benth. and Hook. f. ex Aschers. and C. Schweinf., *Mem. Inst. egypt.* 2:169 (1887). **Rice millet.** (Ill. N.T. Burbidge (1970) *Australian grasses* 3: pl. 13). Glabrous perennial; culms leafy, to c. 1 m high; leaves flat and glossy, 4-7 mm broad and to 30 cm long; panicle widely open with numerous verticillate branches, 30-40 cm long; spikelets 4-5 mm long (incl. awn); glumes about equal, c. 3 mm long, acuminate, often purple; lemma less than 2 mm long (excl. awn), apically notched, forming a hard shiny sheath round the fruit, bearing an apical deciduous more or less straight awn 3-4 mm long.—*Agrostis miliacea* L., *Sp. Pl.* 61 (1753).

Native to Mediterranean; naturalised in the U.S.A., New Zealand and all Australian States except Qld; in S.Aust. from the Eyre Pen., Yorke Pen., Southern Lofty and S.E. regions.

Flowers have been recorded throughout most of the year but most frequently during summer and autumn.

5. STIPA L.

Sp. Pl. 78 (1753).

(Greek *stype*, tow; alluding to the fibre obtained from esparto grass, *S. tenacissima* L.)

Usually perennials; spikelets with 1 bisexual flower, usually paniculate; rhachilla articulated above the glumes; glumes membranous, equal or unequal, usually longer than the lemma; lemma becoming hardened, narrow, rolled around the flower, with a terminal persistent straight or bent spirally twisted awn; palea with 2 nerves; stamens 3. About 300 species, cosmopolitan. *Stipa* is being revised; considerable changes can be expected. The key is very tentative, is based on published descriptions and must be used with caution.

- | | |
|--|-----------------------------|
| 1. Awn 120-150 mm long; annual | <i>S. macalpinei</i> 16. |
| 1. Awn not exceeding 100 mm; perennials. | |
| 2. Leaves less than 25 mm long; 1st glume c. 25 mm long | <i>S. muelleri</i> 17. |
| 2. Leaves more than 25 mm long; 1st glume less than 25 mm long. | |
| 3. Panicle branches and pedicels more or less plumose; the very loose panicle breaking away from the culm at maturity. | |
| 4. Culms glabrous | <i>S. elegantissima</i> 13. |
| 4. Culms hairy | <i>S. tuckeri</i> 30. |
| 3. Panicle branches and pedicels glabrous, scabrid or pubescent, but not plumose; the panicle remaining on the culm at maturity. | |
| 5. Awns to 40 mm long. | |

- 6. Outer glume 5-6 mm long *S. breviglumis* 6.
- 6. Outer glume at least 7 mm long.
- 7. Ligule less than 3 mm long *S. congesta* 9.
- 7. Ligule more than 3 mm long.
- 8. 1st glume 11-12 mm long *S. brachystephana* 5.
- 8. 1st glume 15-20 mm long *S. stipoides* 28.
- 5. Awns 40 mm or more long.
- 9. Ligule 4-6 mm long; lemma 5-8 mm long.
- 10. Awn 50-80 mm long.
- 11. 1st glume 12-15 mm long *S. platychaeta* 22.
- 11. 1st glume 7-10 mm long *S. acrociliata* 1.
- 10. Awn 40-50 mm long; 1st glume 14-18 mm long *S. setacea* 27.
- 9. Ligule less than 4 mm long.
- 12. Ligule 2-3 mm long.
- 13. Leaf-blades 10-20 cm long; panicle 15-25 cm long *S. dura* 11.
- 13. Leaf-blades 6-8 cm long; panicle 5-8 cm long *S. mundula* 19.
- 12. Ligule less than 2 mm long.
- 14. Lemma surmounted by a tuft of hairs 1-5 mm long.
- 15. Leaves scabrous *S. blackii* 4.
- 15. Leaves glabrous or pubescent.
- 16. Leaf-blades 8-20 cm long; tuft of hairs on lemma 1-1.5 mm long *S. bigeniculata* 3.
- 16. Leaf-blades 20-30 cm long; tuft of hairs on lemma 2-5 mm long *S. clelandii* 7.
- 14. Lemma variously hairy but without a tuft of hairs 1-5 mm long.
- 17. Lemma covered with golden, brown or reddish hairs.
- 18. Awn minutely pubescent.
- 19. Panicle narrow and dense; 1st glume c. 10 mm long *S. compacta* 8.
- 19. Panicle loose; 1st glume 12-20 mm long .. *S. eremophila* 14.
- 18. Awn with hairs c. 1 mm long *S. plumigera* 23.
- 17. Lemma covered with white hairs (if light golden lacking a collar at the summit of the lemma).
- 20. Lateral veins of 1st glume obsolete or faint and only reaching the middle.
- 21. 1st glume c. 15 mm long *S. aphanoneura* 2.
- 21. 1st glume to 14 mm long.
- 22. Awn glabrous or subglabrous.
- 23. Panicle dense, 1-2 cm broad *S. nitida* 20.
- 23. Panicle loose, 2-5 cm broad *S. variabilis* 31.
- 22. Awn scabrid or strongly barbellate on lower part.
- 24. Awn 45-50 mm long; 1st glume 7-8 mm long *S. nodosa* 21.
- 24. Awn 55-80 mm long; 1st glume 9-11 mm long *S. drummondii* 10.
- 20. Lateral veins of 1st glume distinct and extending well beyond the middle.
- 25. 2nd glume to 11 mm long.

- 26. 1st glume bulging round the swollen lemma and narrowed above it *S. puberula* 24.
- 26. 1st glume not bulging round the swollen lemma.
- 27. Panicle 1-3 cm broad, dense (sometimes becoming loose later).
- 28. Culms 30-60 cm long; 1st glume 9-12 mm long *S. tenuiglumis* 29.
- 28. Culms 60-100 cm long; 1st glume 12-15 mm long *S. compacta* 8.
- 27. Panicle more than 3 cm broad, loose *S. multispiculis* 19.
- 25. 2nd glume 12-21 mm long.
- 29. Awn plumose.
- 30. Awn shortly plumose all round *S. semibarbata* 26.
- 30. Awn long-plumose along one side only *S. hemipogon* 15.
- 29. Awn not plumose.
- 31. 1st glume 12-14 mm long *S. elatior* 12.
- 31. 1st glume 17-24 mm long *S. pubescens* 25.

1. *S. acrociliata* Reader, *Victorian Nat.* 13:167 (1897). **Graceful spear-grass.** Stems rigid and rather stout, 60-150 cm high; nodes glabrous; leaves glabrous or almost so, the uppermost sheath swollen and loose; the blades mostly flat, stiff, striate, 3-8 mm broad and to 50 cm long, the upper ones sometimes subulate-involute; ligule c. 5 mm long, glabrous; panicle 20-40 cm long, loose, the branches often spreading widely in flower, finally contracted, the lower branches 6-12 cm long, naked in lower part; spikelets narrow, purple, finally pale, gaping; glumes scabrous on the prominent nerves, ciliate on margins close to summit; 1st glume 7-10 mm long, 3-nerved, mucronate, the 2nd 3-nerved, 6-8 mm long; lemma c. 6 mm long (including callus of 1 mm), white-pubescent; awn very slender, 5-8 cm long, almost straight or slightly twice bent, the column c. 15-20 mm long; bristle straight or slightly curved.

Occurs in W.Aust., N.S.W., Vic. and S.Aust. (all regions except the N.W., Lake Eyre and Kangaroo I. regions).

Flowers are usually produced Aug.-Nov.

2. *S. aphanoneura* Hughes, *Kew Bull.* 1921:25 (1921). Stems pubescent, 30-60 cm high; nodes pubescent; sheaths ashy-pubescent; ligule short, ciliate with hairs 2-5 mm long; blades subulate-involute, 10-20 cm long, more or less pubescent; panicle contracted, to 20 cm long, 2-3 cm broad, the branches to 6 cm long; spikelets narrow, thin, pale; glumes pointed, membranous, the 1st 14 mm long, the 2 lateral nerves almost obsolete, the 2nd 12-14 mm long, 5-nerved; lemma 8 mm long (including callus of 2 mm), white-pubescent; awn 5-6 cm long, the column to 2 cm long, the bristle straight or slightly curved.—*S. flavescens* non Labill., sensu Benth., *Fl. Aust.* 7:566 (1878).

Recorded from Tas., Vic. (but excluded and the distinctness queried by Willis (1962) *A handbook to plants in Victoria* 1:188) and S.Aust. Recorded in the type description from Swanport on the Murray, but unknown by Black (1943) and no specimen identified with it since in AD.

3. *S. bigeniculata* Hughes, *Kew Bull.* 1922:20 (1922). Rather slender grass, 30-60 cm high; leaves glabrous; nodes pubescent; blades filiform or subulate, 8-20 cm long; ligule short, ciliate; panicle rather narrow but loose, 10-25 cm long, 2-4 cm broad, the lower branches 4-6 cm long, few-flowered; spikelets purplish or straw-coloured, not or slightly gaping, swollen in middle; glumes pointed, scabrous on the prominent nerves, the 1st 12-16 mm long, 3-nerved, the 2nd 9-13 cm long, sub-5-nerved; lemma 6-8 mm long (including callus of 2 mm), white-pubescent, surmounted by a tuft of hairs 1-1.5 mm long; awn slender, abruptly twice bent, 4-5.5 cm long; column 15-22 mm long; bristle straight; no ring of hairs on sheath behind orifice.

Occurs in N.S.W. and ?Vic. (Willis (1962) *A handbook to plants in Victoria* 1:188 considered it possibly synonymous with *S. blackii*), Tas. and S.Aust. (Eyre Pen., Northern and Southern Lofty and Kangaroo I. regions).

Flowering period not available.

4. *S. blackii* C. E. Hubbard, *Kew Bull.* 1925:431 (1925). **Crested spear-grass.** Rather slender grass, to 45(-60) cm high (stouter than *S. bigeniculata*, cf. Black (1943), p.92); leaf-base glabrous; nodes pubescent; blades linear, stiff, to 20 cm long, scabrous with minute hairs; ligule less than 1 mm long, ciliate; panicle rather narrow but loose, 10-25 cm long, 2-4 cm broad, the lower branches 4-6 cm long, few-flowered; spikelets purplish or straw-coloured, not or slightly gaping, swollen in middle; glumes pointed, scabrous on the prominent nerves, the 1st 12-16 mm long, 3-nerved, the 2nd 9-13 mm long, sub-5-nerved; lemma 6-8 mm long (including callus of 2 mm), white-pubescent, surmounted by a tuft of hairs 3-5 mm long, awn slender, abruptly twice bent, 4.5-5 cm long; column 15-22 mm long; bristle straight; no ring of hairs on sheath behind orifice.—*S. pubescens* var. *comosa* J. M. Black, *Fl.S.Aust.* 66 (1922).

Occurs in N.S.W., Vic. and S.Aust. (recorded from "northern areas; Flinders Range." by Black (1943), p. 92, and not recorded since then in AD).

See note under *S. bigeniculata*.

5. *S. brachystephana* S. T. Blake, *Proc.R.Soc.Qld* 62:90 (1952). Perennial, tufted grass c. 70-90 cm high; sheaths tight, glabrous, smooth or minutely rough, the blades filiform, tightly convolute, nearly smooth and glabrous; nodes glabrous; ligule 4-7 mm long, often divided sometimes to the base, glabrous; panicle rather loose, narrow, 13-15 cm long, 1.5-2.5 cm broad, the lower branches usually to 3.5 cm long; spikelets more or less gaping, swollen about the middle, the glumes scabrid, often toothed at summit, the 1st glume 11-12 mm long, 5-nerved; the 2nd glume 9-10 mm long, 5-nerved; lemma swollen, 6.5-7 mm long (including callus of 1.6-1.8 mm), white-pubescent with an apical tuft of white hairs to nearly 1 mm long; palea similar to the lemma; awn twice bent, 2.3-2.6 mm long, scabrid, the column about equal to the bristle in length or shorter.

Only known from the type material (Port Germein Pass, Flinders Ranges region), where it flowered in August.

6. *S. breviglumis* J. M. Black, *Trans.R.Soc.Aust.* 65:333 (1941). **Bamboo spear-grass, cane spear-grass.** Stout, rigid (cane-like) grass to 1 m high, often branched from the glabrous nodes; sheaths, except the tight upper one, broad, loose and withering early; ligule oblong, truncate, glabrous, 2-3 mm long; blades filiform, 10-20 cm long; panicle cylindrical, rather dense, soon exserted, 10-18 cm long, 2-3 cm broad, the branches erect-spreading, 4-5 cm long, clothed with spikelets to near base; spikelets swollen in middle; glumes subequal, 5-6 mm long, both with 3 scabrous nerves up to summit; lemma 4 mm long (including obtuse callus of 0.5 mm), white-pubescent; awn very slender, obtusely once bent, 2.5-3 cm long, the column c. 15 mm long, the bristle straight; palea only half the length of the lemma.

Occurs in W.Aust., Qld, N.S.W., Vic. and S.Aust. (Flinders Ranges, Northern and Southern Lofty regions).

Flowering time not known.

Considered by Veldkamp, *Blumea* 22:10 (1974), to be synonymous with *S. verticillata* but Vickery (pers. comm.) disagrees.

7. *S. clelandii* Summerh. & C. E. Hubbard, *Kew Bull.* 1927:362 (1927). Slender or rather stout grass, 50-90 cm high; leaves glabrous or minutely pubescent, the blades 20-30 cm long, subulate or flattened and 3-5 mm broad; nodes pubescent; ligule short, ciliolate; no distinct ring of hairs outside the summit of sheath; panicle narrow, compact and rather dense; 20-30 cm long, 2-3 cm broad, the branches 6-10 cm long; spikelets slightly swollen, not or slightly gaping; glumes acute, with prominent nerves and scabrous on midnerve, the 1st

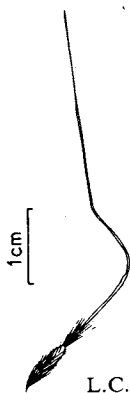


Fig. 61—*Stipa clelandii*, lemma.

14-20 mm long, 3-nerved, the 2nd 10-12 mm long, sub-5-nerved; lemma 7-8 mm long (including callus of 2 mm), white-pubescent, with a tuft of hairs 2-5 mm long at summit; awn 5-6 mm long, slender; column 2-2.5 cm long, obtusely twice bent; bristle straight.

Restricted to S.Aust. (Eyre Pen., Northern Lofty, Yorke Pen., Southern Lofty, Murray and S.E. regions).

Flowering period not known.

8. ***S. compacta*** Hughes, *Kew Bull* 1921:24 (1921). **Spear-grass.** Stems stiff and rather stout, 60-100 cm high; leaves glabrous or almost so, filiform, rarely channelled or slightly flattened, 8-30 cm long, nodes pubescent; ligule short, truncate, ciliolate; panicle narrow, at first dense and usually embraced by uppermost sheath, afterwards rather loose, 15-25 cm long, 1-2 cm broad, the lower branches 5-10 cm long; spikelets narrow, pale, finally slightly gaping; glumes unequal, acute, scabrous on the prominent nerves, the 1st 12-15 mm long, 3-nerved, the 2nd 10-11 mm long, sub-5-nerved; lemma narrow, 7-8 mm long (including callus of 2 mm), pale golden brown or white-pubescent; awn slender, 5-6.5 cm long, obtusely twice bent; column 2-2.5 cm long; bristle straight; no ring of hairs outside summit of sheath.

Occurs in Vic., Tas. and S.Aust. (Eyre Pen., cf. Black, 1943, Southern Lofty and S.E. regions).

Flowers have been recorded Aug.-Nov.

Willis (1962) *A handbook to plants in Victoria* 1:186 considered it possible that *S. compacta* and *S. flavescens* Labill. *Nov.Holl.Pl.Sp.* 1:24(1804) were synonymous in which case the correct epithet would be *flavescens*.

9. ***S. congesta*** Summerh. & C. E. Hubbard, *Kew Bull.* 1927:362(1927). Rather stout grass, the stem and leaves densely and minutely pubescent, the sheaths tight, the leaf-blades to 30 cm long, subulate-involute, with a ring of short white hairs behind the orifice; ligule 1-2 mm long, jagged at summit, ciliolate; panicle dense, oblong-fusiform, c. 12 x 3 cm, the lower branches c. 3 cm long (without the awns); spikelets somewhat swollen in middle; glumes hyaline, pubescent all over, 3-nerved, the 1st 14-15 mm long, the 2nd 11-12 mm long, lemma 5-5 mm long (including callus of 1.5 mm), white-pubescent; awn 3-3.5 cm long, obtusely twice bent, the column 11-14 mm long, pubescent or sub-plumose with hairs c. 0.5 mm long, the bristle straight.

Occurs only in S.Aust. (Morialta, Southern Lofty region).

Flowering period is not known.

10. ***S. drummondii*** Steud., *Synops.Pl.glumac.* 1:128 (1854). **Cottony spear-grass.** A stiff and often stout grass, 30-80 cm high, the basal sheaths loose and pubescent or silky-villous, the uppermost embracing the base of the panicle, the ligule short, truncate, ciliate, the lobes ciliate-villous; leaf-blades hard, often stiff, erect, scabrous with short stiff spreading hairs, subulate-involute, the basal ones much shorter than stems; nodes usually concealed, when exposed they are glabrous or minutely pubescent like the stems; panicle narrow, loose in flower, becoming rather dense, 15-40 cm long, 2-4 cm broad (without the awns), the lower branches 5-8 cm long; spikelets narrow, not gaping, the glumes hyaline, almost glabrous, sometimes purplish, usually torn or 3-toothed at summit, the 1st 9-11 mm long, 3-nerved to middle, the 2nd 8-10 mm long, sub-5-nerved; lemma 5-6 mm long (including callus of 2 mm), white-pubescent, awn slender, 5-5.8 cm long, once bent, the column 12-16 mm long, pubescent with white hairs c. 0.5 mm long, the bristle much curved.—*S. luehmannii* Reader, *Victorian Nat.* 16:158 (1900); *S. horrifolia* J. M. Black, *Trans.R.Soc.S.Aust.* 44:191 (1900).

Occurs in W.Aust., N.S.W., Vic. and S.Aust. (all regions except the N.W.).

Flowers probably mainly Aug.-Nov.

11. ***S. dura*** J. M. Black, *Trans.R.Soc.S.Aust.* 65:333 (1941). Glabrous grass to 60 cm high; leaves mostly basal; sheaths tight, except the terminal one which is loose and at first sheaths the panicle; blades subulate, stiff, rush-like, 10-20 cm long; ligule 2-3 mm long, ciliate; nodes minutely pubescent; panicle 15-25 cm long, 1-2 cm broad, narrow, dense, the branches 3-4 cm

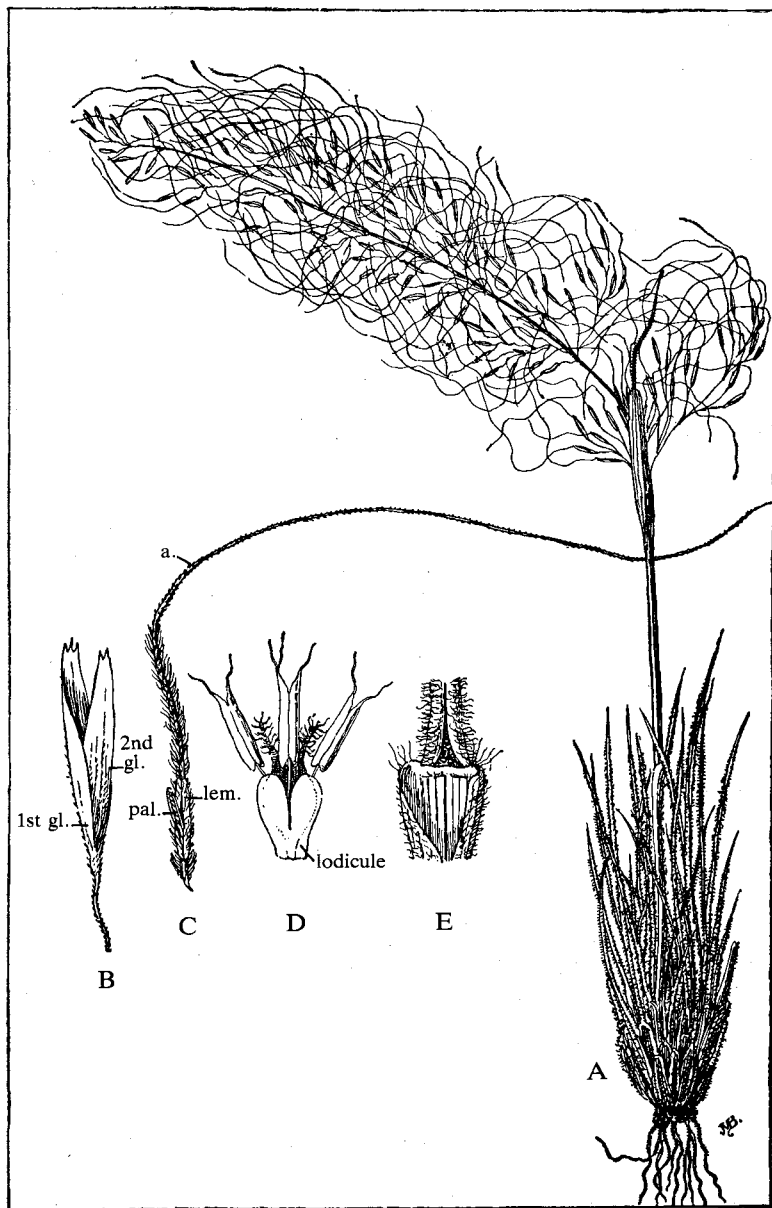


Fig. 62—*Stipa drummondii*. A, whole plant, $\times \frac{1}{2}$; B, glumes, $\times 5$; C, flower, $\times 5$; D, lodicules, styles and stamens, $\times 12$; E, summit of leaf-sheath, $\times 8$.

long (without the awns); spikelets straw-coloured, narrow, not gaping, the 1st glume 14-15 mm long, pointed, 3-nerved, the 2nd 1-13 mm long, sub-5-nerved; lemma entire at summit, 8 mm long (including callus of 2 mm), white-hairy on yellow ground; awn slender, almost straight, slightly twice bent, 7-8 cm long, the column 2.5 cm long.

Restricted to S.Aust. Said by J. M. Black (1943) to occur on the "Nullarbor Plain; Cape Thevenard, Eyre Peninsula", but no specimens have been seen.

12. *S. elatior* (Benth.) Hughes, *Kew Bull.* 1921:24 (1921). **Spear-grass.** Stems stout, stiff, to 1 m high or more; leaf-sheaths loose, the lowest minutely pubescent, the blades usually glabrous, stiff, involute-filiform or channelled or flat and 3-6 mm broad, filiform upwards and to 40 cm long; ligule very short, ciliate; no ring of hairs behind orifice; nodes pubescent; panicle dense, narrow, 15-35 cm long, 1-3 cm broad, usually sheathed at the base, the branches 6-8 cm long, erect, glumes pointed, subequal, 12-14 mm long, scabrous on keels, the 1st 3-nerved, the 2nd sub-5-nerved; spikelets narrow, finally gaping; lemma 7-9 mm long (including callus of 3 mm), finally dark-brown, white-pubescent; awn slender, slightly twice bent, 5-7 cm long, the column from nearly 2 to 2.5 cm long; bristle straight.—*S. scabra* Lindl. var. *elatior* Benth., *Fl. Aust.* 7:571 (1878).

Occurs in W. Aust., Vic., Tas. and S. Aust (islands off west coast S.W. of Ceduna, and the coast of the Southern Lofty region).

Flowering time not known.

13. *S. elegantissima* Labill., *Nov. Holl. Pl. Sp.* 1:23 (1805). **Feather spear-grass.** Glabrous except inflorescence, 50-100 cm high; stems stiff but slender; nodes glabrous; leaf-blades narrow, involute except at base, erect; ligule c. 3 mm long, torn at summit; panicle very loose, 15-20 cm long, the whorled branches c. 10 cm long, finally spreading horizontally, the rhachis, the branches and the long capillary pedicels all plumose with spreading hairs; glumes 3-nerved, purplish, hairy, the 1st 10-12 mm long, the 2nd rather shorter; lemma narrow, 8 mm long (with acute villous callus 1 mm long), hairy only towards the base, the upper part minutely muricate-tuberculate (under lens); palea 2 mm long, obtuse; awn 3-4.5 cm long, once bent, the column nearly 15 mm long, pubescent. A very handsome grass.

Occurs in all Australian States except Qld, Tas. and N.T. In S. Aust from the Nullarbor, Eyre Pen., Yorke Pen., Flinders Ranges, Southern Lofty, Murray and Kangaroo I. regions.

Flowers principally Sept.-Nov.

14. *S. eremophila* Reader, *Victorian Nat.* 17:154 (1901). **Desert spear-grass.** Stems stiff, glabrous, stout or slender, 30-80 cm high; some of the withering basal sheaths pubescent, otherwise the leaves glabrous or almost so, the blades varying from subulate to filiform, 10-25 cm long, nodes pubescent or almost glabrous; ligule short, ciliate; no ring of hairs on the sheath behind the hairy orifice; panicle narrow, loose or contracted, sometimes embraced at base by the uppermost sheath, 8-25 cm long, 1.5-4 cm broad

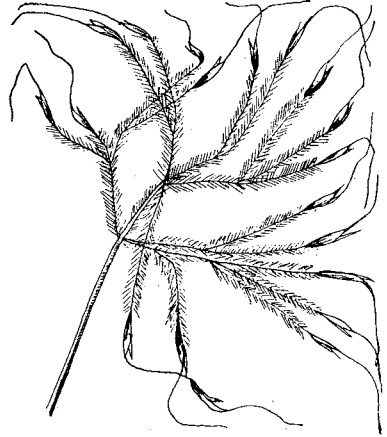


Fig. 63—*Stipa elegantissima*.

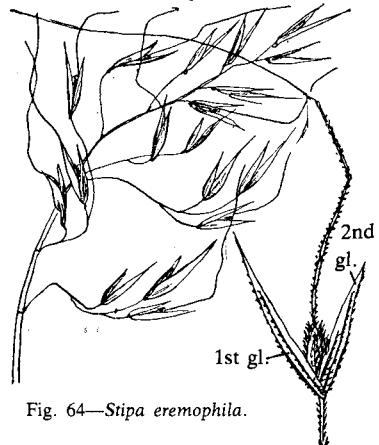


Fig. 64—*Stipa eremophila*.

(without the awns); the lower branches 4-10 cm long, in clusters of 2-6, each branch bearing few or many spikelets, so that the panicle may appear few- or many-flowered, spikelets not swollen in middle, gaping or almost closed after flowering; glumes usually purple in lower part and pale above, acute, scabrous on the prominent nerves, the 1st 13-21 mm long, 3-nerved, the 2nd 10-15 mm long, sub-5-nerved; lemma 7-10 mm long (with callus of 2.5-3 mm), the pubescence becoming golden-brown or reddish-brown, the golden hairs sometimes appearing only on the callus, the lemma with usually an almost glabrous short collar or neck at the summit, surmounted by a tuft of hairs 1-2 mm long; awn twice bent, sometimes abruptly, 5-8 cm long, slender, the column 2-3 cm long, minutely pubescent, the bristle straight.—*S. pubescens* non R. Br., sensu Benth., *Fl. Aust.* 7:569 (1878), partly; *S. fusca* C. E. Hubbard, *Kew Bull.* 1925:432 (1925); *S. variegata* Summerh. & C. E. Hubbard, *Kew Bull.* 1927:363 (1927).

Occurs in W.Aust., Vic., N.S.W. and S.Aust. (all regions S. of about 31°S.)

Probably flowers mainly Sept.-Nov.

15. ***S. hemipogon* Benth.**, *Fl. Aust.* 7:569 (1878). **Spear-grass.** Stem stiff to c. 1 m high; leaves mostly basal, sheaths tight, pubescent, blades stiff, erect, subulate, subulate-involute or channelled, pubescent or scabrous, 12-25 cm long; nodes pubescent; ligule short, ciliolate, with a ring of hairs behind the orifice; panicle exerted, rather dense, 15-30 cm long, 1-3 cm broad, the branches 4-6 cm long; spikelets narrow, pale, not or slightly gaping; glumes scabrous on nerves, the 1st 14-25 mm long, 3-nerved, the 2nd 12-21 mm long, sub-5-nerved; lemma 7-9 mm long (including callus of 2-3 mm), white-pubescent; awn slender, 6-10 cm long, twice bent, the column unilaterally plumose, 16-30 mm long, with similar hairs extending to approx. half the length of the straight bristle.—*S. indepressa* J. M. Black, *Trans.R.Soc.S.Aust.* 65:334 (1941); *S. plagiopogon* J. M. Black, *Trans.R.Soc.S.Aust.* 65:334 (1941). (Cf. Willis (1962) *A handbook to Plants in Victoria* 1:184.)

Occurs in W.Aust., Vic. and S.Aust. (Eyre Pen., Flinders Ranges, Southern Lofty, Murray and S.E. regions).

Flowers not known.

16. ***S. macalpinei* Reader**, *Victorian Nat.* 14:143 (1899). **Annual spear-grass, one-year grass.** Annual, with rather stout stems, 20-90 cm high; lower leaf-sheaths loose, densely beset with spreading glistening hairs, the upper leaves becoming glabrous, the uppermost sheath swollen and usually embracing base of panicle; blades filiform-involute, 7-12 cm long; nodes glabrous; ligule 6-10 mm long, glabrous; panicle 10-30 cm long, narrow, loose when flowering, later contracted, the lower branches 6-12 cm long, naked in lower part; spikelets narrow, shining, gaping; glumes pointed, the 1st 18-20 mm long, 3-nerved, the 2nd 12-14 mm long, 5-nerved; lemma 7 mm long (including callus of 3 mm), white-pubescent; awn slender, 12-15 cm long, slightly twice bent, the column 3.5-4 cm long, the bristle straight or curved.—*S. compressa* R.Br. var. *lachnocolea* Benth., *Fl. Aust.* 7:567 (1878); *S. lachnocolea* (Benth.) Hughes, *Kew Bull.* 1921:26 (1921); *S. setacea* R.Br. var. ? *latifolia* Benth., *Fl. Aust.* 7:568 (1878); *S. sclerata* Behr ex J. M. Black, *Fl.S.Aust.* 65 (1917).

Occurs in W.Aust., Vic. and S.Aust. (Southern Lofty, Murray, Kangaroo I. and S.E. regions).

Flowers Oct.-Dec.

17. ***S. muelleri* Tate**, *Trans.R.Soc.S.Aust.* 7:70 (1885). **Wiry spear-grass.** Stems wiry, glabrous; leaves reduced to short distant blades on the stem and at the base of the long filiform peduncles, which bear 1-3 spikelets in a short terminal raceme; ligule short, glabrous; glumes acute, subequal, c. 25 mm long, the 1st 3-nerved, the 2nd 5-nerved; spikelets stiff, gaping; lemma pubescent, 18-20 mm long (including callus of 3 mm), with 2 erect hyaline lobes of c. 3 mm; awn once bent, 6-7 cm long, the column 4-5 cm long, the bristle straight.

Occurs in Vic. and S.Aust. (Southern Lofty and S.E. regions).

Flowers Oct.-Dec.

18. *S. multispiculis* J. M. Black, *Trans.R.Soc.S.Aust.* 65:333 (1941). Stems rather stout, stiff, 50-70 cm high, geniculate near the base; nodes pubescent; leaf-sheaths loose, the lowest ones pubescent; the blades stiff, subulate or broad near base, minutely scabrous, to 40 cm long; ligule very short, ciliate; panicle very loose, 20-30 cm long, 3-6 cm broad, the branches many-flowered, 5-6 in cluster and 6-12 cm long; spikelets pale, finally gaping, narrow; 1st glume 10-12 mm long, 3-nerved and scabrous on nerves, the 2nd 8-10 mm long, sub-5-nerved; lemma 6-8 mm long (including callus of 1-2 mm), white-pubescent; awn slender, slightly or abruptly twice bent, 4-6 cm long, column 18-25 mm long, bristle straight.

Restricted to S.Aust. (material in AD restricted to a radius of 45 km from Adelaide; recorded by J. M. Black, (1943) from Yorke Pen.).

Flowers Sept.-Nov.

19. *S. mundula* J. M. Black, *Trans.R.Soc.S.Aust.* 65:333 (1941). Stems slender, 20-30 cm high, geniculate in lower half, leaves glabrous, mostly basal, the sheaths tight, the uppermost embracing base of panicle, the blades filiform, mostly curved, 6-8 cm long; ligule oblong, glabrous, truncate, 2-3 mm long; nodes pubescent; panicle narrow, but rather loose, 5-8 cm long, 1-2 cm broad, the branches c. 3 cm long, 2-3-flowered; spikelets narrow, slightly gaping; glumes pointed, hyaline, the 1st 14-16 mm long, 3-nerved, the 2nd 10-11 mm long, sub-5-nerved; the lemma 7 mm long (including callus of 2.5 mm), white-pubescent; awn very slender, 6.5-7 cm long, almost straight; column 26-28 mm long; palea as long as the lemma.

Restricted to S.Aust. (Eyre Pen., Yorke Pen., Murray and S.E. regions).

Flowers Oct.-Nov.

20. *S. nitida* Summerh. & C. E. Hubbard, *Kew Bull.* 1927:80 (1927). **Balcarras grass.** Stem erect, 5-50 cm high; nodes usually concealed, when disclosed glabrous; leaf-sheaths glabrous or some of the basal sheaths pubescent or woolly, the swollen uppermost one embracing the base of the panicle, the blades filiform-involute, 4-20 cm long, stiff, smooth or scabrous with minute

hairs; ligule very short, ciliate, the lateral lobes usually prominent and woolly or villous-ciliate with loose hairs 3-5 mm long, or sometimes almost glabrous; panicle dense, silvery-shining, 12-30 cm long, 1-2 cm broad (without the awns); spikelets linear-lanceolate, the 1st glume 10-12 mm long, sub-3-nerved, the 2nd 9-11 mm long, sub-5-nerved; lemma 4-5 mm long (including callus of 1.5 mm), white-hairy; awn slender, once bent, 5-6.5 cm long, the column c. 10 mm long, the bristle straight or slightly curved, but scarcely falcate.

Occurs in W.Aust., Vic. and S.Aust. (N.W., Lake Eyre, Eastern, Eyre Pen., Yorke Pen., Southern Lofty and Murray regions).

Flowers over a long period, July-Dec.



Fig. 65—*Stipa nitida*.

21. *S. nodosa* S. T. Blake, *Proc.R.Soc.Qld* 62:89 (1952). Perennial, tufted grass, c. 1 m high; leaves mostly cauline; leaf-sheath tight, rough, the outer margin ciliate, not embracing base of panicle; blades rigid, capillary, very pointed, minutely scabrous, usually to 30 cm long; ligule truncate, glabrous, 0.5-0.75 mm long; nodes glabrous; panicle 20-30 cm long, rather loose, 4-6 cm broad (excluding awns), lower branches to 6 cm long; spikelets narrow, purplish; glumes sub-equal, 7-8 mm long, membranous, strongly pointed-acuminate, glabrous but slightly scabrous on the keel, the 1st shorter, 3-nerved, the 2nd sub-5-nerved, the outermost veins short; lemma 5.5-5 mm long (including callus of 1.3-2 mm), white-hairy; awn slender, 45-50 mm long, scabrous, column 11.5-13 mm long, the bristle very slender, curved.

Recorded only from S.Aust. in the Flinders Ranges region.

Flowers Aug.-Sept.

22. *S. platychaeta* Hughes, *Kew Bull.* 1921:16 (1921). **Flat-awned spear-grass.** Stems stiff, hard, erect, to 1 m high, 3-4 mm thick, glabrous, with many glabrous nodes; leaves glabrous, the blades flat or the uppermost inrolled; ligules truncate, glabrous, to 5 mm long; panicle finally loose, 20-30 cm long, the slender branches naked in the lower part, clustered, finally spreading, the lowest 4-10 cm long; glumes delicate, purplish, unequal, the 1st 3-nerved only near the base, 12-15 mm long, the 2nd sub-5-nerved, 8-11 mm long; lemma pubescent, 5 mm long (including callus of under 1 mm); awn 6-8 cm long, the column 9-13 mm long, narrower than the curved bristle, which is slightly flattened, 1-ribbed on each face and ciliate along the margins.

Occurs in W.Aust., N.S.W., Vic. and S.Aust. (N.W., Eastern, Eyre Pen., Yorke Pen., Southern Lofty and Murray regions).

Flowers almost throughout the year but most frequently in summer.

23. *S. plumigera* Hughes, *Kew Bull.* 1921:20 (1921). Stems erect, to 55 cm high, with pubescent nodes; lower leaf-sheaths pubescent, ciliate on the margins, the blades filiform, glabrous; ligule short, ciliate; uppermost swollen leaf-sheath embracing the base of the panicle, which is contracted and rather dense, 15-20 cm long, 1.5-2 cm broad, the lower branches 3-4 cm long (without the awns), few-flowered, the blade of the uppermost leaf equalling or exceeding the panicle; spikelets narrow, hyaline; not gaping; glumes unequal, hyaline, long-pointed, almost glabrous, the 1st 20-22 mm long, 3-nerved, the 2nd 15 mm long, sub-3-nerved; lemma with dense golden pubescence, 8 mm long (including callus of 3 mm), awn slender, 8-9 cm long, pubescent with hairs c. 1 mm long almost to the summit of the bristle, the column 2 cm long, the bristle straight.—*S. eremophila* Reader var. *dodrantaria* J. M. Black, *Fl.S.Aust.* 66: (1922).

Occurs only in S.Aust. and known from the N.W. region in the Birksgate Range and at Emu (Gt Victoria Desert).

Flowering time not known.

24. *S. puberula* Steud., *Synops.Pl.glumac.* 1:128 (1854). Stems stiff, to 70 cm high; sheaths and lower blades minutely pubescent, the blades channelled or flat in lower part and 2-4 mm broad, ribbed, subulate in upper part; orifice of sheath villous; nodes pubescent; ligule very short, ciliate; panicle narrow but rather loose, c. 20 cm long, 2-3 cm broad, the erect branches 3-4 cm long (without the awns); spikelets swollen in middle, scabrous on nerves; glumes subequal, the 1st 9-10 mm long, 3-nerved, the 2nd a little shorter, sub-5-nerved; lemma 7 mm long (including callus of 2 mm), white-pubescent, swollen; awn slender, c. 4-4.5 cm long, slightly twice bent, the column 16-18 mm long, the bristle straight. As *S. puberula* in J. M. Black (1943, p. 92).

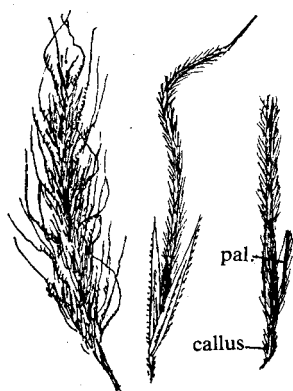
Occurs in W.Aust. and S.Aust. (Southern Lofty and Kangaroo I. regions).

Flowering not known.

25. *S. pubescens* R.Br., *Prod.Fl.Nov.Holl.* 174 (1810) var. *maritima* J. M. Black, *Trans. R.Soc.S.Aust.* 67:36 (1943). **Tall spear-grass.** Stout grass, 50-80 cm high; basal sheaths softly pubescent, the loose uppermost sheath often embracing base of panicle; nodes pubescent; ligule short, ciliate; blades stiff, subulate or some flat and 8-10 mm broad, glabrous or scabrous, to 45 cm long; panicle dense or becoming loose towards the base, 15-35 cm long, about 2-3 cm broad, bristly with its long erect awns; spikelets narrow, straw-coloured, not gaping; glumes pointed, scabrous on the prominent nerves, the 1st 17-24 mm long, 3-nerved, the 2nd 15-20 mm long, often toothed near summit, sub-5-nerved; lemma 10-12 mm long (including callus of 3 mm), white-pubescent; awn slightly twice bent, 5-5 cm long, the column 2-5 cm long, stout, very shortly white-pubescent, the bristle straight.

Restricted to a small coastal area S.W. of Adelaide (Marino, Kingston Park and Hackham).

Flowering not known.

Fig. 66—*Stipa semibarbata*.

26. *S. semibarbata* R.Br., *Prod.Fl.Nov.Holl.* 174 (1810). **Fibrous spear-grass, barbed spear-grass.** Stems slender or rather stout, 30-150 cm tall; sheaths and blades minutely pubescent, rather stiff, the latter subulate to filiform, the basal ones sometimes scabrous with short stiff hairs; nodes pubescent; ligule short, truncate, ciliate, with a ring of white hairs behind orifice of sheath; panicle narrow, 14-30 cm long, often exserted from sheath, usually dense, 1-3 cm broad (without awns), the lower branches 4-7 cm long (without awns); spikelets narrow, sometimes gaping after flowering; glumes minutely scabrous, the 1st 15-21 mm long, 3-nerved, the 2nd 13-18 mm long, sub-5-nerved; lemma 8-10 mm long (including callus of 2.5-3 mm), white-pubescent on brown ground; awn 6-10 cm long, slightly twice bent, the column rather stout, 2-4 cm long, plumose with hairs c. 2 mm long.

Var. **semibarbata.** Stem rather stout; panicle 20-30 cm long, dense; awn 6-10 cm long.

Occurs in all Australian States, except N.T., Qld. and N.S.W. In S.Aust. from the Eyre Pen., Southern Lofty, Murray and Kangaroo I. regions.

Flowering not known.

Var. **gracilis** J. M. Black, *Trans.R.Soc.S.Aust.* 67:36 (1943). Stem slender; panicle c. 14 cm long, sometimes rather loose; awn 6-7 cm long.

Occurs only in S.Aust. (Southern Lofty and Kangaroo I. regions).

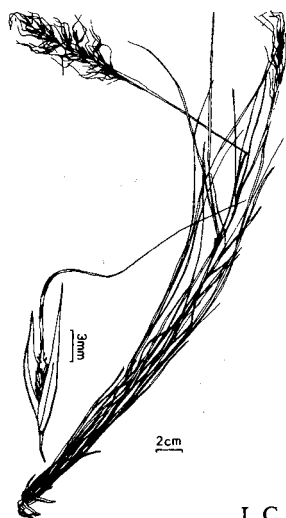
Flowering not known.

27. *S. setacea* R.Br., *Prod.Fl.Nov.Holl.* 174 (1810). **Corkscrew grass.** Slender, glabrous grass, 30-60 cm high; nodes brown, glabrous; leaves mostly basal, the uppermost swollen sheath usually embracing base of panicle, the blades filiform-involute flexible; ligule oblong-lanceolate, glabrous, 4-6 mm long, decurrent on sheath; panicle narrow but rather loose, 10-16 cm long, c. 2 mm broad; the branches 2-5 cm long, few-flowered; spikelets swollen in middle, scarcely gaping; glumes hyaline, pointed, the 1st 14-18 mm long, sub-3-nerved, the lateral nerves ascending to near middle but very faint, the 2nd 12-14 mm long, sub-5-nerved; lemma 7-8 mm long (including callus of 2-3 mm), white-pubescent; awn 4-5 cm long, twice bent, the column 2-2.5 cm long, fairly stout, the bristle straight.

Occurs in all States except W.Aust. and N.T. Recorded in S.Aust. from the Lake Eyre and Southern Lofty regions and recorded by J. M. Black (1943) from Ooldea (in the west), Eyre Pen., Flinders Ranges and the Murray region.

Flowers usually Sept.-Nov. (-March).

28. *S. stipoides* (Hook.f.) Veldk., *Blumea* 22:11 (1974). **Prickly spear-grass, coast spear-grass.** Straw-coloured, almost glabrous, stems erect, stiff; leaves very long, erect, filiform, rigid, almost pungent-pointed; ligule oblong, 6-10 mm long, glabrous; panicle narrow, 12-20 cm long; glumes equal, broad, acute whitish, 15-20 mm long, the 1st 3-nerved, the 2nd 5-nerved; lemma 10-12 mm long, villous all over, with 2 lanceolate hairy lobes on each side of the awn, 2-3 mm long; awn 2.5-4 cm long,

Fig. 67—*Stipa setacea*.

finely pubescent, twice bent, column 10-15 mm long.—*Dichelachne stipoides* Hook.f., *Fl. Nov. Zel.* 1:294 (1853); *S. teretifolia* Steud., *Synops. Pl. glumac.* 1:128 (1854).

Occurs in W.Aust., N.S.W., Vic., Tas. and S.Aust. (Eyre Pen., Kangaroo I. and S.E. regions).

Flowers Oct.-March.

29. *S. tenuiglumis* Hughes, *Kew Bull.* 1921:22 (1921). Stiff but slender stems 30-60 cm high; nodes pubescent; sheaths tight, except the uppermost one, the blades filiform or sometimes flattened in lower part, the basal ones rather short and usually scabrous with minute hairs; ligule very short, ciliolate; panicle narrow, dense or becoming somewhat loose, especially near base, 10-20 cm long, 1-3 cm broad; spikelets narrow, finally gaping, pale or purplish; glumes scabrous on the prominent nerves, the 1st 9-12 mm long, 3-nerved, the 2nd 8-10 mm long, sub-5-nerved; lemma 7-8 mm long (including callus of 2 mm), white-pubescent; awn slender, slightly twice bent, 4-5.5 cm long, the column 16-25 mm long, the bristle straight.—*S. scabra* Lindl. var. *sriata* Benth., *Fl. Aust.* 7:570 (1878).

Occurs in W.Aust. and S.Aust. (Eyre Pen., Yorke Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions).

Flowering not known.

30. *S. tuckeri* F. Muell., *Fragm. Phyt. Aust.* 11:128 (1881). **Spear-grass.** Stems stiff but slender, 20-30 cm high; stems and leaves densely pubescent; the blades flat or narrow-involute, when flat they are 4-5 mm broad and multistriate; ligule c. 3 mm long, ciliate; panicle very loose, 8-12 cm long, the whorled branches 4-5 cm long, spreading and, like the long capillary pedicels, shortly and inconspicuously plumose or pubescent; glumes subequal, 3-nerved, c. 8 mm long; lemma 5 mm long, (with almost obtuse villous callus 1 mm long), hairy at the very base, the upper part minutely muricate-tuberculate (under lens); palea 1 mm long, obtuse; awn slender, once bent, c. 3 cm long, the column c. 10 mm long.

Occurs in W.Aust., N.S.W., Vic. and S.Aust. (only known from N. of Baratta, 62 km E. of Hawker, Eastern region).

Flowered in Dec.

31. *S. variabilis* Hughes, *Kew Bull.* 1921:15 (1921). **Variable spear-grass.** Stems erect, glabrous, 30-80 cm high; leaf-sheaths tight, glabrous; nodes 1 or 2, glabrous, often concealed; ligule short, truncate, ciliate, usually with 1 or 2 lateral lobes; blades to 20 cm long, subulate-involute, scabrous with minute deflexed hairs or almost glabrous; panicle loose, 15-30 cm long, 2-5 cm broad, the lower branches to 5 cm long (without the awns), few-flowered; pedicels scabrous; spikelets very narrow, golden-brown; glumes acute, almost hyaline, minutely scabrous, often purplish, the 1st 10-13 mm long, sub-3-nerved, the 2nd 9-12 mm long, sub-5-nerved; lemma 5-7 mm long (with callus of 1.5-2 mm). the hairs white on a yellow or brown ground; awns 6-7 cm long, once bent, slender, the column 10-15 mm long, apparently glabrous, brown and twisted, the bristle curved when ripe.—*S. falcata* Hughes, *Kew Bull.* 1921:14 (1921); *S. incurva* Hughes, *Kew Bull.* 1921:16 (1921); *S. pubescens* R.Br. var. *effusa* Benth., *Fl. Aust.* 7:570 (1878); *S. scabra* non Lindl., sensu Benth., *Fl. Aust.* 7:571 (1878); *S. scabra* Lindl. var. *pubescens* Benth., *Fl. Aust.* 7:571 (1878); *S. setacea* non R.Br., sensu Benth., *Fl. Aust.* 7:568 (1878).

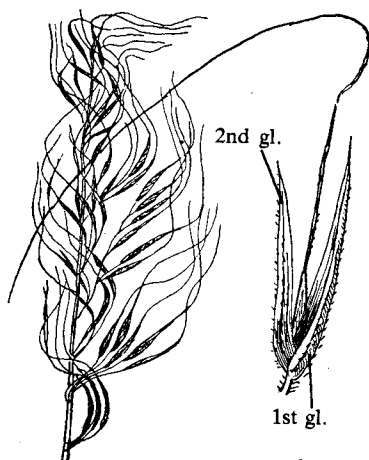


Fig. 68—*Stipa variabilis*.

Occurs in all States except N.T. In S.Aust. it is very widespread in all regions.

Flowers most frequently Aug.-Feb.

Blackall (1954) *How to know Western Australian Wildflowers*, pt. 1 treated *S. variabilis* as a synonym for *S. tenuiglumis*.

S. densiflora Hughes, *Kew Bull.* 1921:18 (1921); has once been collected near Adelaide.

S. falcata Hughes var. *minor* J. M. Black appears in Black (1943) but its place of publication and status have not been determined.

S. leptophylla Hughes, *Kew Bull.* 1921:14 (1921); was regarded as doubtfully present by Hj. Eichler (1965) and has not been confirmed.

S. nobilis Pilg., *Bot.Jb.* 35:70 (1905). Plants similar to this species have been recorded in AD from Kangaroo I. and Mount Lofty.

TRIBE 3.—ARUNDINEAE

6. ARUNDO L.

Sp.Pl. 81 (1753).

(*Arundo* was an old Latin name for *Arundo donax*.)

Plants with creeping perennial rhizomes; leaves more or less evenly spaced along tall stems; spikelets all bisexual except the reduced uppermost flower in a feathery plume-like panicle; rachilla articulated above the glumes; glumes thin, as long as the spikelet, 3-5-nerved; lemmas without awns, with silky hairs almost as long as the lemma on the lower part, callus shortly hairy; paleas much shorter than the lemmas. About 12 tropical and temperate species.

*1. **A. donax** L., *Sp.Pl.* 81 (1753). **Spanish reed, giant reed, Danubian reed.** Culms 2-6 m high; leaves rounded at the base, tapering to a long fine point, glabrous, to 7 cm broad; panicle 30-60 cm long, dense, silky hairy, cream-coloured or brown; spikelets 8-15 mm long, 2-7-flowered; glumes almost equal, glabrous; lemma 5-9-nerved.

Native to Southern Europe and Asia but introduced as an ornamental into most of the world. It usually grows in damp places. In Australia it is not generally regarded as naturalised but it has been sporadically recorded outside cultivation in Vic. and S.Aust. (Yorke Pen., flowering in July) and is considered to be naturalised in Qld.

7. CORTADERIA Stapf

Gdnrs' Chron., ser.3,22:378 (1897).

(An Argentinian name for pampas grass.)

Plants without creeping rhizomes, forming large dense tussocks; leaves mostly crowded at the base of the tall culms; spikelets unisexual, the sexes on separate plants, in a panicle which is a handsome plume in the female but glabrous in the male; glumes papery, sometimes shorter than the spikelet, 1-nerved; lemmas awned or slender-pointed, glabrous in male, long silky hairy in the female, callus in female long silky hairy. 15 South American species.

*1. **C. selloana** (Schult.) Aschers. & Graebner, *Syn.Mitteleur.Fl.* 2:325 (1900). **Pampas grass.** Culms 2-3 m high; leaves relatively narrow, tapering to a fine point, scabrid; panicle 30-100 cm long, the female silky hairy, handsomely plumose, silvery white, pink or mauve, the male glabrous; spikelets 2-4-flowered; glumes glabrous; lemma 1-nerved.—*Arundo selloana* Schult., *Syst.Veg.* 2, mant. addit. 1:605 (1827).

Native to South America, but introduced as an ornamental into most of the world. Grows on hills and plains and does not require damp conditions. In Australia it is not generally regarded as naturalised but it has been sporadically recorded outside cultivation in Vic. and S.Aust. (Southern Lofty region, flowering in March).

PHRAGMITES Adans.

Fam. 2:34 (1763).

(Greek *phragmitēs*, growing in hedges; plants grow crowded together in a row along the water's edge.)

Plants with creeping perennial rhizomes; leaves more or less evenly spaced along tall stems; spikelets with the lowest flower male or sterile, followed by 1-9 bisexual flowers and the uppermost flower sterile and reduced, in an open or contracted drooping, silky hairy plume-like panicle; flowers articulated to rhachilla; glumes thin, shorter than the spikelet, 3-5-nerved; lemmas awned or slender-pointed, glabrous, the callus silky hairy. 3 cosmopolitan species. (Key from Clayton (1967) *Kew Bull.* 21:115).

1. Leaf-blades smooth beneath, the tips filiform and flexuous, rhachilla hairs 6-10 mm long, copious, silky, panicle often smaller, the lowest node usually few-branched, some of the branches bearing spikelets nearly to their base; upper glume 5-9 mm long *P. australis* 1.
1. Leaf-blades scabrid beneath (at least in upper half), the tips attenuate, stiff or even pungent (occasionally almost smooth or with filiform tips); rhachilla hairs 4-7 mm long, rather sparse; lowest node of the panicle often many-branched in a whorl, the branches bare of spikelets for some distance from their base *P. karka* 2.

1. ***P. australis*** (Cav.) Trin. ex Steud., *Nom. bot.*, ed. 2, 2:324 (1841). **Common reed.** (Ill. H.I. Aston (1973) *Aquatic plants of Australia*, fig. 82). Culms 1-3 m high; leaves narrowly lanceolate, long-tapering, c. 20-55 x 1.5-4.5 cm, glabrous; panicle 12-40 cm long; sometimes plume-like, usually white to pale brown; spikelets 10-18 mm long, with the lowest flower male, followed by up to 6 bisexual flowers; glumes conspicuously unequal in length, glabrous; lemma usually 1-nerved, glabrous, callus with long silky hairs.—*Arundo australis* Cav., *Ann. Hist. Nat.* 1:100 (1799); *A. phragmites* L., *Sp. Pl.* 81 (1753); *A. vulgaris* Lam., *Fl. Franc.* 3:615 (1778); *P. vulgaris* (Lam.) Crep., *Man. Fl. Belge*, ed. 2:345 (1866); *P. communis* Trin., *Fund. Agrost.* 134 (1820).

A cosmopolitan species, occurring in all mainland Australian States. Recorded in S.Aust. from the Lake Eyre, Flinders Ranges, Southern Lofty, Murray and S.E. regions.

Flowers Dec.-Aug.

Grows in wet places, especially along the banks of rivers and ponds.

2. ***P. karka*** (Retz.) Trin. ex Steud., *Nom. bot.*, ed. 2, 2:324 (1841).—*Arundo karka* Retz., *Obs. Bot.* 4:21 (1786).

Occurs in Africa, Asia and northern Australia (W.Aust., N.T. and Qld). Recorded in S.Aust. from the Lake Eyre region.

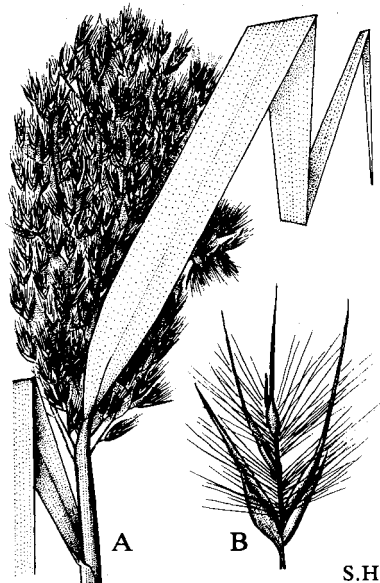


Fig. 69—*Phragmites australis*. A, inflorescence, x 1/6; B, spikelet, x 2.

TRIBE 4.—DANTHONIEAE

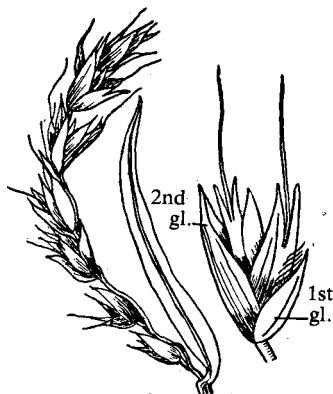
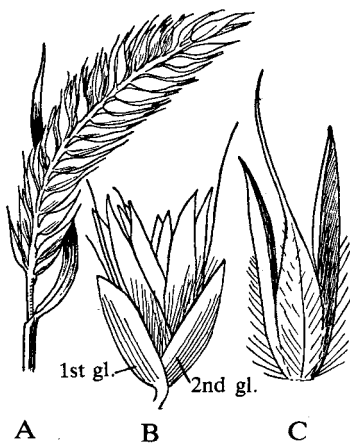
9. *ASTREBLA* F.Muell. in Benth.*Fl.Aust.* 7:602 (1878).(Greek *a*, not; *streblos*, twisted; referring to the awn.)

Ligule a ring of hairs; spikelets 3-6 flowered, sessile or nearly so in the alternate notches of the rachis of 1 or 2 unilateral terminal spikes; glumes 2, acute, many-nerved, persistent; lemmas silky-hairy, 3-lobed, the lateral lobes erect and rigid, the central lobe tapering into an untwisted awn, the terminal flowers in each spikelet with awn reduced or wanting. 4 species confined to Australia, especially in dry country. Provide good stock feed.

1. Spikes 6-20 cm; awn much exceeding the lateral lobes; glumes unequal *A. lappacea* 1.
1. Spikes 3-10 cm; awn very little longer than the lateral lobes; glumes almost equal *A. pectinata* 2.

1. *A. lappacea* (Lindl.) Domin, *Bibliotheca bot.* 85:372 (1915). **Curly Mitchell grass, wheat Mitchell.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 18b.). Perennial, 30-90 cm high; leaf-blades flat, glabrous or tuberculate-scabrous; spikes 6-10 cm long, c.1 cm broad, the spikelets alternate and somewhat spaced along the rachis; spikelets 4-6-flowered; glumes unequal, the 1st 5-7 mm long, 1-3 -nerved, the 2nd 8-12 mm long, 9-13-nerved; lemma villous on back, the body c. 4 mm long, the 2 glabrous 3-nerved lanceolate lateral lobes 6-7 mm long, the straight central awn exceeding them by 4-6 mm.—*Danthonia lappacea* Lindl. in T. L. Mitchell, *Three Exped. Int. eastern Austral.* 1:313 (1838); *D. triticoides* Lindl. in T. L. Mitchell, *J.Trop.Austral.* 365 (1848); *A. triticoides* (Lindl.) F.Muell. in Benth., *Fl.Aust.* 7:602 (1878).

Occurs in W.Aust., N.T., N.S.W., Qld and S.Aust. (Lake Eyre and Flinders Ranges regions). Flowers recorded in May.

Fig. 70—*Astrebula lappacea*.Fig. 71—*Astrebula pectinata*. A, spike; B, spikelet; C, lemma.

2. *A. pectinata* (Lindl.) F.Muell. in Benth., *Fl.Aust.* 7:602 (1878). **Barley Mitchell grass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl.18c.). Perennial, 15-120 cm high; leaf-blades flat, tuberculate-scabrous; spikes 3-10 cm long, 1-1.5 cm broad, the spikelets closely packed

together; spikelets about 4-flowered; glumes subequal, c. 10 mm long, the 1st 7-9-nerved, the 2nd 13-15-nerved; lemma villous on back; the entire body c. 4 mm long, the 2 lanceolate glabrous rigid, 2-3-nerved lateral lobes 6-8 mm long, the straight awn, rising from the short, broad, central lobe, exceeding the lateral lobes by 1-2 mm.—*Danthonia pectinata* Lindl. in T. L. Mitchell, *Three Exped. Int. eastern Austral.* 2:26 (1838).

Occurs in all Australian mainland States except Vic. In S.Aust. from the N.W., Lake Eyre, Gairdner-Torrens and Flinders Ranges regions.

Flowers mainly Sept.-March.

A. squarrosa C. E. Hubbard, *Kew Bull.* 1928:259 (1928). *Bull Mitchell Grass.* Distinguished by the central or all 3 lobes of the lemma ending in hooked awns.—Occurs in N.S.W. and Qld and was considered by J. M. Black (1943) likely to occur in the N.E. of S.Aust., but has not yet been recorded.

10. DANTHONIA Lam. & DC.

Fl. Franc. ed.3,3:32 (1805).

(After Etienne Danthoine, a botanist of Marseilles.)

Lower leaf sheaths not woolly; ligule a ring of hairs; spikelets 3-9-flowered, the upper flowers reduced, pedicellate, in panicles or racemes; glumes 2, acute, 5-9-nerved, persistent, rounded on back, with membranous margins, as long as or longer than the flowers, lemmas more or less hairy on the back, deeply cut into 2 lateral usually 3-nerved lobes, with a bent and twisted awn rising between them, the base faintly 7-nerved; callus sharp, bearded; palea broad. Formerly regarded as a large cosmopolitan genus with about 150 species. Zotov (1963) *New Zealand J. Bot.* 1:87 considered it to be restricted to the northern hemisphere and described 4 new genera for New Zealand. The only S.Aust. species dealt with by Zotov were placed in *Notodanthonia*. Although subsequent authors appear to have accepted that all S.Aust. species should be transferred to *Notodanthonia* the necessary combinations have not all been made and the species are here retained in *Danthonia*. (Vickery (1956) *Contr. N.S.W. natn. Herb.* 2:249-325). The key is modified from Hj. Eichler (1965).

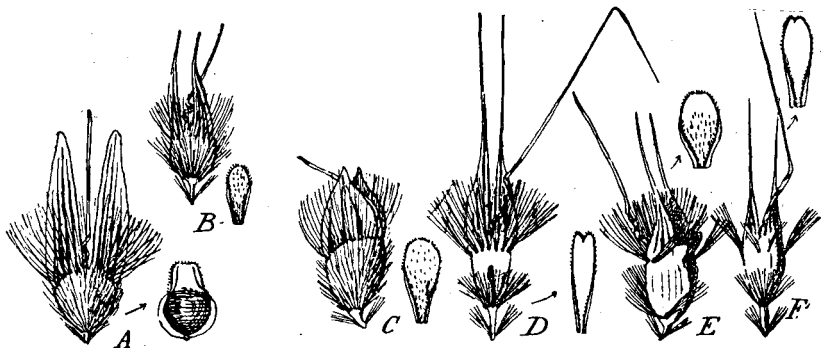


Fig. 72.—*Monachather*, lemma and palea. A, *M. paradoxa*; B, *D. geniculata*; C, *D. carphoides*; D, *D. semiannularis*; E, *D. auriculata*; F, *D. racemosa*.

1. Lemma with scattered hairs over the back.
 2. Hairs on lemma of uniform length.
 3. Central awn much longer than lateral lobes *D. clelandii* 4.
 3. Central awn scarcely exceeding lateral lobes *D. geniculata* 7.
 2. Hairs below sinus longer than those lower down on lemma.
 4. Lateral lobes shorter than body of lemma *D. carphoides* 3.
 4. Lateral lobes equal to or longer than body of lemma.
 5. Lateral lobes usually 2-3 times as long as the 2-3 mm body of the lemma; central awn twisted at base *D. geniculata* 7.
 5. Either the lateral lobes not twice as long as the body of the lemma or the body is over 3 mm long or the central awn is not much twisted at the base or, if so, then exceeding the lateral lobes by more than 2 mm.
 6. Shorter dorsal hairs usually over 1 mm and lengthening upwards.
 7. Central awn reflexed or once twisted at base *D. richardsonii* 12.
 7. Central awn strongly twisted at base *D. linkii* 9.
 6. Hairs on back of lemma uniformly short (mostly c. 0.5 mm long).
 8. Lateral lobes not or minutely awned *D. semiannularis* 13.
 8. Lateral lobes with setae 4-6 mm long *D. setacea* 14.
 1. Lemma with hairs in distinct tufts or transverse rows of tufts or hairs reduced or absent.
 9. Lemma with a complete row of tufts just below the sinus.
 10. Lemma with a row of hair tufts just above the callus.
 11. Membranous margins continued up the outer edges of lateral lobes.
 12. Body of lemma usually pale at maturity.
 13. Body of lemma usually less than 2.5 mm long *D. setacea* 14.
 13. Body of lemma 3 mm or more.
 14. Setae much shorter than the flat portion of the lateral lobes and usually c. 2 mm long *D. tenuior* 15.
 14. Setae about as long as the flat portion of lateral lobes and rarely less than 4 mm long.
 15. Palea narrow-lanceolate and usually much exceeding the sinus *D. caespitosa* 2.
 15. Palea broadly obovate to oblanceolate, only shortly exceeding the sinus *D. eriantha* 6.
 12. Body of lemma golden-brown at maturity *D. duttoniana* 5.
 11. Membranous margins ending abruptly in a small auricle *D. auriculata* 1.
 10. Lemma without a row of hair tufts above the callus; often with lateral tufts at the margin *D. laevis* 8.
 9. Lemma with dorsal and marginal tufts of hairs below the sinus or the tufts of hairs wholly or partly suppressed.
 16. Panicle usually short (4-5 cm), crowded *D. pilosa* 10.
 16. Panicle linear (5-15 cm), usually not crowded *D. racemosa* 11.
1. *D. auriculata* J.M. Black, *Trans. R. Soc. S. Aust.* 53:261 (1929). **Lobed wallaby-grass.** (Ill. N. T. Burbidge (1966) *Australian grasses* 1, pl. 35c.). Erect, slender, tufted perennial, 20-50 cm high, sometimes geniculate at the base; leaves rather short, 2-10 cm long, flat or inrolled, 2 mm broad, more or less densely hairy; ligule reduced to a ring of short cilia c. 0.5 mm long, often with longer hairs at the sides; panicle exserted, dense, oblong, compact, sometimes reduced to a raceme; spikelets about 6-flowered, shorter than glumes; glumes broad, 9-11-nerved, pale green,

9-16 mm long, body of lemma 3.5-4.0 mm long (including callus of 0.5-1.0 mm); conspicuous tufts of hairs above callus and below sinus, the latter hairs 5-6 mm long; lateral lobes 10-12 mm long, narrowing abruptly after c. 4 mm into long setae, the membranous outer margins terminating abruptly in a membranous lobe or auricle; central awn 2-3 mm longer than the lateral lobes; palea shortly exceeding the sinus, ovate-cuneate, obtuse, pubescent on back.—*Notodanthonia auriculata* (J. M. Black) Zotov, *New Zealand J.Bot.* 1:113 (1963).

Occurs in N.S.W., Vic., New Zealand (introduced) and S.Aust. (Flinders Ranges, Southern Lofty and Murray regions).

Flowers Sept.-Dec.

Regarded as an important element of natural pastures.

2. *D. caespitosa* Gaud. in Freyc., *Voyage autour du Monde par des Corvettes l'Uranie et la Physicienne pendant 1817-20*, 4, Botanique 408 (1826). **Common wallaby-grass.** Very variable, erect, tufted perennial, 20-90 cm high; leaf-sheaths rather densely hairy with tubercle-based hairs to 2 mm long or almost glabrous; ligule ciliate, the lateral hairs and those on collar rather long; leaves flat or loosely involute, 2-4 mm x c. 25 cm, glabrous or hairy; panicles shortly to much exserted, linear-lanceolate in outline, rarely ovate, usually with 10-30 spikelets; spikelets 4-9-flowered, pale and usually shorter than glumes; glumes 14-24 mm long, sub-equal, 5-7-nerved; lemma pale, 4-6 mm long, including the 0.75-1.5 mm hairy callus, lanceolate, with 2 rows of hairs on the back and glabrous between; lateral lobes with narrow membranous margins, flat portion c. 4 mm and fine setae c. 8 mm long, central awn 15-25 mm long, strongly exserted from glumes; palea usually exceeding sinus, c. 4.5-5.0 mm long, bifid, narrow lanceolate, glabrous on back.—*Notodanthonia caespitosa* (Gaud.) Zotov, *New Zealand J.Bot.* 1:117 (1963); *D. semiannularis* non (Labill.) R.Br., sensu J. M. Black, *Fl.S.Aust.* 107 (1943), partly.

Widespread in Australia except N.T. and Qld and in New Zealand. Very common in all the southern parts of S.Aust. from the Nullarbor to the Flinders Ranges regions and south, but rare or absent in the two northern regions.

Almost always flowers between Sept.-Dec.

Highly palatable and with a high nutritive value, it is regarded as one of the most valuable native pasture grasses.

Vickery (1956) commented that despite exceptionally great variability it had not been found possible to segregate sub-specific taxa.

3. *D. carphoides* F. Muell. in Benth., *Fl. Aust.* 7:592 (1878). **Short wallaby-grass.** (Ill. N. T. Burbidge (1970) *Australian grasses* 1, pl. 35a.). Rather small tufted perennial, 10-40 cm high; leaves inrolled-filiform, glabrous or with short scattered hairs; ligule a ring of short cilia; panicle or raceme dense, ovoid, 1.5-3 cm long, with few spikelets 7-10 mm long, 3-6-flowered, very short pedicels; glumes 6-8 mm long, subequal, 5-9-nerved, with wide scarious margins; body of lemma 3-6 mm long, lobes of lemma broad, about as long as the body of lemma; awn equal to or somewhat exceeding the lobes; palea oblong-cuneate, reaching the sinus, pubescent on lower part of the back, ciliate on the keels. *Notodanthonia carphoides* (F.Muell.) Zotov, *New Zealand J. Bot.* 1:113 (1963).

Var. **carphoides.** Spikelets 3-5-flowered, the florets scarcely exceeding the glumes; glumes broad, narrowed towards the apex into a short, acute or rarely shortly acuminate tip, strongly cymbiform; body of lemma 4-6 mm long, the lateral lobes c.2 mm long, obtuse or abruptly

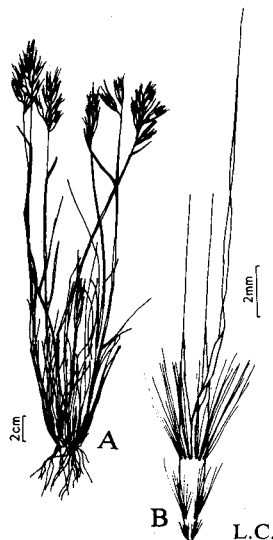


Fig. 73—*Danthonia caespitosa*. A, whole plant; B, lemma.

narrowed into a short acute or acuminate point; palea rather broadly obovate, narrowed into the base, c. 2.3 mm wide.

Occurs in N.S.W., Vic., Tas. and S.Aust. (Southern Lofty and S.E. regions).

Flowers Oct.-April.

Regarded as useful in natural pastures, despite its small size.

Var. **angustior** Vickery, *Contr. N.S.W. natn. Herb.* 2:279 (1956). Spikelets 2-3-flowered, the florets shorter than the glumes; glumes only of moderate width, tapering more or less gradually into the acute to acuminate tip, slightly cymbiform; lemma less broadly turbinate, the body 3-4 mm long, the lateral lobes 3-4 mm long, narrowing evenly into a acute tip; palea rather broadly lanceolate-elliptical (broadest above the middle), narrower than in the typical variety, 1-1.5 mm wide.

Occurs in Vic., Tas. and S.Aust. (a single record from Encounter Bay, Southern Lofty region, but no specimen in AD).

4. **D. clelandii** Vickery, *Contr. N.S.W. natn. Herb.* 1:297 (1950). Rather robust, tufted perennial, to 75 cm high; leaves flat or inrolled, 0.75-2 mm wide, more or less smooth on lower surface, finely scabrous-pubescent on upper surface; sheaths usually shorter than internodes; ligule of dense short cilia; panicle exserted, 8-13 cm long, loose, the branches distant with a few spikelets; spikelets 4-5-flowered the florets shorter than the glumes; glumes 16-20 mm long, subequal; body of lemma 5 mm long (including callus of 1 mm); lateral lobes c. 8 mm long, including 4 mm awns; central awn c. 16 mm long; palea c. 8 mm long, bifid at apex, pubescent on back in the lower part.

Restricted to the Southern Lofty region in S.Aust.

Flowers Oct.-Feb.

5. **D. duttoniana** Cashm., *Commonw. Austral., C.S.I.R. Bull.* 69, app. 2 (1932). **Brown-back wallaby-grass.** Erect, densely tufted, moderately robust, glabrous perennial, to 80 cm high; sheaths rather loose, smooth; leaves firm, 2.0-3.5 mm wide, 20 cm long, green and smooth on lower surface; ligule of short cilia (0.5 mm), sometimes bearded at the edges; panicle 4-12 cm long, finally exserted, obliquely ovate, the lower branches often to 2 cm apart and to 8 cm long; spikelets numerous, clustered, pale-green, tinged with purple, 5-7-flowered, about two-thirds the length of glumes; glumes 11-20 (usually c. 16) mm long, c. 7-nerved with broad hyaline margins; lemma 3-4 mm long (including callus of 0.75-1.0 mm), with 2 rows of hairs; body of lemma golden-brown at maturity; lateral lobes pale coloured, c. 6-9 mm long, flat for about 3-4 mm and narrowed obliquely and rather abruptly into the setae; central awn c. 11-15 mm long, strong, somewhat reflexed from the base and again bent c. 4-6 mm above the base; palea exceeding the sinus by c. 2 mm, ovate-lanceolate, with a bi-lobed tip, glabrous on back.

Occurs in N.S.W., Vic. and S.Aust. (Southern Lofty region, but doubtfully native or naturalised.)

Believed to have considerable economic potential, but is not particularly abundant under natural conditions.

6. **D. eriantha** Lindl. in T. L. Mitchell, *Three Exped. Int. eastern Austral.* 2:304 (1838). **Wallaby-grass.** Erect, densely tufted perennial, 20-70 cm high; sheaths slender, hairy with tubercle-based hairs; ligule ciliate; leaves fine, inrolled, rarely flat, usually hairy, to 25 cm long; panicle finally exserted, lanceolate to ovate, 2-7 cm long, bearing 4-15 spikelets; spikelets greenish, tinged with purple, 4-6-flowered; florets shorter than glumes, glumes 11-16 mm long, sub-equal, 11-13-veined, broad margins; lemma lanceolate, 3.5-4 mm long (including callus of 1 mm), hairs at base about as long as body of lemma, dense row of hairs c. 6-7 mm long just below the sinus; palea rather broad, obovate to oblong, shortly exceeding the sinus, firm, shining, occasionally with a few hairs on the back.

Occurs in N.S.W., Vic. and S.Aust. (Flinders Ranges, Yorke Pen. and Southern Lofty regions).

Flowers mainly Nov.

An important grazing species in some areas.

7. **D. geniculata** J. M. Black, *Trans. R. Soc. S. Aust.* 53:261 (1929). **Kneed wallaby-grass.** Tufted perennial; stems slender, 10-45 cm high, often geniculate near base; leaves filiform, pubescent with short tubercle-based hairs, inrolled; ligule finely ciliate; panicle dense, oblong, pale, 1.5-4 cm long; spikelets 4-5-flowered, florets a little shorter than the glumes; body of lemma c. 2.5 mm (including callus of 0.75 mm); lateral lobes 4-6 mm long, lanceolate and shortly awned, the central awn scarcely longer; palea obovate, obtuse, pubescent on back, reaching to the sinus. —*Notodanthonia geniculata* (J. M. Black) Zotov, *New Zealand J.Bot.* 1:114 (1963).

Occurs in New Zealand (introduced), Vic. and S.Aust. (Southern Lofty, Kangaroo I. and S.E. regions).

Flowers mainly Oct.-Dec. and March.

"Though small and not outstanding in quality, this species should be a useful constituent of natural pastures in southern parts of the continent with a fairly good rainfall". Vickery (1956).

8. **D. laevis** Vickery, *Contr.N.S.W.natn.Herb.* 1:299 (1950). **Wallaby-grass.** (Ill. N. T. Burbidge (1968) *Australian grasses* 2, pl. 16c.). Erect, densely tufted perennial, 20-60 cm high; leaves usually fine, inrolled, somewhat rigid, pointed, to 1.5 mm broad and 20 cm long, glabrous or hirsute, the tubercle-based hairs somewhat appressed; ligule reduced to short cilia, margins long ciliate; panicle exserted, short (3-4 cm long), loosely racemose or paniculate, bearing 5-20 spikelets; spikelets greenish, tinged with purple, 4-6-flowered, florets shorter than glumes; glumes rather narrow, 11-18 mm long sub-equal, firm, 5-7-nerved; lemma lanceolate to fusiform, with a row of rather long hairs (4-7 mm) just below the sinus and rather dense tufts on the margins just above the callus; body of lemma 4-5 mm long (including callus of 1.0 mm); lateral lobes 8-10 mm long, fairly broad with membranous margins, narrowing upwards into fine setae 2-4 mm long; central awn 12-28 mm long; palea 5 mm long, lanceolate to oblanceolate, minutely ciliate on upper part of keels,—*Notodanthonia laevis* (Vickery) Zotov, *New Zealand J.Bot.* 1:117 (1963).

Occurs in New Zealand (introduced), N.S.W., Vic., Tas. and S.Aust. (Flinders Ranges, Southern Lofty and possibly Eastern regions).

Flowers Sept.-Oct.

9. **C. D. linkii** Kunth, *Enum. Pl.* 1:315 (1833). **Wallaby-grass.** (Ill. N. T. Burbidge (1968) *Australian grasses* 2, pl. 16a). Erect, densely tufted, very leafy, sub-glabrous perennial, to 70 cm high; ligule shortly ciliate; leaves firm, flat or involute, to 30 cm long, 1.5-3.0 mm broad; panicles with few to many spikelets, elongate and loose, sometimes sparse and almost linear; spikelets pale, about 6-flowered, crowded, shorter than glumes except for the shortly exserted awns; glumes sub-equal, 12-17 mm long; lemma pale, sometimes striate, lanceolate, 3.0-3.5 mm long (including densely hairy callus of 1.0 mm), covered uniformly over the back with short hairs which grade into a row of fine hairs to 5 mm long just below the sinus; lateral lobes 7-8 mm long in all, the setae 3-4 mm long; awn 7-12 mm long, brown and twisted for 3-4 mm at base; palea lanceolate-elliptical, exceeding the sinus, c. 4.5 mm long, rather hairy on back.—*D. semiannularis* (Labill.) R. Br. var. *browniana* Domin, *Bibliotheca bot.* 85:363 (1915), partly.

Occurs in Qld, N.S.W. Vic. and S.Aust.

Var. **fulva** Vickery, *Contr.N.S.W.natn.Herb.* 1:299 (1950). The only variety in S.Aust.

Occurs in N.S.W., Vic. and S.Aust. (Southern Lofty region).

Flowers recorded Nov. and March.

10. **D. pilosa** R.Br., *Prod.Fl.Nov.Holl.* 177 (1810). **Velvet wallaby-grass, purple-awned wallaby-grass.** Erect or slightly geniculate, tufted perennial; blades flat or inrolled, to 2 mm wide and 12 cm long, hairy; ligule ciliate; panicle exserted, 4-5 cm long; spikelets crowded and much overlapping, sometimes almost racemose, 7-9-flowered, pale, closely packed, about the same length as the glumes except for the long exserted central awns; glumes 9-20 mm long, sub-equal, 5-7-nerved; lemma 4-6 mm long (including hairy callus of 0.75-1.0 mm), glabrous except for a row

of hairs above the callus and 2 marginal and 2 dorsal tufts c. 1.5 mm below the sinus (dorsal tufts sometimes absent); lateral lobes narrow, firm, tapering within 2-4 mm into setae 6-8 mm long; central awn usually exceeding the lateral lobes by 5-10 mm; palea only shortly exceeding the sinus, oblanceolate, glabrous on back or with a few cilia near base.—*Notodanthonia pilosa* (R.Br.) Zotov, *New Zealand J.Bot.* 1:118 (1963).

Var. ***pilosa***. Slender plant to 50 cm high; glumes 9-13 mm long, narrow, keeled in upper part; lemma narrow-fusiform; central awn exceeding the lateral lobes by c. 5 mm.

Occurs in New Zealand, Qld, N.S.W., Vic., Tas., W.Aust. and S.Aust. (Southern Lofty, Murray and S.E. regions).

Flowers Oct.-Jan.

Useful pasture grass.

Var. ***paleacea*** Vickery, *Contr.N.S.W.natn.Herb.* 2:313 (1956). Usually more robust, to 90 cm high; glumes 13-20 mm long, broad, with conspicuous chaffy margins; lemma broader; central awn exceeding lateral lobes by up to 10 mm.

Occurs in Vic., W.Aust. and S.Aust. (Southern Lofty region only).

Flowers Oct.-Feb.

Useful pasture grass.

11. ***D. racemosa*** R.Br., *Prod.Fl.Nov.Holl.* 177 (1810). **Wallaby-grass.** (Ill. N. T. Burbidge (1968) *Australian grasses* 2, pl. 16b). Erect, slender, tufted perennial, rather variable, 20-60 cm high; leaves fine, narrow, inrolled, 5-15 cm long, glabrous to loosely hairy with tubercle-based hairs; ligule of very short cilia (0.25 mm); panicles much exserted, 5-15 cm long, few-to many-flowered; spikelets pale greenish to straw-coloured, 6-10-flowered, the group of florets usually exceeding the glumes; glumes sub-equal, 7-16 mm long, 5-7-nerved; lemma linear to oblanceolate, 4.0-5.5 mm (including callus); callus prominent, 1.5-2.0 mm long, hairy on sides and at the base, callus of lowest floret shorter; hairs of lemma 1-2 mm long at base and in marginal tufts below the level of the sinus (sometimes 2 dorsal tufts); lateral lobes often broad with membranous margins narrowing abruptly into fine setae (total length c. 7 mm); central awn c. 14 mm, twisted basal part 4 mm, straight and fine above; palea exceeding sinus, elliptical, obtuse or bifid, 4-5 mm long, glabrous on back.—*Notodanthonia racemosa* (R.Br.) Zotov, *New Zealand J.Bot.* 1:121 (1963); *D. penicellata* non (Labill.) F.Muell. sensu J. M. Black, *Fl.S.Aust.* 107 (1943).

Occurs in New Zealand, Qld, N.S.W., Vic., Tas., W.Aust. and S.Aust. (Nullarbor, Flinders Ranges, Southern Lofty, Kangaroo I. and S.E. regions and the Investigator Group off Eyre Pen.).

Flowers throughout the year, particularly in summer.

Only var. ***racemosa*** occurs in S.Aust.

12. ***D. richardsonii*** Cashm., *Commonw.Austral., C.S.I.R.Bull.* 69 (1932). **Wallaby-grass.** Erect, densely tufted, sub-glabrous perennial, to 1 m; leaves to 35 x 2.5 mm, lightly striate, smooth on lower surface; ligule densely ciliate, larger hairs at the sides; panicle exserted, dense, lanceolate to ovate, 4-10 cm long; spikelets pale in colour, 10-15 mm long, 4-6-flowered; florets closely packed, slightly shorter than the glumes; glumes with broad membranous margins, sub-equal, 7-9-nerved; body of lemma 4-6 mm (including callus of 0.5-1.0 mm); densely villous all over the back with soft hairs c. 2.5 mm long and a dense row of 4-5 mm hairs c. 1 mm below the sinus; lateral lobes 5-7 mm long, narrowed to fine awns 1-2 mm long, central awn fine, 6-10 mm long, column short; palea broadly ovate, reaching to about the sinus, pilose on the back in the lower part.

Occurs in Qld, N.S.W., Vic. and S.Aust. (Southern Lofty region).

Flowering; 1 record for Nov.

"*D. richardsonii* is probably one of the most potentially useful species as a fodder grass. It produces large leafy tufts which are readily consumed by stock. However, it does not seem to be very abundant in many natural pastures at the present time". Vickery (1956, p. 282).

13. *D. semiannularis* (Labill.) R.Br., *Prod. Fl. Nov. Holl.* 177 (1810). **Wallaby-grass**. Erect, tufted, subglabrous perennial, 20-45 cm high; ligule a dense ring of hairs, 0.5 mm long; leaves rather narrow, involute, glabrous, firm, rarely above 15 cm long; panicles much exserted, contracted, 5-8 cm long, spikelets greenish-purplish; florets about three-quarters as long as glumes, not very closely packed; glumes sub-equal, 5-7-nerved, 7-11 mm long, membranous margins firm and distinct; lemma lanceolate, 2-2.5 mm long (including callus), uniformly though sometimes sparsely hairy with short hairs (0.5 mm) over back and with a row of longer hairs (to 4 mm long) just below the sinus; lateral lobes to 4 mm, narrow, thin, tapering into fine points, setae to 1 mm; awn brown and twisted for 2-3 mm at base, c. 9 mm long, more than twice as long as lateral lobes; palea exceeding the sinus, c. 2.5-3.5 mm long, lanceolate to oblong, with a few scattered hairs on the back in the lower part.—*Arundo semiannularis* Labill., *Nov. Holl. Pl. Sp.* 1:26 (1804); *Notodanthonia semiannularis* (Labill.) Zotov, *New Zealand J. Bot.* 1:116 (1963).

Occurs in New Zealand (probably introduced), N.S.W., Vic., Tas. and S.Aust. (Yorke Pen., Southern Lofty and S.E. regions).

Flowers usually Oct.-Jan., with 1 record for July.

Not sufficiently abundant to be of importance, but is palatable.

14. *D. setacea* R.Br., *Prod. Fl. Nov. Holl.* 177 (1810). **Bristly wallaby-grass, mulga wallaby-grass**. Erect, densely tufted, slender perennial 15-60 cm high; leaves all filiform, pubescent or glabrous, 5-20 cm long; ligule a more or less dense ring of hairs, 0.5 mm long; panicle narrow-oblong, 3-9 cm long, sub-racemose to more or less contracted and rather dense; spikelets pale-coloured or purplish, 4-10-flowered, the florets closely placed and half to two-thirds the length of the glumes, awns shortly exserted; glumes narrow, 8-14 mm long, sub-equal, 3-5-nerved; membranous margin narrow; lemma pale-coloured, 2-3 mm long (including hairy callus of 0.5-0.75 mm); glabrous or with a few sparse hairs on the back except for 2 rows of hair tufts, the lower series to 1.5 mm long, the upper series to 3 mm and sometimes incomplete; lateral lobes narrow, thin, 6-10 mm long of which the greater part is a fine awn; central awn exceeding lateral lobes by 3-6 mm; palea oblong-cuneate, obtuse, glabrous to sparsely hairy towards margins.

Occurs in N.S.W., Vic., Tas., W.Aust. and S.Aust. (Nullarbor, Eyre Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions).

Usually flowers Oct.-Jan., with 1 record for July.

Of considerable importance as a pasture grass.

Only var. *setacea* occurs in S.Aust.

15. *D. tenuior* (Steud.) Conert, *Senckenberg. biol.* 56:163 (1975). **Wallaby-grass**. (Ill. N.T. Burbidge (1970) *Australian grasses* 3, pl. 50b). Erect tufted perennial, 30-90 cm high; leaves flat at base and becoming loosely inrolled, 1-3 mm wide, to 20 cm long, firm but not stiff and glabrous to hairy; ligule shortly ciliate, with long hairs at the margins and on the collar; panicles much exserted, lanceolate to ovate, spikelets 5-20 (usually c. 10) cm long; spikelets 4-6-flowered, the florets shorter than glumes; glumes firm, with firmly membranous, usually purplish, margins, 10-17 mm long, sub-

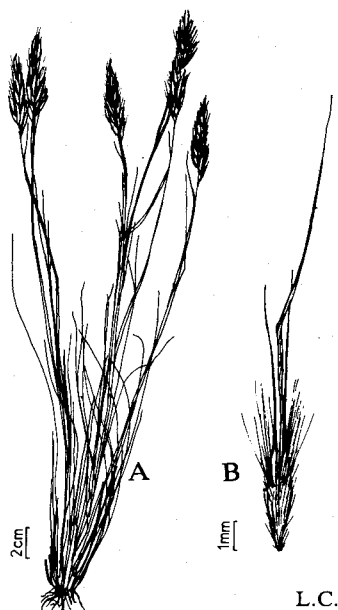


Fig. 74—*Danthonia setacea*. A, whole plant; B, lemma.

equal; lemma lanceolate, c. 3.5 mm long (including hairy callus of 1.0-1.5 mm); lower row of hairs exceeding the smooth shining back, row of hairs below sinus c. 5 mm long; lateral lobes 7-10 mm long, with narrow membranous margins, narrowing evenly into setae which are usually c. 2 mm long; central awn 9-12 mm long; palea oblanceolate to elliptical, distinctly exceeding the sinus, slightly hairy on the back.—*Danthonia purpurascens* Vickery, *Contr. N.S.W. natm. Herb.* 1:301 (1950), *Notodanthonia purpurascens* (Vickery) Zotov, *New Zealand J. Bot.* 1:114 (1963); *Plinthanthesis tenuior* Steud., *Synops. Pl. glumac.* 1:14 (1854); *Notodanthonia tenuior* (Steud.) S.T. Blake, *Contr. Qld. Herb.* 14:3 (1972); *D. semiannularis* (Labill.) R. Br. var. *browniana* Domin, *Bibliotheca bot.* 85:363 (1915), partly.

Occurs in New Zealand (introduced), Qld, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty region).

Flowers Sept.-May.

ERIACHNE R.Br.

Prod. Fl. Nov. Holl. 183 (1810)

(Greek *erion*, wool; *akhne*, glume; the lemma and sometimes the glumes are hairy.)

Ligule a ring of hairs; spikelets with 2 (rarely 1) bi-sexual flowers, pedicellate, in panicles; glumes 2, 7-11-nerved, persistent, membranous to scarious, rounded on the back or somewhat keeled, shorter than or as long as the lemmas; lemmas hairy on the back at least towards the base, awnless or with a terminal untwisted awn, the margins in-rolled and tightly embracing the keels of the palea usually for the greater part of their length, 5-7-nerved; palea obtusely 2-keeled, more or less flat between the keels, entire or bifid. About 40 species, in southern Asia and Australia (c. 30 in N.T.). (Lazarides (1970) *The grasses of Central Australia*).

1. Glumes hairy, lemma with an awn more or less as long as itself *E. aristidea* 1.
1. Glumes glabrous; lemma without an awn.
 2. Spikelets c. 3 mm long; small delicate annuals *E. isingiana* 4.
 2. Spikelets 5-10 mm long; more or less rigid perennials.
 3. Lemma recurved and in the upper part diverging from the palea, 7-9 mm long *E. benthamii* 2.
 3. Lemma straight or incurved, usually 5-6 mm long.
 4. Base of plant woolly; lemma longer than glumes *E. helmsii* 3.
 4. Base of plant shortly hairy (not woolly); lemma about the same length as the glumes *E. mucronata* 5.

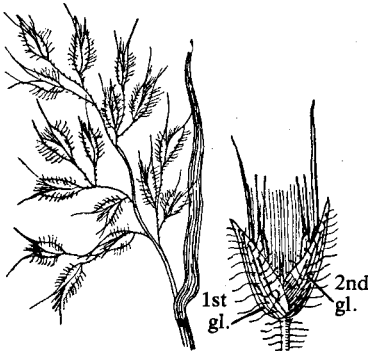


Fig. 75—*Eriachne aristidea*.

1. *E. aristidea* F.Muell., *Fragm. Phyt. Aust.* 5:205 (1866). **Three-awned wanderrie.** (Ill. Lazarides (1970) l.c., pl. 43a). Densely tufted annual or short-lived perennial; stems bearded at nodes, slender, 8-40 cm high; leaves flat, bearded at orifice of sheath; panicle loose, 4-7 cm long, 3.5 cm broad, consisting of few spreading branches bearing relatively few solitary spikelets on very short or long stalks; spikelets c. 8-10 mm long (excluding awns), with 2 florets; glumes turning purplish, about as long as the spikelet, with long spreading tubercle-based hairs; lemma rather shorter, villous on back, tapering into an awn as long as or longer than the glume; palea hairy, bifid, with 2 long points.

Occurs in all States except Vic. and Tas. In S.Aust. restricted to the Lake Eyre region with a single record for the S.E.

Flowers throughout the year but usually in winter, according to AD records; Lazarides says mainly summer.

Probably palatable when green.

2. *E. benthamii* W. Hartley, *J.Linn.Soc. (Bot.)* 52:345 (1942). **Swamp wanderrie.** (Ill. Lazarides (1970), l.c. pl. 47a). Stout often bluish-grey perennial, 40-90 cm high, forming dense tussocks to 30 cm wide; leaves long, erect, flat or subulate, mostly glabrous, sometimes pilose at orifice of sheath; panicle contracted, 5-15 cm long, the erect branches 2-4 cm long; spikelets numerous, 7-9.5 mm long, with 2 florets; glumes bluish-green or purplish, 5-6 mm long, glabrous, the 1st 15-nerved, the 2nd 13-nerved; lemma exserted, 8 mm long, mucronate, recurved, villous in the lower half; palea bifid, villous on back, the upper part free from the glume.—*E. ovata* non Nees, sensu J. M. Black, *Fl.S.Aust.* 71 (1922); *E. ovata* Nees var. *pallida* Benth., *Fl.Aust.* 7:631 (1878).

Occurs in W.Aust., N.T., Qld and S.Aust. (Lake Eyre region).

Flowers throughout the year.

Despite being rather coarse, eaten by stock. Said by Lazarides (1970) to be restricted "to cracking clay soils; producing dense stands in the vicinity of permanent swamps and lagoons or periodically flooded lowlands".

3. *E. helmsii* (Domin) W. Hartley, *J.Linn.Soc.(Bot.)* 52:346 (1942). **Woollybutt wanderrie.** (Ill. Lazarides (1970) l.c., pl. 45a). Coarse perennial, erect or spreading or sometimes decumbent, forming loose straggly tussocks 45-90 cm high and to 75 cm wide; base densely woolly, thickened; leaves 2.5-10 cm long, flat or narrowly rolled, stiffly spreading, firmly pointed, somewhat rough; panicle narrow, exserted, 5-11 cm long, 1-2 cm broad; spikelets 5-6 mm long, on pedicels 2-4 mm long, with 2 florets; glumes pale or straw-coloured, nearly as long as the spikelet, glabrous, 9-13-nerved; lemma rather longer than the glumes, exserted, almost obtuse at summit, with a minute mucro and 2 minute terminal rounded lobes.—*E. mucronata* non R.Br., sensu J. M. Black, *Fl.S.Aust.* 71 (1922); *E. mucronata* R.Br. var. *helmsii* Domin, *Bibliotheca bot.* 85:361 (1915).

Occurs in W.Aust., N.T., Qld, N.S.W. and S.Aust. (N.W. and Lake Eyre regions).

Flowers April-July.

Common in central Australia on a wide range of soils. Often heavily grazed despite unpalatable appearance.

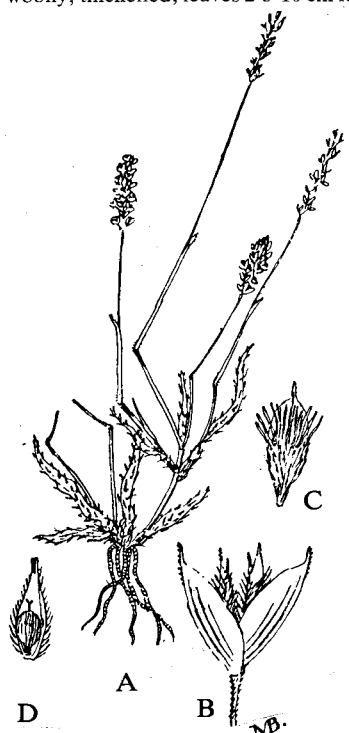


Fig. 76—*Eriachne isingiana*. A, habit, $\times \frac{1}{2}$; B, spikelet, $\times 5$; C, back of lemma, $\times 5$; D, palea and fruit, $\times 5$.

4. *E. isingiana* J. M. Black, *Trans.R.Soc.S.Aust.* 57:148 (1933). Slender annual, to c. 15 cm; stems usually prominently geniculate, 1-3-noded; leaves short or the uppermost usually reduced to its sheath; blades and sheaths with rather long and slender prominently tubercle-based hairs; panicle dense, oblong to oblong-lanceolate, 1.5-2.5 cm long; spikelets shortly pedicellate, 3 mm long; glumes about as long as spikelet, glabrous; lemma acuminate-mucronate, acute in profile, densely hairy in lower part; palea minutely bifid, pubescent throughout on back.

Occurs in N.T., Qld and S.Aust. (Lake Eyre region, collected twice from near Pedirka and Innamincka).

Flowers Aug. (1 record).

5. ***E. mucronata*** R.Br., *Prod.Fl.Nov.Holl.* 184 (1810). **Mountain wanderrie.** (Ill. Lazarides (1970) l.c., pl. 46a and b). Tufted stems, 15-45 cm high, often much-branched; base shortly hairy (not woolly); nodes, where exerted, minutely pubescent; leaf-blades scabrous, variable, stiff, subulate and pungent, erect-spreading or recurved, 1-3 cm long; or flexible and narrowly channelled or flattish, 8-10 cm long; panicle narrow, exerted, 1-7 cm long, c. 1 cm broad; spikelets 4-30, pale or purplish, the lateral pedicels 4-7 mm long; glumes glabrous, 5-6 mm long, 9-13-nerved; lemma as long, distinctly mucronate so that in profile it appears abruptly acuminate, villous on lower part of back, closely embracing the palea, which is minutely 2-toothed at summit.—*E. scleranthoides* non F.Muell., sensu Benth., *Fl.Aust.* 7:631 (1878); *E. ovata* Nees var. *pedicellata* non Nees, sensu J. M. Black, *Fl.S.Aust.* 71 (1922).

Occurs in all mainland States except Vic. In S.Aust. occurs throughout the N.W. and Lake Eyre regions.

Flowers May-June.

In central Australia it grows in hilly and rugged country on shallow soils. It is not considered to be of any value as a natural pasture grass.

12. MONACHATHER Steud.

Synops.Pl.glumac. 1:247 (1854).

(Derivation not known.)

Lower leaf sheaths woolly around the more or less swollen base of the plant; ligule membranous often ciliate; spikelets 3-8-flowered, the upper flowers reduced, pedicellate, in few-flowered racemes or raceme-like panicles; glumes 2; acute, c. 13-nerved, persistent, rounded on back; with membranous margins usually as long as or longer than the flowers; lemmas densely hairy, deeply cut into 2 c. 4-nerved lobes, with a bent and twisted awn rising between them; the body of the lemma subglobose or broadly turbinate; callus very short, bearded; palea broad. Generally treated as a synonym for *Danthonia* but recognised as a distinct and monotypic genus by S. T. Blake *Contrib.Qld herb.* 14:3-4 (1972).

1. ***M. paradoxa*** Steud., *Synops.Pl.glumac.* 1:247 (1854). **Bandicoot grass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 28c). Base almost bulbous and rather woolly; leaves flat or channelled, scabrous on edges; ligule membranous, truncate, jagged, 1-3 mm long, often bordered by dense cilia; spikelets few (4-15) on short, erect, distant pedicels, 3-8-flowered, the florets crowded, usually not or scarcely exceeding the glumes; glumes 10-15 mm long, sub-equal; lemma deeply bifid, lobes broadly lanceolate, obtuse, not awned and 3 times as long as the short entire basal portion which is 2 mm long and broad; central awn almost straight and about the same length as lateral lobes; palea very shortly exceeding the body of the lemma, broadly ovate and narrowed above the middle, glabrous on the back.—*Danthonia bipartita* F. Muell., *Fragm.Phyt.Aust.* 1:160 (1859).

Occurs in arid grasslands in all Australian States except Tas. In S.Aust. from the N.W., Lake Eyre, Gairdner-Torrens and Eastern regions.

Flowers throughout the year.

Described by Lazarides (1970) as readily grazed and particularly valued after winter rains.

13. PENTASCHISTIS Stapf

Fl.Cap. 7:480 (1899).(Greek *pente*, five; *schistos*, cut; the lemma has about 5 divisions at the summit.)

Ligule a ring of short hairs; panicle-branches and pedicels capillary; spikelets with 2 fertile sessile flowers, compressed laterally; glumes hyaline, persistent, acute, 1-nerved, rounded on back, longer than the flowers but exceeded by their awns; lemmas membranous, 5-7-nerved, 2-lobed with a slender bent and twisted awn from the notch, a straight capillary bristle-like awn rising on each side of the central awn and much shorter than it, and usually 2 short teeth on each side of the 2 bristle-like awns; callus short, bearded. About 60 species from Africa and Madagascar.

- | | |
|---------------------------------|-------------------------|
| 1. Annual; lemma glabrous | <i>P. airoides</i> 1. |
| 2. Perennial; lemma hairy | <i>P. thunbergii</i> 2. |

*1. *P. airoides* (Nees)Stapf, *Fl.Cap.* 7:511 (1899). **False hair-grass.** Delicate little annual, 5-16 cm high; leaf-blades 1-4 cm long, narrow, villous, the margins usually ciliate with minute stalked glands, the sheaths villous and most of them with similar glands on back; panicle 2-4 cm long and broad, soon becoming loose; glumes c. 3 mm long; lemmas scarcely 2 mm long, glabrous; central awn 5-6 mm long, the lateral teeth obscure.—*Pentameris airoides* Nees, *Sem. Hort. Bot. Vratisl.*(1834); *Danthonia airoides* (Nees)Nees, *Fl.Afr.Austr.* 284 (1841).

Native to southern Africa; introduced and naturalised in W.Aust., N.S.W., Vic. and S.Aust. (Eyre Pen., Flinders Ranges, Southern Lofty, Murray and S.E. regions).

Flowers Sept.-Nov.

Resembles *Aira caryophyllea*, which is a glabrous plant.

*2. *P. thunbergii* (Kunth)Stapf, *Fl.Cap.* 7:507 (1899). Perennial, c. 30 cm high, with narrow leaves bearded at orifice of sheath; spikelets numerous in a golden-brown rather dense ovate panicle; 2-5 cm long, 1-2.5 cm broad; glumes 4-5 mm long, enclosing the small flowers, of which only the awns protrude; lemma villous on nerves, c. 2 mm long; central awn 5-6 mm long.—*Danthonia thunbergii* Kunth, *Rev. Gram.* 1:107 (1829).

Native to southern Africa; naturalised in W.Aust. and S.Aust. (Southern Lofty and S.E.regions).

Flowers Sept.-Jan.

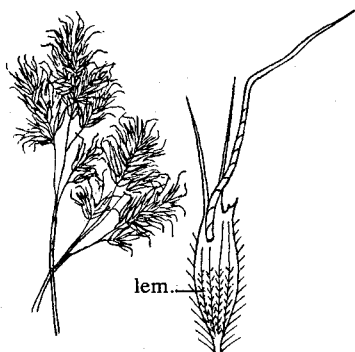


Fig. 77—*Pentaschistis thunbergii*.

14. PLECTRACHNE Henr. in Schinz
Vjschr.naturf.Gesch.Zurich 74:132 (1929).

(Greek *plēktron*, spur; *akhne*, a glume; alluding to the stiff 3-awned lemma.)

Leaf-blades long, subulate, rigid, often spreading, ending in needle-like points, forming a prickly tuft or tussock at the base of the stems; ligule a ring of hairs, usually very short; spikelets several-flowered, with 2 or 3 terminal flowers male or empty; panicle loose; glumes 3-7-nerved, stiff, sub-equal, about as long as the flowers without the awns; lemma broad, coriaceous, with 3 erect awns, straight or recurved, tapering upwards from a broad flattish base. 11 Australian species known as *porcupine grasses*.

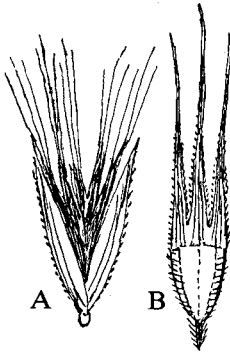


Fig. 78—*Plectrachne helmsii*. A, spikelet; B, lemma.

1. *P. helmsii* C.E.Hubbard, *Kew Bull.* 1941:29 (1941). Perennial, with glabrous rigid stems to 80 cm high, with a tuft of rigid leaves at base, the short basal sheaths minutely pubescent, the blades glabrous, subulate, pungent-pointed, spreading or spreading-erect, 4-12 cm long, stem-leaves few, distant; nodes about 2, glabrous; ligule a row of soft hairs, with longer hairs at summit of sheath; panicle exserted beyond the short uppermost leaf-blade, narrow but loose, 10-15 cm long, c. 2 cm. broad, the branches capillary, 2-3 cm long, rather distinct, solitary or rarely clustered in 2's or 3's, bearing 1-2 spikelets; glumes narrow, 14-16 mm long, acute, sub-5-7-nerved, minutely scabrous on keel, purplish; body of fertile lemmas 5 mm long (including acute bearded callus of 1 mm), 3-nerved, the 2 outer nerves ciliate; awns 3-nerved, minutely scabrous on margins, the central one 12 mm long, the 2 lateral ones 10 mm long, palea 6 mm long, bifid at summit, scabrous on the 2 nerves.—*Triraphis bromoides* non F.Muell., sensu J.M.Black, *Fl.S.Aust.* 74 (1943).

Known from W.Aust., Qld and the Everard Range in the N.W. region of S.Aust.

No specimen in AD.

15. SCHISMUS Beauv.

Agrost. 73 (1812).

(Greek *schisma*, division; the lemma is split at the top.)

Annual grasses; spikelets several-flowered, pedicellate, compressed laterally; rhachilla disarticulating between the flowers; glumes persistent, sub-equal, 5-7-nerved, longer than the individual flowers, but not exceeding the spikelet; lemmas 9-nerved, rounded on back, villous-ciliate on the 2 outer nerves, bifid at summit and with a short mucro in the notch; palea cuneate, entire at summit. 5 species from Africa, the Mediterranean and India.

- | | |
|---|-----------------------|
| 1. Lemma 3-5 mm long, divided for nearly half its length into 2 acute lobes | <i>S. arabicus</i> 1. |
| 1. Lemma 2 mm long, with a very shallow notch | <i>S. barbatus</i> 2. |

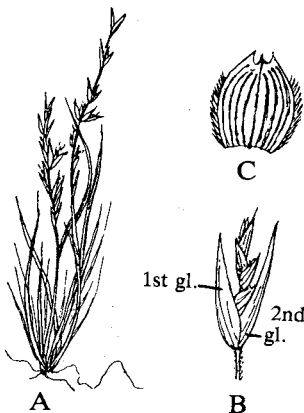


Fig. 79—*Schismus barbatus*. A, habit; B, spikelet; C, lemma.

*1. *S. arabicus* Nees, *Fl.Afr.Austr.* 422 (1841). Tufted annual, with geniculate ascending stems 5-25 cm long; leaves inrolled-setaceous, glabrous with long hairs at orifice of sheath; panicle narrow, 1-6 cm long; spikelets 6-8-flowered; glumes as long as or rather shorter than the flowers; lemma 3-5 mm long, divided for one-third to nearly one-half of its length into 2 lanceolate lobes; palea acute, only two-thirds as long.

Native to the Mediterranean and India; naturalised in W.Aust. and S.Aust. (Lake Eyre region, Marree).

*2. *S. barbatus* (L.)Thell. in Schinz & Thell., *Bull. Herb. Boiss.* Ser. 2, 7:391 (1907). **Arabian grass, kelch grass.** (Ill.Meredith (1970) *The grasses and pastures of South Africa*, fig. 213). Tufted annual, with geniculate ascending stems 5-25 cm long; leaves inrolled-setaceous, glabrous, with long hairs at orifice of sheath; panicle narrow, 1-6 cm long; spikelets 6-8-flowered; glumes as long as or rather shorter than the flowers; lemma 2 mm long, with a short notch about one-sixth of its

length; the palea obtuse and as long as the lemma.—*Festuca barbata* L., *Amoen.Acad.* 3:400 (1756); *F. calycina* Loeffl., *Iter Hisp.* 116 (1758); *S. calycinus* (Loeffl.) K. Koch, *Linnaea* 21:372 (1848); *S. marginatus* Beauv., *Agrost.* 74 (1812).

Native to Africa, the Mediterranean and India, naturalised in W.Aust., N.S.W., Vic. and S.Aust. (Flinders Ranges, Eastern, Eyre Pen., Yorke Pen., Northern Lofty, Southern Lofty and Murray regions).

Flowers most of the year but especially Sept.-Oct.

16. TRIODIA R.Br.

Prod.Fl.Nov.Holl. 182 (1810).

(Greek *treis*, three; *odous*, a tooth; the lemma is divided into 3 obtuse or acute teeth or lobes.)

Perennials; leaf-blades long, subulate, rigid, often spreading, ending in needle-like points, forming a prickly tuft or tussock at the base of the stems; ligule a ring of hairs, usually very short; spikelets several-flowered, compressed laterally, the upper flowers reduced, male or empty, arranged in a narrow but rather loose panicle; glumes stiff, acute, keeled, 3- or more-nerved, subequal, persistent, shorter than the flowers; rachilla disarticulating; lemmas stiff, rounded on back, at least in lower half, the nerves 6-9, rarely more, arranged in 3 sets of 2-3 (rarely more) nerves each, with 3 lobes or 2 lobes and a central mucro; callus short, bearded; lodicules 2, free, broadly obovate, sometimes 3-lobed at summit. 35 Australian species known as spinifex or porcupine grass (N.T. Burbidge (1953) *Aust.J.Bot.* 1:121-184).

1. Spikelets not conspicuously racemose along lateral branches.
2. Lobes of the lemmas stiffly scarious and as long as or longer than the horny base; leaf-sheaths more or less woolly, always woolly at the orifice.
3. Lateral lobes of the lemmas obtuse or acute and glabrous except for marginal cilia *T. basedowii* 1.
3. Lateral lobes of the lemmas acuminate and softly pubescent *T. lanigera* 4.
2. Lobes of the lemmas never as long as the base and may be mere indentations of the apices, not scarious unless the whole texture is thin; leaf-sheath not usually woolly.
4. Central nerve of lemmas continued as a short awn between the stiffly scarious lateral lobes; palea glabrous on back; glumes as long as or nearly as long as spikelets *T. irritans* var. *irritans* 2.
4. Central nerve of lemma short in an emarginate or ragged or semi-truncate apex; glumes rarely more than half as long as spikelet, usually about as long as lowest lemma (if longer then the lemma is not aristulate); palea hairy on back.
5. Sheaths and glumes glabrous, puberulous or scabrid.
6. Glumes and lemmas stiff and more or less indurate; lateral portions of the lemmas flat and with a group of 2 or 3 distinct nerves.
7. Spikelets 8-12 flowered; lemmas neatly distichous-imbricate; coastal *T. irritans* var. *compacta* 2.
7. Spikelets 4-8-flowered; opposing lemmas closely overlapping when young but later very loosely distichous and divaricate; inland *T. irritans* var. *laxispicata* 2.

6. Glumes and lemmas thinly scarious; lateral nerve (or closely proximal nerves) forming a ridge above so that the lemma may appear dorsally flattened towards the apex *T. scariosa* 6.
5. Leaf-sheaths woolly tomentose; glumes more or less pubescent *T. lanata* 3.
1. Spikelets racemose along conspicuously alternate lateral branches of a narrow panicle *T. longiceps* 5.
1. *T. basedowii* E. Pritzel, *Reprium nov. Spec. Regni veg.* 15:356 (1918). **Lobed spinifex, hard spinifex.** (Ill. N.T. Burbidge (1953), fig. 9a; Lazarides (1970) *The grasses of Central Australia*, pl. 60a). Tussocks pyramidal and sometimes becoming annular or crescentic owing to the death of the older culms in the centre; leaf-blades glabrous, at least 10 cm long, the sheaths woolly-tomentose especially around the orifice, becoming glabrous with age; panicle exserted, 8-12 cm long, 1-2 cm broad, the branches 1-2 cm long, with very few spikelets; spikelets 6-8-flowered, ovate or oblong, 10-12 mm long; glumes 6-8 mm long, 7-11-nerved; lemmas 6-8 mm long, villous near base, the 3-nerved scarious lobes as long as the horny body, the 2 lateral ones broad, obtuse, or acute and glabrous except for marginal cilia, the central one acute or subobtuse and rather longer.—*T. pungens* non R.Br., sensu J. M. Black, *Fl.S.Aust.* 74 (1922).
- Occurs in W.Aust., N.T., Qld, N.S.W. and S.Aust. (N.W. and Lake Eyre regions). Described by Lazarides (1970) as "undoubtedly the most common grass in Central Australia". Flowering appears to be throughout the year.
- Characteristic especially of sandy regions. Not generally eaten even under extreme conditions.

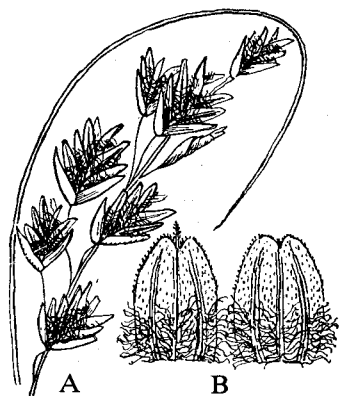


Fig. 80—*Triodia irritans* var. *irritans*.
A, inflorescence; B, lemmas.

2. *T. irritans* R.Br., *Prod. Fl. Nov. Holl.* 182 (1810). **Porcupine grass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 61b). Tussocks usually dense, but sometimes spreading or dying back in the centre; leaf-blades glabrous, 8-20 cm long, the sheaths glabrous, or very minutely pubescent, rather loose; panicle narrow, dense or slightly loose, 8-20 cm long, the branches with few spikelets, erect, the lower ones 2-5 cm long; spikelets 4-12-flowered, oblong-lanceolate or ovate, 12-20 mm long, mostly on long slender pedicels; glumes glabrous, stiff and shining, 8-11 mm long, obscurely 5-7-nerved; lemmas 7-8 mm long, about 9-nerved in 3 sets, with 2 rounded ciliate short lateral lobes and a mucro between them, which may be shorter than the lobes or exceed them by 1-2 mm, the lower part of the lemmas densely silky-villous on the nerves; palea as long, ciliate on the 2 nerves and often villous towards the base of the nerves.

The varieties are difficult to distinguish (see key to species).

Var. *irritans* (Ill. N.T. Burbidge (1953), fig. 14). Leaf-sheaths glabrous; spikelets 5-10 flowered; glumes as long as or nearly as long as spikelets; lemmas neatly distichous-imbricate, the central nerve continues as a short awn between the stiffly scarious lateral lobes; palea glabrous on back.—*T. aristata* J. M. Black, *Trans. R.Soc.S.Aust.* 39:825 (1915).

Occurs in W.Aust., N.T. and S.Aust. (from the Musgrave Ranges and other parts of the N.W. and Lake Eyre regions and south to the Eyre Pen., Yorke Pen., Flinders Ranges, ?Southern Lofty and ?S.E. regions). The more southern specimens, especially from Mount Lofty, have smaller, fewer-flowered spikelets.

Flowers usually Aug.-Nov.

Var. **compacta** Burbidge *Aust.J.Bot.* 1:169 (1953). (Ill. N.T. Burbidge (1953), fig. 15a). Leaf-sheaths glabrous; spikelets 8-12-flowered; glumes rarely more than half as long as the spikelet; lemmas neatly distichous-imbricate, the central nerve not continued as an awn; palea pubescent on the lower half between the ciliolate nerves.

Occurs only in Vic. and S.Aust. (Nuyts Archipelago and the Eyre Pen., Yorke Pen., Southern Lofty and S.E. regions). A coastal variety.

Flowers Sept.-Nov.

Var. **laxispicata** N. T. Burbidge, *Aust.J.Bot.* 1:171 (1953). (Ill. N.T. Burbidge (1953), fig. 16a). Leaf-sheaths very minutely pubescent; spikelets 4-7-flowered; glumes rarely more than half as long as the spikelets; lemmas closely imbricate at first, later free of one another and divaricate, the central nerve not continued as an awn; palea pubescent between nerves.

Occurs in Qld, N.S.W. and S.Aust. (Flinders Ranges, Northern Lofty and Murray regions).

Flowers Sept.-Nov.

3. **T. lanata** J. M. Black, *Trans.R.Soc.S.Aust.* 40:57 (1916). (Ill. N. T. Burbidge (1953), fig. 14b). Forms dense hemispherical "pincushion" tussocks c. 45 cm in diameter; leaf-blades glabrous except adjacent to the orifice, 5-12 cm long, the sheaths woolly-tomentose becoming glabrous with age; panicle narrow, but rather loose, 8-10 cm long, the lower branches 2-3 cm long; spikelets 5-7-flowered, ovate to lanceolate, 10-13 mm long, on long slender pedicels, densely woolly or silky-villous; glumes 10 mm long, 3-nerved, silky; lemmas silky nearly to the summit, the mucro about as long as the 2 very short lateral lobes or teeth, the whole lemma 7-8 mm long, 3-nerved in the upper half, 9-nerved in the lower.

Occurs only in S.Aust. (?N.W., Gairdner-Torrens, and Eyre Pen. regions).

Flowers Sept.-Oct.

4. **T. lanigera** Domin, *J.Linn.Soc. (Bot.)* 41:278 (1912). (Ill. N.T. Burbidge (1953), fig. 9b). Tussocks usually hemispherical or pyramidal; leaf-blades glabrous, usually 60-90 cm long, the sheaths woolly-tomentose especially around the orifice, becoming glabrous with age; panicles open, c. 8-12 cm long, 1-2 cm broad; spikelets 6-8-flowered, ovate or oblong, 10-13 mm long; glumes 7-12 mm long, 9-12-nerved; lemmas (5-) 9-12 mm long, softly pubescent at the base, the 3-5-nerved lobes longer than the horny body, the 2 lateral ones acuminate and pubescent, the central one acuminate, ciliolate, softly pubescent and longer.

Occurs in W.Aust. and S.Aust. (recorded only from the Everard Ranges in the N.W. region). The S.Aust. specimens have rather small spikelets.

Flowering; one record for S.Aust. in June.

5. **T. longiceps** J. M. Black, *Trans.R.Soc.S.Aust.* 54:59 (1930). (Ill. N. T. Burbidge (1953), fig. 13b). Tussocks up to twice as wide as high; leaf-blades glabrous, to 20 cm or more long, the sheaths glabrous or minutely puberulous except for the very short hairs at the orifice; panicle at least 50 cm long, slender, with narrow spikelets racemose along slender lateral branches; spikelets 6-21-flowered, narrow, linear, 8-20 mm long; glumes 1-nerved, lanceolate to ovate,

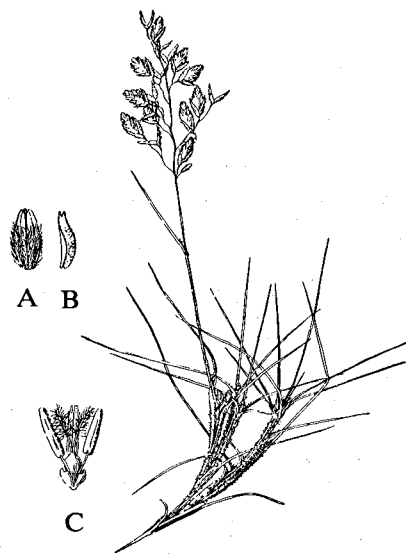


Fig. 81—*Triodia lanata*. A, lemma; B, palea; C, lodicules, gynoecium and stamens.

keeled; lemmas 4-4.5 mm long, lanceolate, indurate, glabrous or with a basal tuft of short hairs associated with the minute callus and sometimes puberulous and minutely ciliate along the margin, lobes 1-nerved, acute or obtuse, the central one sometimes mucronate.

Occurs in W.Aust., N.T., Qld and S.Aust. (N.W. region, Musgrave Ranges).

Flowers in Oct. (1 record).

6. *T. scariosa* N. T. Burbidge, *Aust.J.Bot.* 1:173 (1953). **Porcupine grass.** (Ill. N. T. Burbidge (1953), fig. 16b-d). Forming hemispherical or flat-topped tussocks, which may become ring-like or crescentic when old; leaf-blades and sheaths glabrous; panicle narrow but loose, 12-30 cm long; spikelets 4-9-flowered, linear or lanceolate, 9-16 mm long, lax; glumes scarious, 5-8 mm long, 3-5-nerved; lemmas 5-8 mm long, villous at base, ciliate, apex emarginate often with a minute mucro, with apparently 3 nerves of which the laterals form a ridge close to the margin in the upper half.

Occurs in W.Aust., N.S.W., Vic. and S.Aust. (N.W. and Nullarbor regions).

Flowers Sept.-Oct.

T. pungens R.Br., *Prod.Fl.Nov.Holl.* 182 (1810) was thought likely to occur in S.Aust. by J. M. Black (1943) but has not been found.

TRIBE 5.—ARISTIDEAE

17. ARISTIDA L.

Sp.Pl. 82 (1753).

(Latin *arista*, the awn or beard of grain; alluding to the trifid awn.)

Glabrous tufted annuals or more often perennials; leaf-blades subulate; ligule very short, ciliate or consisting of a ring of hairs; panicle branches bearing very few spikelets; spikelets 1-flowered; glumes 2, narrow, keeled, persistent; lemma rigid, mounted on a short usually acute callus and terminating in a 3-fid awn, which consists of 3 long awns or bristles united at base and seated on the summit of the lemma, or the 3 awns may spring from an entire basal portion (called the "column") which terminates the lemma; palea small. A cosmopolitan genus with c. 330 species in temperate and subtropical areas. (Key adapted largely from Lazarides (1970) *The grasses of Central Australia*.)

1. Awns borne on a well-developed spirally twisted column.
2. Lemma not articulate with the column; column to 6.5 mm long *A. latifolia* 6.
2. Lemma articulate below the column; column 11-35 mm long.
3. Lemma 7.5-9.5 mm long (including callus of 2-2.5 mm); spikelets usually pale; culms and panicles stiffly erect *A. browniana* 3.
3. Lemma 6-7 mm long (including callus of 2 mm); spikelets usually purplish-black or brown; culms ascending and panicles drooping *A. contorta* 5.
1. Awns continuous with the lemma, without a column.
4. Lemma with involute margins forming a furrow on the ventral surface *A. anthoxanthoides* 1.
4. Lemma with convolute margins forming a tube.
5. Panicle short (5-9 cm), dense and nearly as broad as long; glumes very unequal.
6. Lemma glabrous, 8-10 mm long *A. behriana* 2.
6. Lemma scabrous, 11.5-14.5 mm long *A. obscura* 8.
5. Panicle usually sparse, often over 9 cm long, several times longer than broad; glumes sub-equal.

7. Panicle dense, 15-25 cm long and 2-3 cm broad (including awns) *A. strigosa* 9.
 7. Panicle sparse, 6-19 cm long and 0.75-1.75 cm broad (including awns).
 8. Culms simple or sparsely branched; lemma stout; awns flat and broad *A. nitidula* 7.
 8. Culms strongly branched; lemma very slender; awns somewhat flattened only near the base *A. capillifolia* 4.

1. *A. anthoxanthoides* (Domin) Henr., *Meded. Herb. Leid.* 54B:691 (1928). **Yellow threeawn.** (Ill. Lazarides (1970), pl. 12b). Stems 8-30 cm high; leaves subulate, 3-5 cm long somewhat rigid, minutely scabrous; panicle oblong, dense, 3-7 cm long, 1-1.5 cm broad; glumes somewhat unequal, 1-nerved, mucronate, the 1st 5-6 mm, the 2nd 6-7 mm long; lemma c. 6 mm long (including bearded callus of 1 mm), very scabrous or almost bristly in upper half, furrowed on the ventral side by the involute margins; awns equal, 10-12 mm long, divergent when ripe.—*A. adscensionis* L. var. *anthoxanthoides* Domin, *Bibliotheca bot.* 85:343 (1915); *A. depressa* non Retz., sensu Benth., *Fl. Aust.* 7:563 (1878).

Occurs in W. Aust., N.T., Qld, N.S.W. and S. Aust. (Lake Eyre, Gairdner-Torrens, Flinders Ranges and Murray regions).

Flowers March-Aug.

Described by Lazarides (1970) as "more palatable than many three awns and readily grazed when green".

2. *A. behriana* F. Muell., *J. Trans. Vic. Inst.* 44 (1855). **Bush-wire-grass, brush spear-grass.** A short ascending grass with thick rootstock and loose leaf-sheaths, the blades subulate, the uppermost one sometimes as long as the panicle; panicle only 5-8 cm long, dense and broad, purplish; 1st glume 7-9 mm long, the 2nd 14-18 mm long; lemma 8-10 mm long, glabrous, with 3 capillary sessile awns, 3-4 cm long.



Fig. 82—*Aristida anthoxanthoides*. A, inflorescence, $\times \frac{1}{2}$; B, spikelet, $\times 3$.

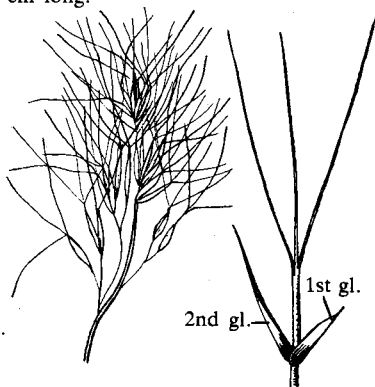


Fig. 83—*Aristida behriana*.

Occurs in N.S.W., Vic. and S. Aust. (Flinders Ranges, Eastern, Yorke Pen. and Northern and Southern Lofty regions). Usually in dry ground.

Flowers mainly Sept.-Nov.



Fig. 84—*Aristida browniana*, spikelet, natural size.

3. *A. browniana* Henr., *Meded. Herb. Leid.* 54B:63 (1926). **Erect kerosene grass, white grass.** (Ill. Lazarides (1970), pl. 13b). Stems erect, rather stiff, 15-40 cm high, leaf-blades subulate, 8-20 cm long; panicle 8-15 cm long (including the awns), very narrow, glumes 1-nerved, very unequal, at first purplish, later straw-coloured, the 1st 8-12 mm long, the 2nd 15-22 mm long; lemma 7-9.5 mm long (including bearded callus of c. 2 mm), smooth except for minute tubercles near summit; column 22-30 mm long, rarely longer, twisted; awns subequal, slender, 35-65 mm or rarely longer.—*A. muelleri* Henr., *Meded. Herb. Leid.* 54A:358 (1927); *A. stipoides* non Lam., sensu R.Br., *Prod. Fl. Nov. Holl.* 174 (1810).

Occurs in all Australian mainland States except Vic. In S.Aust. from the N.W., Lake Eyre, Gairdner-Torrens, Flinders Ranges, Eastern, Yorke Pen. and Southern Lofty regions.

Flowers mainly winter in the north and summer in the south.

Not eaten by stock except when young. (Lazarides, 1970).

4. *A. capillifolia* Henr., *Meded. Herb. Leid.* 58A:298 (1932). **Needle-leaved threeawn.** (Ill. Lazarides (1970), pl. 14a). Stems very slender, 0.5-0.75 mm diam., 20-50 cm long, usually fastigiate branched from the lower nodes; leaf-sheaths longer than the internodes on the flowering branches, sometimes shorter than those of the lowermost part of the plant; blades very fine, slightly curved, mostly 5-15 cm long or the lower ones shorter, abruptly contracted from their sheaths, tightly involute and scarcely 0.5 mm wide; panicle narrow-linear, c. 6-10 cm long and c. 1 cm

wide, the branches and spikelets erect and appressed; glumes distinctly unequal to sub-equal, the 1st acute and 5-7 mm long, the 2nd bifid and mucronate, 7-8 mm long; lemma very slender, compressed and keeled in the upper part, scabrous on the keel and sometimes also on the sides, 6.5-7.5 mm long, its callus only 0.75 mm long and shortly bearded; awns slender, c. 14-16 mm long.

Occurs in W.Aust., N.T., Qld and S.Aust. (N.W. and Lake Eyre regions).

Flowers June-Aug.

Not important because of sparseness and low palatability.

5. *A. contorta* F.Muell., *J. Trans. Vict. Inst.* 44 (1855). **Mulga grass, sand wire-grass, sand spear-grass, bunched kerosene grass, wind grass.** (Ill. Lazarides (1970), pl. 13a). Stems slender, densely tufted, 8-30 cm high; leaf-blades filiform, glabrous or hairy, 3-8 cm long, often curved; panicle 5-10 cm long (including awns), narrow; glumes very unequal, 1-nerved, dark-purple, withering to straw-colour, the 1st 9-12 mm long, the 2nd 15-20 mm long, mucronate; lemma 5-6 mm long (including callus of 2 mm), glabrous except for minute tubercles towards summit; column 10-20 mm; awns sub-equal, 3.5-6 mm long.—*A. arenaria* non Trin., sensu Gaud., *Voy. aut. Monde (Bot.)* 407 (1829).

Regarded as a valuable dry-area grazing grass; the ripe florets can, however, be harmful to animals.

Var. contorta. Leaves glabrous.

Occurs in all mainland Australian States. In S.Aust. from all regions except the Yorke Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers throughout the year, especially spring.

Var. *hirsuta* (Henr.) Hj.Eichl., *Suppl.* 48 (1965). Leaves hairy.—*A. arenaria* var. *hirsuta* Henr., *Meded.Herb.Leid.* 54:36 (1926).

Occurs in the Lake Eyre and Flinders Ranges (Mount Lyndhurst and Lake Frome) regions.

Flowers only recorded in Aug.

6. *A. latifolia* Domin, *Biblihca bot.* 85:339 (1915). **Feathertop wiregrass.** (Ill. Lazarides (1970), pl. 15b). Stems erect, rigid but rather slender, 40-60 cm high, 1-1.5 mm thick; leaf-blades long, flat except towards the summit, 2-3 mm broad, striate, minutely scabrous above, glabrous below, becoming twisted; orifice of sheath almost glabrous; panicle 12-15 cm long, narrow, pale-coloured, branches erect, the lower ones rather distant; glumes sub-equal, 1-nerved, mucronate, c. 10 mm long, the 1st scabrous on keel, otherwise both glabrous; lemma 5-6 mm long (including the bearded callus), scabrous towards the summit and surmounted by a slender continuous twisted scabrous column of 5-7 mm, or c. 12 mm long in all, the margins convolute; awns sub-equal, very slender, 15-25 mm long.

Occurs in all mainland Australian States, except Vic. and ? N.S.W. In S.Aust. from the gibber plains in the Lake Eyre region and recorded by J. M. Black (1943) from near Oodnadatta and Snake Gully near Pedirka.

Flowers July (one record).

Not generally taken by stock.

7. *A. nitidula* (Henr.) S. T. Blake ex J. M. Black, *Fl.S.Aust.* 83 (1943). **Flat-awned threeawn.** (Ill. Lazarides (1970), pl. 17a). Stems erect, rather stiff, 20-50 cm high, 1-1.5 mm thick; leaves almost glabrous except hairs at orifice of sheath, the blades subulate, rather stiff, 9-13 cm long; panicle 10-20 cm long, narrow, spike-like, usually straw-coloured, the branches erect, rather distant towards base; glumes strongly 1-nerved, sub-equal, mucronate, scabrous on keel, 7-10 mm long; lemma 6-9 mm long (including the bearded callus), bristly with short glassy conical hairs in its upper half, sometimes mottled with purple; awns rather broad and flat at base, sub-equal, 8-18 mm long.—*A. echinata* var. *nitidula* Henr., *Meded.Herb.Leid.* 58A:285 (1932).

Occurs in W.Aust., N.T., Qld and S.Aust. (N.W., Lake Eyre, Flinders Ranges and Eastern regions and an isolated record from near Adelaide).

Flowers at all times of the year.

Not palatable.

8. *A. obscura* Henr., *Meded.Herb.Leid.* 54A:385 (1927). **Brush threeawn.** (Ill. Lazarides (1970), pl. 16b). Stems wiry, erect or often bent, forming tussocks, usually less than 30 cm high; leaves usually with short bristles and a dense tuft of long fine soft silvery hairs near the mouth of the orifice, the blades rolled or sometimes flattened, stiffly pointed, with thickened edges usually 12-20 cm long; panicle 7-9 cm long, almost as wide as long, open, the branches spreading; glumes 1-nerved, acute, with a small bristle-like point, strongly unequal, the 1st 8.5-10 mm long, scabrous on the nerve, slightly scabrous on the surface, the 2nd 13.5-16.5 mm long, rather smooth; lemma 11.5-14.5 mm long (including densely bearded callus) densely scabrous; awns subequal, 2.9-3.9 cm long.

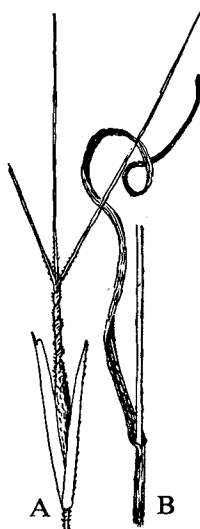


Fig. 85—*Aristida latifolia*. A, spikelet, x 2.5; B, leaf, natural size.



Fig. 86—*Aristida nitidula*. A, spikelet, x 2.5; B, lemma, x 4.

Occurs in W.Aust., N.T., Qld, N.S.W. and S.Aust. (a single record from the Musgrave Range, N.W. region).

Flowers Sept. (1 record).

Palatable but, because of its rarity, of no importance.

9. *A. strigosa* (Henr.) S. T. Blake ex J. M. Black, *Fl.S.Aust.* 83 (1943). **Rough threeawn.** (Ill. Lazarides (1970), pl. 17b). Stems rigid, 50-70 cm high, 2-2.5 mm thick; nodes several, glabrous; leaf-blades minutely scabrous, long, stiff, flat but subulate in the upper part or almost all the length; orifice of sheath hairy; panicle 12-26 cm long, straw-coloured, narrow and compact above, rather loose below, the branches erect and the lower ones distant; glumes 1-nerved, rather unequal, the 1st 8-10 mm long, scabrous on keel, the 2nd 10-12 mm long, scabrous on keel only near summit, both with mucro usually inserted between 2 small terminal teeth; lemma 9-11 mm long (including the bearded callus), becoming purplish, more or less bristly in upper half with small glassy erect hairs; awns subequal, slender, 15-25 mm long.—*A. calycina* var. *strigosa* Henr., *Meded.Herb.Leid.* 58A:297 (1932); *A. muricata* non Henr., sensu J. M. Black, *Trans.R.Soc.S.Aust.* 57:146 (1933).

Occurs in W.Aust., N.T., Qld and S.Aust. (Lake Eyre, Flinders Ranges and Southern Lofty regions).

Flowers May and Aug.

Not grazed.

TRIBE 6.—ISACHNEAE

18. ISACHNE R.Br.

Prod.Fl.Nov.Holl. 196 (1810).

(Greek *isos*, equal; *akhne*, glume; glumes and lemmas are nearly equal.)

Perennials, or less often annuals, with creeping rhizomes; leaf-blades expanded, ligule a row of hairs; inflorescence a panicle; spikelets 2-flowered, obtuse, slightly compressed dorsally, enclosing 2 bisexual flowers or 1 female and 1 male below it, on capillary pedicels not articulated below the glumes but the rachilla of the spikelet articulated above them; glumes 2, equal; lemma and palea almost as long, hardened. About 60 species widespread in warm areas.

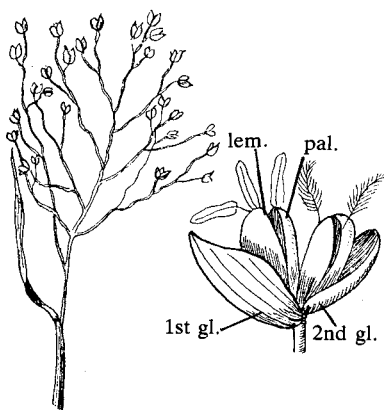


Fig. 87—*Isachne globosa*.

1. *I. globosa* (Thunb.) Kuntze, *Rev.Gen.Pl.* 2:778 (1891). **Swamp millet.** (Ill. N.T. Burbidge (1970) *Australian grasses* 3, pl. 24). Slender, graceful perennial grass, to 30 cm or more with creeping rhizome; leaves flat, rather rough, blades 5-8 cm long; ligule a row of hairs; panicle often partly enclosed by uppermost leaf-sheath, very broad and loose, 5-12 cm long and 6-8 cm broad, with many filiform branches; spikelets ovoid, c. 2 mm long; glumes ovate, convex, 5-7-nerved, nearly equal, often purplish; lower floret male or bisexual, upper floret female or bisexual; lemmas hard and shiny.—*Milium globosum* Thunb., *Fl.Jap.* 49 (1784); *I. australis* R.Br., *Prod.Fl.Nov.Holl.* 196 (1810).

Occurs in Qld, N.S.W., Vic., New Zealand and Asia. In S.Aust. from the Southern Lofty region as far south as Lake Alexandrina.

Flowers Dec.-May.

Grows in wet places. Not important for grazing.

TRIBE 7.—**BRACHYPODIEAE**19. **BRACHYPODIUM** Beauv.*Agrost.* 100 (1812).(Greek *brachys*, short; *podion*, a little foot; the pedicels of the spikelets are very short.)

Annuals or perennials; culms erect or decumbent; leaf-blades expanded; ligule short, truncate or jagged, glabrous or hairy; spikelets pedicellate or sessile, arranged alternately and on opposite sides of the rhachis which is channelled on the side facing each spikelet, appressed to the rhachis by their flat faces (sides of the lemmas), thus forming a short loose spike-like raceme, at first cylindrical, then laterally compressed, many-flowered; glumes persistent stiff, rounded on back, many-nerved, shorter than florets; lemmas linear-lanceolate, rounded on backs, with several nerves and a terminal awn; palea conspicuously ciliate, grain hairy at summit, linear-oblong, adherent to the palea. 10 species in temperate climates.

*1. ***B. distachyon*** (L.) Beauv., *Agrost.* 101 (1812).

False brome. Small annual, with kneed stems 10-50 cm high and pubescent nodes; leaves flat, short, scabrous; spikelets 1-6 in a short erect spike-like raceme, slightly compressed, 20-30 mm long, 7-15-flowered; glumes unequal, the 1st 5-nerved, the 2nd 7-nerved; lemmas conspicuously 7-nerved, stiff, with a straight terminal awn longer than the lemma; palea nearly as long, rigidly ciliate on the 2 nerves or keels.—*Bromus distachyos* L., *Cent.Pl.* 2:8 (1756).

Native to the Mediterranean, Europe and Asia; introduced into N.S.W., Vic., Tas., W.Aust. and S.Aust. (Flinders Ranges, Yorke Pen. and Southern Lofty regions).

Flowers Aug.-Nov.

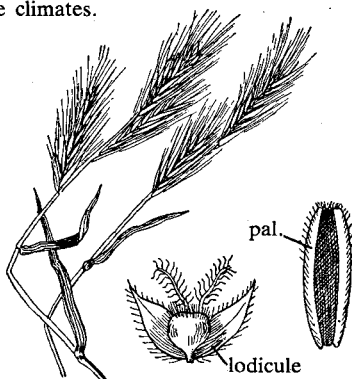


Fig. 88.—*Brachypodium distachyon*.

TRIBE 8.—**BROMEAE**20. **BROMUS** L.*Sp.Pl.* 76 (1753).(Greek *bromos*, some kind of oat.)

Annual grasses, usually tufted; leaf-blade linear, pubescent; ligule membranous; inflorescence a rather loose panicle or raceme; spikelets rather large, compressed at least after flowering, several-flowered; glumes unequal, shorter than the florets, persistent, the 1st 1-nerved, the 2nd 3-5-nerved; lemma rounded or keeled on the back, 5-7-nerved, awned a little below the bifid summit, the awn straight; palea strongly ciliate on the nerves; styles inserted on one side of the pubescent summit of the ovary. About 50 species (Airy Shaw (1966) *A dictionary of the flowering plants and ferns*) in *Bromus* sensu lato (incl. *Ceratochloa* and *Serrafalcus*) in tropical climates. Authors do not agree on whether *Ceratochloa* and *Serrafalcus* should be separated from *Bromus*.

- | | |
|--|--------------------------|
| 1. Lower branches of inflorescence more than 2 cm long;
spikelets nodding | <i>B. diandrus</i> 1. |
| 1. Lower branches of inflorescence less than 2 cm long;
spikelets erect or erect-spreading. | |
| 2. Stem glabrous; panicle somewhat loose | <i>B. madritensis</i> 2. |
| 2. Stem pubescent below panicle; panicle very dense | <i>B. rubens</i> 3. |

*1. ***B. diandrus* Roth, Bot. Abh. Beobacht. 44 (1787). Great brome, brome grass.** (Ill. N. T. Burbidge (1968) *Australian grasses* 2, pl. 11). Erect annual, with pubescent stems 30-80 cm high; leaves pubescent, with long hairs on the blades; panicle 8-25 cm long, not usually purplish, often very open, with scabrid or ciliate branches often longer than the spikelets, the lower more than 2 cm long; spikelets 6-10 cm long (incl. awns), 4-10-flowered; glumes glabrous; lemma scabrid, lanceolate, with 7 prominent nerves, 20-30 mm long (excl. awn), awn about twice as long as lemma.—*B. rigidus* non Roth, sensu J. M. Black, *Fl. S. Aust.* 128 (1943); *B. gussonii* Parl., *Pl. nov.* 66 (1842); *Anisantha diandra* (Roth) Tutin ex Tzvelev, *Not. Syst. Herb. Inst. Bot. Acad. Sci. URSS* 22:4 (1963).

Native to the Mediterranean, but introduced widely and present in all Australian states. In S. Aust. from the Flinders Ranges, Eyre Pen., Yorke Pen. and all southern regions.

Flowers mainly Sept.-Nov.

Of slight value, when young, but a troublesome weed in crops and its mature spikelets can cause serious losses among lambs; known in the country as 'jabbers' on account of the stiff rough awns.

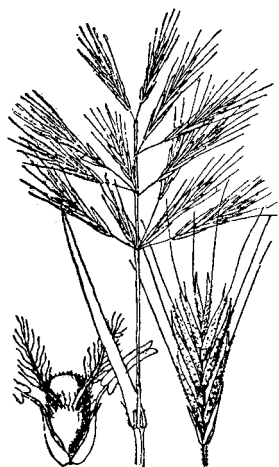


Fig. 89—*Bromus madritensis*.

*2. ***B. madritensis* L., Cent. Pl. 5 (1755). Madrid brome, compact brome, lesser brome.** (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 38). Annual, with glabrous slender stems 10-40 cm high; leaves pubescent or almost glabrous, rather scabrous; panicle 7-14 cm long, becoming purplish, rather loose, with short erect-spreading branches not exceeding 2 cm long; spikelets 3-6 cm long (incl. awns), 7-12-flowered; glumes pubescent or glabrous; lemmas glabrous or pubescent, almost subulate, faintly 7-nerved, 14-18 mm long (excl. awn); awn a little longer than the lemma.—*Anisantha madritensis* (L.) Nevski, *Acta Univ. As. Med.*, ser. 8b, Bot. fasc. 17:21 (1934).

Native to Europe (Britain to Arabia and Macaronesia), widely introduced, in Australia in all States, except N.T. and Qld; in S. Aust. from the Eyre Pen. Yorke Pen. Flinders Ranges and all southern regions.

Flowers Aug.-Nov.

Of slight value, when young, and the mature spikelets may injure stock and spoil wool.

*3. ***B. rubens* L., Cent. Pl. 5 (1755). Red brome.** Annual, with usually erect pubescent stems 15-40 cm high; leaves pubescent; panicle 4-10 cm long, becoming purplish, very dense, ovoid, with very short erect branches; spikelets usually less than 3 cm long (incl. awns), 4-11-flowered; lemmas scabrid or pubescent, almost subulate, faintly 7-nerved, 12-15 mm long (excl. awns); awn a little longer than the lemma.—*Anisantha rubens* (L.) Nevski, *Acta Univ. As. Med.*, ser. 8b, Bot. fasc. 17:21 (1934).

Native to the Mediterranean, introduced in all Australian mainland states, except N.T. In S. Aust. from the Nuyts Archipelago and the Flinders Ranges, Eyre Pen., Yorke Pen., Eastern and probably all southern regions. Relatively scarce in the Adelaide and Mount Lofty area and further south.

Flowers July-Nov.

21. CERATOCHLOA DC. & Beauv.

Beauv., *Agrost.* 75 (1812).

(Probably from the Greek *keratos*, a small horn; *chloē*, a grass.)

Annuals or perennials; leaf-blade flat, glabrous or pubescent; ligule membranous; inflorescence a panicle or raceme; spikelets rather large, conspicuously compressed, 6-12

flowered; glumes subequal, shorter than the florets, persistent, the 1st 7-nerved, the 2nd 9-nerved; lemma keeled, 9-13-nerved, awn usually present and arising from the sinus between the lobes, the awn straight; palea usually ciliate on the keel; styles inserted on one side of the pubescent summit of the ovary. About 75 species, native to America. It is not certain that *Ceratochloa* should be separated from *Bromus*; in this work C. A. Gardner (1952) *Flora of Western Australia* 1 and N. T. Burbidge (1970) *Australian grasses* 3 are followed.

*1. *C. unioides* (Willd.) Beauv., *Agrost.* 75 (1812). **Prairie grass, rescue grass.** (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 15). Annual, biennial or sometimes perennial, 40 cm to over 1 m high, with stout, erect, glabrous stems; leaves flat, rough on the upper side, the sheaths of the lower ones softly villous; ligule short, torn; panicle 10-30 cm long, loose, pyramidal, erect or slightly drooping with long rough filiform branches; spikelets pale-green, very flat, oblong-lanceolate, scabrous, 6-8-flowered, 25-35 mm long; 1st glume 7-nerved, 2nd glume 9-nerved; lemmas broad, scabrous, sharply keeled, 9-13-nerved, 16-18 mm long, with a very short awn.—*Festuca unioides* Willd., *Hort. Berol.* 1:3 (1806); *Bromus unioides* Humb., *Bonpl. & Kunth, Nov. Gen.* 1:151 (1816); *B. catharticus* ? non Vahl (*nom. dub.*), sensu J. M. Black, *Fl. S. Aust.* 128 (1943); *C. catharticus* ? (Vahl) Henr., sensu Gardner, *Fl. W. Aust.* 1:104 (1952); *B. schraderi* Kunth, *Enum. Pl.* 1:416 (1833).

Native to S. America but widely introduced. Occurs in all Australian States except N.T. In S.Aust. from the Flinders Ranges, Yorke Pen., Northern and Southern Lofty and S.E. regions.

Flowering variable but mainly Sept.-Dec.

A weed of waste land, but a valued pasture plant especially winter and spring feed.

The name *Bromus unioides* is commonly used and may prove to be preferable.

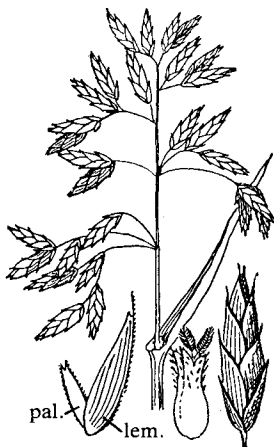


Fig. 90—*Ceratochloa unioides*.

**Bromus stamineus* E. Desv. in C. Gay, *Hist. fis. pol. Chile (Flor. Chile)* 6:440 (1854) has been naturalised in Vic. (cf. Willis (1970) *A handbook to plants in Victoria*, ed. 2:431) and reported from S.Aust. (P. Kloot, pers. comm.). It is distinguished by having more spreading glumes with distinct awns about 5 mm long. Probably occasional in the Southern Lofty and S.E. regions.

22. SERRAFALCUS Parl.

Rar. Pl. Sicilia 2:14 (1840).

(Latin *serra*, a saw; *falx*, a sickle; referring to the awn of *S. alopecuros*.)

Annuals; leaf-blade flat, hairy; ligule membranous; inflorescence a panicle; spikelets rather smaller than in most members of the Bromaeae, turgid, 5-15-flowered; glumes more or less unequal, shorter than the florets, the 1st 3-5-nerved, the 2nd 7-9-nerved; lemmas rounded on the back, 7-9-nerved, awned a little below the bifid summit, the awn straight; palea ciliate on the keels; styles inserted on one side of the pubescent summit of the ovary. Said to have several species, mostly European. But authors do not agree on whether this genus should be separated from *Bromus*. See also *Ceratochloa*.

- | | |
|--|--------------------------|
| 1. 1st glume 3- or 4-nerved; spikelets expanded at the top after flowering | <i>S. arenarius</i> 1. |
| 1. 1st glume 5-nerved; spikelets contracted at the top after flowering. | |
| 2. Awns erect | <i>S. hordeaceus</i> 2. |
| 2. Awns spreading outwards | <i>S. lanceolatus</i> 3. |

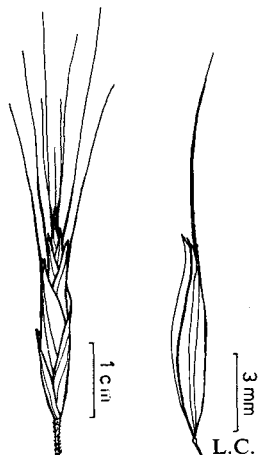


Fig. 91—*Serrafalcus arenarius*.

5-15 cm high; leaves and leaf-sheaths pilose; ligule short, obtuse; panicle usually compact, ovoid-oblong, 2-12 cm long, erect, the branches short, bearing 1-7 spikelets; spikelets oblong-lanceolate, 10-20 mm long (including awns), bright or pale-green, 5-11-flowered; 1st glume 5-nerved, the 2nd 7-nerved; lemmas 6-8 mm long, 7- or 9-nerved, pubescent or shortly and sparsely scabrid-hairy in the upper half, obovoid, remaining closed, with a slender, erect awn.—*Bromus hordeaceus* L., *Sp.Pl.* 77 (1753); *B. mollis* L., *Sp.Pl.* ed.2, 1:112 (1762); *Serrafalcus mollis* (L.)Parl., *Rar.Pl.Sicilia* 2:16 (1840).

Native to the Mediterranean and naturalised in all Australian mainland states except N.T. Recorded in S.Aust. from the Eyre Pen., Yorke Pen., Southern Lofty and S.E. regions.

Flowers Oct.-Jan.

Eaten by stock but probably not in significant quantities.

The names *Bromus hordeaceus* and *B. mollis* are commonly used.

*3. *S. lanceolatus* (Roth) Parl., *Rar. Pl.Sicilia* 2:18 (1840). **Mediterranean brome.** Annual, 10-50 cm high, with stiff glabrous stems and softly villous blades and sheaths; ligule short, torn; panicle oblong, erect, dense, 3-8 cm long, the short erect branches each bearing 1-3 spikelets; spikelets oblong-lanceolate, more or less villous, 3-4.5 cm long (incl. awns), 9-11-flowered; 1st glume 5-nerved, the 2nd 7-nerved; lemmas elliptic-oblong, 10-14 mm long, 7-9-nerved, villous at least near the summit, with a slender awn 9-15 mm long, inserted lower than in other species (4-5 mm below the notched summit), finally bent near base and spreading outwards almost horizontally. *Bromus lanceolatus* Roth, *Catal.bot.* 1:18 (1788);

1. *S. arenarius* (Labill.) C. A. Gardner, *Fl.W. Aust.* 1:96 (1952). **Sand brome.** Annual, with glabrous or sparsely pubescent stems and soft densely pubescent or villous leaves; panicle loose, 4-10 cm long, drooping; spikelets 3-4 cm long (incl. awns), pale or purplish, 6-14-flowered, on capillary conspicuous pedicels which are often gracefully curved; 1st glume 3-4-nerved, the 2nd 5-nerved or sub-7-nerved; lemmas 12-15 mm long, 7-nerved, scabrous, lanceolate, becoming divergent, with a slender straight erect or somewhat spreading awn about as long; ligule obtuse, torn, almost fringed at summit.—*Bromus arenarius* Labill., *Nov. Holl.Pl.Sp.* 1:23 (1805).

The only Australian native species of the Bromeae. Occurs in all Australian mainland States except N.T. In S.Aust. from the Nuyts Archipelago and the Nullarbor, Flinders Ranges, Eyre Pen., Yorke Pen. and Southern Lofty regions.

Flowers July-Oct.

The name *Bromus arenarius* is commonly accepted.

*2. *S. hordeaceus* (L.)Gren. & Godr., *Fl.Fr.* 3:590 (1856). **Soft brome grass.** (Ill. C. A. Gardner (1952) *Flora of Western Australia* 1, pl. 27; N. T. Burbidge (1968) *Australian grasses* 2, pl. 44). Erect or prostrate annual, with geniculate, ascending stems,



Fig. 92—*Serrafalcus hordeaceus*.

Bromus macrostachys Desf., *Fl. Atlant.* 1:96 (1798); *Serrafalcus macrostachys* (Desf.) Parl., *Fl. Ital.* 1:397 (1850).

Native to the Mediterranean; naturalised in N.S.W., Vic. and S.Aust. (Murray, Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Oct.-Dec.

The names *Bromus macrostachys* and *B. lanceolatus* are commonly used.

TRIBE 9.—TRITICEAE

23. AGROPYRON Gaertn.

Nov.Comm.Acad.Petrop. 14:539 (1770).

(Greek *agros*, a field; *pyros*, wheat; "wild wheat".)

Perennials with tufted or rhizomatous growth; leaf-blade flat or rolled; ligule scarious; inflorescence a spike; spikelets several-flowered, compressed, solitary and sessile in alternate very shallow notches in the rachis of the spike; one face of the spikelet (sides of the glumes and lemmas) appressed to the rachis; glumes 2, persistent, shorter than the florets; lemmas rounded on back with usually 5 nerves converging at summit; ovary pubescent at top. Over 100 species in temperate areas.

1. Lemma (incl. awn) c.5 cm long *A. scabrum* 2.

1. Lemma (incl. awn) c.1 cm long *A. repens* 1.

*1. *A. repens* (L.)Beauv., *Agrost.* 102 (1812). **Quickgrass, English couch.** Glabrous perennial, 10 cm to 1 m high, with long creeping rhizomes, stiff stems and narrow flat leaf-blades, scabrous above; spike narrow, rather dense, 6-15 cm long; spikelets approximate, 4-6-flowered, ovate-oblong, 10-15 mm long; rachilla not disarticulating; glumes three-quarters as long as spikelet, lanceolate, 7-nerved; lemma c. 10 mm long, faintly 5-nerved, acute or shortly awned—*Triticum repens* L., *Sp.Pl.* 86 (1753).

Native to Europe and Asia. Introduced into all Australian States except N.T. and Qld. In S.Aust. recorded from the Flinders Ranges, Southern Lofty and S.E. regions.

Flowers Oct.-March.

Occurs as a weed.

2. *A. scabrum* (Labill.)Beauv., *Agrost.* 102 (1812). **Common wheat-grass.** (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 69). Perennial, with slender but stiff stems, 30 cm to over 1 m high; leaf-blades narrow, flat or filiform, scabrous on edges; spikelets 1-10 on the rachis, distant, loose in upper part, 6-12-flowered, 5-7 cm long (incl. awn), 2.5-3 cm long (excl. awn); upper florets and awns finally divergent so that the spikelet becomes cuneate; spike loose, often drooping; rachilla disarticulating between florets; glumes lanceolate, the 1st 4-8 mm long, 3-nerved, the 2nd 8-15 mm long, 3-5-nerved; lemmas narrow, rigid, scabrous and faintly nerved on back, 8-12 mm long (excl. awn), tapering into the awn, the margins incurved so that the florets are almost subulate; awns slender, scabrous, 2-4 cm long.—*Festuca scabra* Labill., *Nov.Holl.Pl.Sp.* 1:22 (1805).

Native to Australia, occurring in all States except N.T. but present also in New Zealand. In S.Aust. from the Flinders Ranges, Eyre Pen., Northern and Southern Lofty, Murray and S.E. regions.

Flowers July-Dec.

Palatable only on fertile soils.

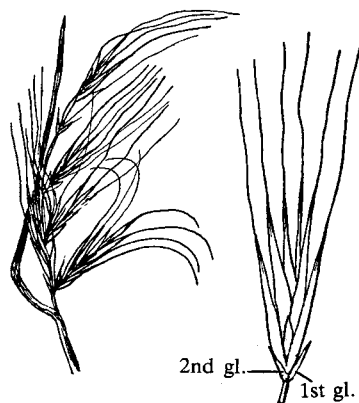


Fig. 93—*Agropyron scabrum*.

24. ELYMUS L.

Sp.Pl. 83 (1753).*(elymos, a Greek name for millet.)*

Annuals or perennials; leaf-blade broad; ligule very short; inflorescence a spike; spikelets 2 or 3 together, 3-4 flowered; glumes 2, 1-5-nerved, about equalling the spikelet and often placed side by side in front of it; lemma rounded on the back and bluntly keeled towards the apex, 3-5-nerved. About 70 species from temperate areas and from S. America.

*1. **E. caput-medusae** L., *Sp.Pl.* 83 (1753). Annual; several culms erect, 20-50 cm high; leaf-sheaths inflated, blades narrow, short; spike bristly, 2-5 cm long; glumes subulate, tapering into an awn 1-2.5 cm long; lemmas lanceolate, 6 mm long, 3-nerved, scabrous, its flat awn 5-10 cm long.

Native of Europe. Naturalised in S.Aust. near Burra (Northern Lofty region).

25. HORDEUM L.

Sp.Pl. 84 (1753).*(Latin name for barley.)*

Annual or perennial; leaf-blade flat; ligule short, truncate; inflorescence a dense spike; spikelets 1-flowered, subcylindrical, arranged side by side in 3's in the alternate notches of the rachis, central spikelets of each triad bisexual, glumes 2, persistent, narrow, resembling awns or bristles and placed side by side in front of the spikelet; lemma convex, 5-nerved, long-awned. 20 species from temperate areas.

1. Rachis continuous and persistent; awn of lemma of central spikelet at least 5 cm long..... *H. vulgare* 5.
1. Rachis readily disarticulating; awn of lemma of central spikelet to 4 cm long.
 2. Lemmas of lateral spikelets (incl. awns) much longer than the glumes (incl. awns).
 3. Anthers of the central floret usually black, sometimes pale, less than 0.6 mm long, remaining within the floret at maturity; anthers of lateral florets at least 3 times as long as those of the central floret..... *H. glaucum* 2.
 3. Anthers of the central floret usually pale, sometimes brown, more than 1 mm long, usually exerted at maturity; anthers of lateral florets about the same length as those of the central floret, sometimes twice as long..... *H. leporinum* 3.
 2. Lemmas of lateral spikelets (incl. awns) much shorter than the glumes (incl. awns).
 4. Glumes of lateral spikelets subequal, bristle-like..... *H. geniculatum* 1.
 4. Glumes of lateral spikelets (except those towards base of spike) dissimilar, the inner broader and somewhat winged..... *H. marinum* 4.

*1. **H. geniculatum** All., *Fl.Pedem.* 2:259 (1785). **Mediterranean barley-grass.** Annual, to 20 cm high, with minutely pubescent leaf-blades and glabrous or pubescent sheaths, the uppermost sheath somewhat swollen; spike 2-4.5 cm long, bristly; central spikelet fertile, its lemma lanceolate, 2-4 mm long, with a straight terminal awn 4-7 mm long, its 2 glumes bristle-like, but slightly widened and more or less channelled and conspicuously scabrid in the lower part, the glumes (incl. awns) less than 2 cm long but always much larger than the lemmas (incl. awns); lateral spikelets similar but rather larger and barren.—*H. hystrix* Roth, *Catal.bot.* 1:23 (1797).

Native to the Mediterranean; naturalised in all Australian mainland States except W.Aust. and N.T. Recorded in S.Aust. from the Nullarbor, Yorke Pen., Southern Lofty and S.E. regions, but nowhere common.

Flowering only recorded in Oct.

Weed of disturbed ground.

*2. *H. glaucum* Steud., *Syn. Pl. Glum.* 1:352 (1854). Description as for *H. leporinum* with which it had previously been confused, but separable by the characters indicated in the key.—*H. leporinum* Link subsp. *glaucum* (Steud.) Booth & Richards, *Bot.J. Linn.Soc.* 72:158 (1976).

Native to Europe and Asia; naturalised in all Australian States and recorded in S.Aust. from the Nuyts Archipelago and all regions except the N.W., Gairdner-Torrens, Kangaroo I. and S.E.

Flowers July-Oct.

H. glaucum and *H. leporinum* are recognised here as distinct species, following Cocks, Boyce and Kloot (*Aust.J.Bot.* 24:651-662; 1976), but Booth and Richards (*Bot.J.Linn.Soc.* 72:149-159; 1976) consider them to be conspecific, differing only at subspecific level. *H. glaucum* is a diploid ($2n = 14$); *H. leporinum* is a tetraploid ($2n = 28$).

*3 *H. leporinum* Link, *Linnaea* 9:133 (1834-5). **Barley grass.** (Ill. N.T. Burbidge (1970) *Australian grasses* 3, pl.68).

Annual, to 30 cm high, with villous or merely scabrous-ciliate leaf-blades and glabrous sheaths, the uppermost sheath swollen; spike 3-10 cm long, bristly; central spikelet fertile, its lemma lanceolate, 8-10 mm long, with a straight terminal awn 2-4 cm long, its glumes capillary but slightly widened and more or less channelled and conspicuously ciliate on the lower part; lateral spikelets similar but rather longer and barren, with both glumes capillary all their length, or the inner one widened and ciliate, like those of the central spikelet; each lemma (incl. awn) is much longer than the glumes (incl. awns).—*H. murinum* non L., sensu J. M. Black, *Fl.S.Aust.* 137 (1943).

Native of Europe and Asia, but now introduced into most parts of the world. Recorded in all Australian States; in S.Aust. from the South Neptune Islands and the Flinders Ranges, Eastern Eyre Pen., Yorke Pen., Northern and Southern Lofty and S.E. regions.

Flowering erratic but often Sept.-Nov.

When fruiting each triad of spikelets breaks away and becomes a nuisance to man and beast, the barbellate awns and glumes attaching themselves to anything that passes, and the sharp base (joint or article of the rhachis) acting like the callus of *Stipa*. See *H. glaucum*, with which it has been confused.

*4. *H. marinum* Huds., *Fl.Angl.* ed.2, 1:57 (1778). **Sea barley.** Annual, 15-20 cm high, uppermost leaf-sheath glabrous, swollen, lower sheaths villous; spike 2-3 cm long, bristly; central spikelet fertile, its lemma linear-lanceolate, 6-7 mm long, with a straight terminal awn 1.5-2 cm long (2-3 times as long as the lemma), the 2 glumes awn-like throughout; lemma of lateral spikelets narrow and barren, about 5 mm long with an awn about as long and therefore much shorter than the glumes which are c. 2 cm long; 1st glume capillary throughout, the 2nd glume dilated and channelled in lower part, scabrous but without prominent cilia.—*H. maritimum* With., *Bot.arr.Brit.Pl.* 172 (1787), *nom.illegit.*

Native to Europe, where it is a coastal species. Naturalised in Australia, in W.Aust., Qld, N.S.W. Vic. and S.Aust., (Northern and Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Oct.-Jan.

Although not a coastal species in Aust., it tends to occur in salty areas subject to inundation.

*5. *H. vulgare* L., *Sp.P.* 84 (1753). **Cultivated barleys.** Annual, to 1 m high, spike often c. 10 cm or more long, not fragmenting at maturity; central spikelet and often the lateral spikelet fertile; awns absent or up to 10 cm long.

Native to Europe and Asia.

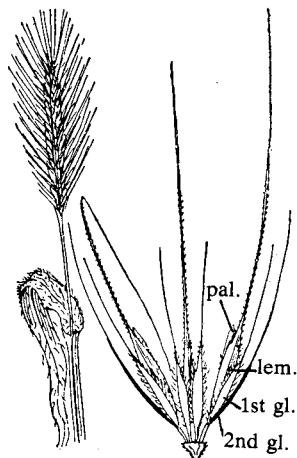


Fig. 94—*Hordeum* sp.
(*H. glaucum* or *H. leporinum*).

Several varieties have been described; some of which are often referred to distinct species. Two varieties (species) have been recorded in S.Aust.

Var. **distichon** (L.) Hook.f., *Fl. Brit. India* 7:371 (1896). **Two-rowed barley**. Lateral spikelets barren; spike with 2 rows of fertile spikelets.—*H. distichon* L., *Sp.Pl.* 85 (1753).

Occurs as an escape from cultivation in Australia. In S.Aust. recorded occasionally from the Flinders Ranges and Yorke Pen. regions.

Flowering records for May and Sept.

Often treated as a distinct species.

Var. **hexastichon** (L.) Aschers., *Fl. Brand.* 1:873 (1864). **Six-rowed barley**. Lateral spikelets fertile; spike with 6 rows of fertile spikelets.—*H. hexastichon* L., *Sp.Pl.* 85 (1753).

Occurs as an escape from cultivation in Australia. In S.Aust. recorded from the S.E. region.

Flowers April (1 record).

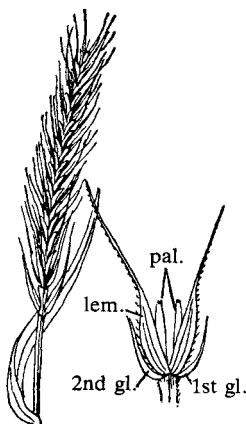


Fig. 95—*Secale cereale*.

26. SECALE L.

Sp.Pl. 84 (1753).

(Latin name for rye.)

Annuals or perennials; leaf-blade flat; ligule membranous; inflorescence a dense cylindrical spike; spikelets solitary, sessile, 2-flowered, appressed by their faces (sides of the lemmas) against the rhachis of the spike; glumes 2, linear, 1-nerved. 2 species from Europe, Asia and Africa.

61. **S. cereale** L., *Sp.Pl.* 85 (1753). **Rye**. (Ill. N. T. Burbidge (1968) *Australian grasses* 2, pl. 50). A tall annual, with flat leaves and a bearded spike 8-15 cm long, finally drooping; spikelets with 2 fertile florets; glumes awl-shaped, keeled; lemma long-awned.

Native to Europe. Occurs as an escape in S.Aust. and recorded from the Flinders Ranges, the Yorke Pen. and Northern and Southern Lofty regions.

Flowers Aug. (1 record).

Grown for stock feed, binding sand, and as a cereal, especially for making bread.

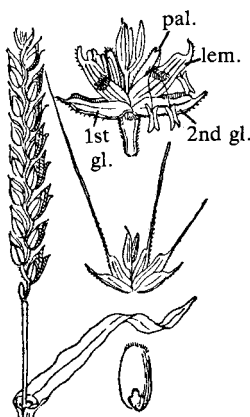


Fig. 96—*Triticum aestivum*.

27. TRITICUM L.

Sp.Pl. 85 (1753).

(Latin for wheat.)

Annuals or biennials; leaf-blade flat; ligule membranous; inflorescence a spike, the rhachis more or less zig-zag; spikelets plano-convex, 2-5-flowered, solitary, sessile and alternate in each excavation of the spike against which they are appressed by their flattened faces (sides of the glumes and lemmas); glumes 2, persistent, several-nerved, rigid, broad, truncate-mucronate or obtuse, usually shorter than the florets; lemmas rounded on back, many-nerved, mucronate or awned. About 20 species from Europe, the Mediterranean and Asia.

*1. **T. aestivum** L., *Sp.Pl.* 85 (1753). **Wheat, common wheat**. (Ill. N. T. Burbidge (1966) *Australian grasses* 1, pl. 44). Annual, with an erect stem and long flat leaves; spikelets 3-5-flowered, nearly as broad as long, forming a dense, somewhat 4-angled spike 7-12 cm long, 1 or 2 upper florets usually barren; glumes equal, oblong,

convex, 7-nerved, mucronate or with a long terminal awn (**bearded wheat**); all the glumes and lemmas hardened and shining in fruit; each spikelet ripening usually 2-3 oblong grains 6-7 mm long.—*T. vulgare* Vill., *Hist.Pl.Dauph.* 2:153 (1787); *T. sativum* Lam., *Fl.Franc.* 3:625 (1778).

Native to Europe and/or Asia. Occurs as an occasional escape from cultivation in Australia. In S.Aust. recorded from the Flinders Ranges, Eyre Pen., Gairdner-Torrens and Yorke Pen. regions.

Flowers recorded Sept., Oct. and May.

The principal cereal grown in Australia and in S.Aust. It is not likely to propagate itself for more than 1 or 2 generations.

TRIBE 10—POEAE

28. BRIZA L.

Sp. Pl. 70 (1753).

(Greek *briza*, name of some form of rye.)

Annual or perennial erect glabrous herbs; leaf-blade flat; ligule long, scarious; inflorescence a panicle or raceme; pedicels slender; spikelets ovoid, compressed laterally, with several spreading, closely imbricate flowers, hanging in a loose panicle; glumes 2, almost equal, boat-shaped, 7-9-nerved, persistent; lemmas membranous, concave, obtuse, several-nerved; palea much smaller. About 20 species from northern temperate areas and South America.

1. Spikelets 10-20 mm long, usually fewer than 9. *B. maxima* 1.

1. Spikelets 2-5 mm long, numerous *B. minor* 2.

*1. *B. maxima* L., *Sp. Pl.* 70 (1753). **Large quaking-grass.** (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 17). Glabrous annual, usually 20-60 cm high; panicle 1-sided, simple or slightly branched, 2-8-flowered; spikelets 10-20 mm long, drooping on filiform pedicels, 9-17-flowered, golden, 8-10 mm broad at base; glumes dark brown or purplish.

Native to the Mediterranean, but naturalised widely, incl. all Australian states except N.T. In S.Aust. from the Flinders Ranges, Eyre Pen., Yorke Pen., Northern and Southern Lofty, Kangaroo I. and S.E. regions.

Flowers Aug.-Dec.

Occurs as a weed in cool places. Palatable but not of economic importance.

*2. *B. minor* L., *Sp. Pl.* 70 (1753). **Lesser quaking-grass.** (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 16). Glabrous annual, usually 10-50 cm high; panicle compound, numerous-flowered; spikelets 2-5 mm long, erect to drooping on slender but more or less straight pedicels, 4-8-flowered, pale-green, 4-5 mm broad at base; glumes usually pale-green but less often purplish.

Native to Europe, but widely introduced and naturalised in all Australian States

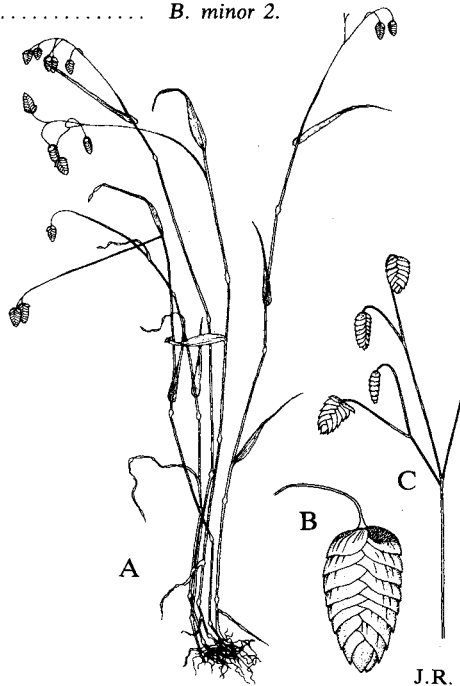


Fig. 97—*Briza*. A, *B. maxima*, habit; B, *B. maxima*, spikelet, natural size; C, *B. minor*, spikelets, natural size.

except N.T. In S.Aust. recorded from the Eyre Pen., Yorke Pen., Northern and Southern Lofty, Kangaroo I. and S.E. regions.

Flowers Aug.-Dec.

Occurs as weed in cool places. Not of economic significance to stock.

29. CATAPODIUM Link

Hort. Berol. 1:44 (1827).

(Presumably Greek *kata*, downward; *podion*, a small foot, probably referring to the culm.)

Glabrous annual herbs; panicle rigid, simple or branched; spikelets somewhat compressed, several-flowered; glumes subequal, keeled, 1-3-nerved; much shorter than the florets; lemma firm, narrow rounded on back, awnless, obscurely 3-5-nerved. 2 species in Europe.

*1. *C. rigidum* (L.) Hubb. ex Dony, *Fl. Bedfordsh.* 437 (1953). **Rigid fescue, hard poa.** (Ill. Burbidge (1970) *Australian grasses* 3, pl. 18). A small glabrous, rigid annual, 5-20 cm high, the stems usually geniculate at base; leaf-blades flat or involute, scabrous; ligule oblong, torn; panicle 4-8 cm long, 1-sided, contracted, the short branches clothed with spikelets almost to the base; spikelets 5-6 mm long, on a short thick pedicel, with 6-10 persistent florets; lemmas 2.5 mm long, obtuse, faintly 3-nerved—*Poa rigida* L., *Cent. Pl.* 5 (1755); *Scleropoa rigida* (L.) Griseb., *Spic. Fl. Rumel.* 2:431 (1844); *Festuca rigida* (L.) Rasp., *Ann. Sci. Nat.* 5:445 (1825); *Sclerachloa rigida* (L.) Link, *Enum. Pl. Hort. Berol.* 1:90 (1821).

Native to Europe and Asia. Naturalised in all Australian States except N.T. and Qld. In S.Aust. from the Eyre Pen., Yorke Pen., Southern Lofty, Murray and S.E. regions.

Flowers Oct.-Jan.

Of little value to stock.

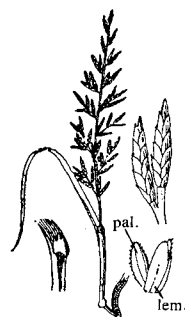


Fig. 98—*Catapodium rigidum*.

30. CYNOSURUS L.

Sp.Pl. 72 (1753).

(Greek *kynos*, of a dog; *oura*, tail; shape of the panicle.)

Erect, glabrous annual or perennial herbs; panicle spike-like; spikelets nearly sessile; upper spikelet on each branch fertile, of few florets; lower spikelets sterile, with rigid awned distichous lemmas; glumes of fertile spikelets thin, subequal, acute, keeled; lemmas of fertile spikelets terete, coriaceous, awned. (From Clapham, Tutin & Warburg (1962) *Flora of the British Isles*. 3 or 4 old world species.)

*1. *C. echinatus* L., *Sp.Pl.* 72 (1753). **Rough dog's tail.** (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 43). Erect glabrous annual; leaves flat, 4-12 mm long; ligule 6-8 mm long; panicle ovate or oblong, 1.5-5 cm long, dense, very bristly; spikelets of 2 kinds, the fertile ones with 2-3 bisexual awned florets, surrounded by the sterile spikelets, which consist of numerous rigid lanceolate, awned glumes and lemmas, arranged in 2 opposite rows; glumes 1-nerved, c. 8 mm long; lemmas of fertile florets pubescent near tip, 2-toothed at summit, 5-nerved, 5-6 mm long, with a straight awn at least twice as long.

Native to Europe. Naturalised in all Australian States except N.T. In S.Aust. from the Southern Lofty, Murray and S.E. regions.

Flowers Oct.-Jan.

Weed of waste places, of no economic value.

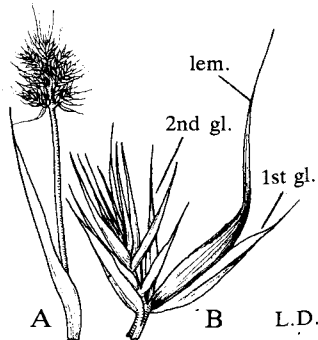


Fig. 99—*Cynosurus echinatus*. A, inflorescence; B, pair of spikelets, sterile on left, fertile on right.

31. DACTYLIS L.

Sp.Pl. 71 (1753).(Greek *daktylos*, a finger; shape of the panicle.)

Perennials with strongly compressed aerial shoots; panicle compound, the lower branches usually long, or spike-like; spikelets compressed laterally, 3-several-flowered, densely crowded in thick 1-sided clusters; rhachilla disarticulating; glumes nearly equal, keeled, acute, persistent, shorter than the florets; lemmas keeled, mucronate, stiff, 5-nerved. 5 species from Europe, North Africa and Asia.

*1. *D. glomerata* L., *Sp.Pl.* 71 (1753). **Cock's-foot.** (Ill. N. T. Burbidge (1968) *Australian grasses* 2, pl. 8). Tall perennial; leaves flat, long; ligule long, glabrous, torn; spikelets 3-5-flowered, in dense 1-sided clusters at the end of the branches of a long panicle, which is narrow except when in flower; spikelets ovate, 5-7 mm long; lemma scabrous-ciliate on keel, with a terminal mucro c. 1 mm long.

Native to Europe, North Africa and Asia, but widely naturalised, including all Australian States, except N.T. Recorded in S.Aust. from the Yorke Pen., Southern Lofty and S.E. regions.

Flowers Nov.-Jan. (somewhat later than most grasses).

Grown as a pasture grass and naturalised in disturbed places.



Fig. 100—*Dactylis glomerata*.

32. DISTICHLIS Rafin.

J.Phys.Chim.Hist.Nat.Arts 89:104 (1819).(Greek *distichos*, in 2 rows; position of the leaves.)

Perennials with long creeping rhizomes; leaves usually strongly distichous, rigid, pointed; ligule a minute rim with hair-tufts at each extremity; inflorescence a raceme or spike; spikelets several-flowered, compressed laterally, dioecious, the rhachilla of the female spikelets disarticulating between the florets; glumes persistent, keeled, several-nerved; lemmas closely imbricate, stiff, acute, many-nerved. 12 species in America and 1 in Australia.

1. *D. distichophylla* (Labill.)Fassett, *Rhodora* 27:71 (1925). **Australian salt-grass.** (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 58). Stems rigid, 10-30 cm high, rising from long creeping rhizomes; leaves rigid, subulate, almost pungent-pointed, arranged in 2 opposite rows, more or less spreading, often crowded; spikelets pale, usually 2-5 in a short terminal spike or raceme, 10-15 mm long, 3-5 mm broad, 6-14-flowered; lemmas 5-6 mm long.—*Uniola distichophylla* Labill., *Nov.Holl.Pl.Sp.* 1:21 (1805); *D. maritima* non Rafin., sensu Benth., *Fl.Aust.* 7:637 (1878); *D. spicata* non (L.)Greene, sensu J. M. Black, *Fl.S.Aust.* 122 (1943).

Occurs in N.S.W., Vic., Tas. and S.Aust. (South Neptune Islands and the Eyre Pen., Yorke Pen., Northern and Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Oct.-Dec. and possibly until April.

Grows in areas of high salinity, along the coast and in salt marshes.

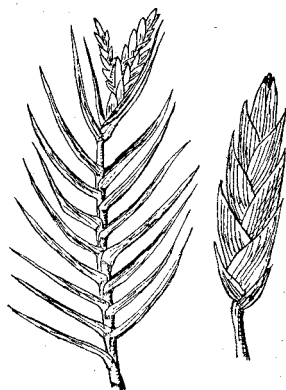


Fig. 101—*Distichlis distichophylla*.

33. FESTUCA L.

Sp. Pl. 73 (1753).

(Latin name of a weed which grew among barley.)

Glabrous perennial herbs; leaf-blade flat to cylindrical or reduced to scales; ligule scarious; inflorescence a panicle; spikelets several-flowered; rhachilla disarticulating between the florets; glumes narrow, keeled, persistent, shorter than the florets, the 1st usually 1-nerved, the 2nd 3-nerved; lemmas rounded on back at least in the lower part, the upper part often keeled, 5-7-nerved, rarely 9-11-nerved, acute or tapering into a short straight awn, terminal or nearly so. About 80 species, cosmopolitan.

1. Leaves of sterile shoots cylindrical, of culms sometimes flat but less than 3 mm broad.
2. Leaves rigid, as long as stems *F. littoralis* 3.
2. Leaves flexible, much shorter than stems.
3. Panicle branches solitary; awn 1-2 mm long *F. rubra* 5.
3. Panicle branches twin; awn 5-15 mm long *F. benthamiana* 2.
1. Leaves all flat, usually more than 3 mm broad.
4. Panicle branches solitary or one of each pair bearing a solitary spikelet *F. pratensis* 4.
4. Panicle branches at each node 2, both usually with several spikelets *F. arundinacea* 1.

*1. *F. arundinacea* Schreb., *Spicil. Fl. Lips.* 57 (1771). Tall (meadow) fescue. (Ill. N. T. Burbidge (1968) *Australian grasses* 2, pl. 2). Stout erect grass to over 1 m high; blades flat, 3-10 mm broad, scabrous on margins; ligule very short, truncate; panicle loose, 15-30 cm long, the branches twin, unequal, bearing 5-15 spikelets; spikelets 8-12 mm long, 4-6-flowered; 1st glume 4 mm long, 1-nerved, the 2nd 6 mm long, 3-nerved; lemma stiff, 7-8 mm long, 5-nerved, with a very short subterminal awn or mucro (0.5-2 mm long).

Native to Europe and Asia and widely naturalised, including Qld, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty, Murray and S.E. regions).

Flowers principally Jan.

Introduced as a pasture grass and since become naturalised.

2. *F. benthamiana* Vickery, *Contr. N.S.W. nat. Herb.* 1:13 (1939). Rather slender but the erect stems stiff, subglabrous; leaves to 20 cm long, sub-setaceous or very narrow linear, mostly basal; ligule c. 0.2 mm long, truncate; panicle contracted or spreading, with mostly twin branches; spikelets c. 15 mm long, 4-6-flowered; 1st glume 4.5-5 mm long, 1-3-nerved, the 2nd 6-7 mm and 3-5-nerved; lemma 5-7-nerved, 9-11 mm long, scabrous on the upper part and towards the margins, narrowed into a fine awn 5-15 mm long; palea 2-toothed; anthers 3, 4 mm long. —*F. duriuscula* var. *aristata* Benth., *Fl. Aust.* 7:664 (1878).

Described from S.Aust. ("in Barossa Ranges") and said by Vickery possibly to occur also in the Flinders Ranges and in Vic. No specimens in AD.

3. *F. littoralis* Labill., *Nov. Holl. Pl. Sp.* 1:22 (1805). Coast fescue. (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 57). Leaves erect, subulate, straw-coloured, rigid, pungent, often exceeding the panicle; panicle narrow, almost spike-like, 6-10 cm long, straw-coloured; spikelets few, on short pedicels, flat, erect, 14-16 mm long, 4-6-flowered; glumes 9-12 mm long, sub-5-nerved; lemma 10-12 mm long, shortly mucronate, scabrous on keel, sub-7-nerved, the nerves equidistant, shortly ciliate towards

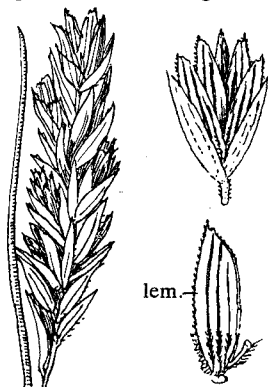


Fig. 102—*Festuca littoralis*.

base; palea as long, ciliate on the 2 nerves; lodicules lanceolate.—*Schedonorus littoralis* (Labill.) Beauv., *Agrost.* 99 (1812).

Occurs in all Australian States except N.T. and Qld. In S.Aust., recorded in the Kangaroo I. and S.E. regions (where it is widespread) and, according to J. M. Black (1943), from Fleurieu Pen. (Southern Lofty region).

Flowers Aug.-Feb.

Occurs most frequently on sand near the sea. Not of pastoral importance.

*4. ***F. pratensis*** Huds., *Fl. Angl.* 37 (1762). **Meadow fescue.** Stout erect grass 40-80 cm high; blades flat, 2-5 mm broad, scabrous; panicle contracted, except when in flower, 8-15 cm long, the branches twin, bearing 1-5 spikelets; spikelets 10-20 mm long, 4-10-flowered; 1st glume 3 mm long, 1-nerved; 2nd 4 mm long, 3-nerved; lemma stiff, 5-7 mm long, 5-nerved, often without a mucro.—*F. elatior* non L., sensu J. M. Black, *Fl. S. Aust.* 126 (1943).

Native to Europe and Asia, widely introduced. Possibly naturalised in W. Aust. (according to Gardner (1952) *Flora of Western Australia* 1, as *F. elatior*, but possibly in error for *F. arundinacea* with which this species has been combined under the name *F. elatior*). Recorded by Black (1943) as occurring in the same localities as *F. arundinacea*.

One record in AD from near Victor Harbor (Southern Lofty region).

Flowers Jan. (1 record).

*5. ***F. rubra*** L., *Sp. Pl.* 74 (1753). **Red fescue, creeping fescue.** Rather slender, but the erect stems stiff, 10-70 cm high; usually stoloniferous; leaves mostly basal, setaceous, short; ligule short, with small lateral lobes; panicle contracted or spreading, 3-15 cm long, with solitary branches; spikelets 8-12 mm long, 6-8-flowered; 1st glume 4 mm long, 1-nerved; 2nd glume 5 mm long, 3-nerved; lemma faintly 5-nerved, 5-6 mm long, terminating in an awn of 1-2 mm; palea 2-toothed; anthers 3, 4 mm long.—*F. duriuscula* L., *Sp. Pl.* 74 (1753); *F. asperula* non Vickery, sensu Hj. Eichl., *Suppl.* 67 (1965).

Native to Europe, Asia and North America. Introduced into N.S.W., Vic., Tas. and S.Aust. (one record from northern Yorke Pen.)

Flowers Oct. (1 record).

Several varieties have been introduced as pasture and lawn grasses.

F. asperula Vickery, *Contr. N.S.W. natn. Herb.* 1:12 (1939), was described to give a new name to plants named as *F. duriuscula* L. in N.S.W. and has since been found in Vic., but no material has definitely been reported from S.Aust. Black's record for Saddleworth (Northern Lofty region) was based on a collection from an experimental plot. It differs from *F. rubra* in its leaves being rough to the touch and in the lemma being 6-8 mm long.

34. GLYCERIA R.Br.

Prod. Fl. Nov. Holl. 179 (1810).

(Greek *glykeros*, sweet; alluding to the herbage and seeds of *G. fluitans*.)

Perennial or annual, usually aquatic grasses; with creeping rhizomes; leaf-blades usually narrow, flat; ligule membranous, lacerated; inflorescence a panicle; spikelets few-to many-flowered, cylindrical or slightly compressed, solitary; glumes 2, persistent, unequal, mostly 1-nerved; lemmas rounded on back and not keeled, prominently 3-9-nerved; ovary glabrous. Cosmopolitan; with c. 40 species



Fig. 103—*Glyceria australis*.

1. *G. australis* C. E. Hubbard, *Kew Bull.* 1934:450 (1934). **Australian sweet grass.** Stout glabrous perennial, 40 cm to 1 m high, with creeping rootstock; blades flat, 3-8 mm broad, finally striate longitudinally and with transverse nerves; ligule oblong, 5-6 mm long; panicle narrow but loose, unilateral, 30-55 cm long, the distant, slender, solitary or twin branches bearing 1-4 spikelets; spikelets at first almost cylindrical, later broader and flattish, 10-30 mm long, 6-14-flowered; glumes thin, subobtusate, the 1st 5-7 mm long, the 2nd 5-6 mm long, both 1-nerved; lemmas acuminate, 6-10 mm long, 7-nerved and minutely scabrous on nerves.—*G. fluitans* non (L.) R.Br., sensu J. M. Black, *Fl.S.Aust.* 125 (1943).

Native to Australia, occurring in all States except W.Aust., N.T. and Qld. In S.Aust. from the Flinders Ranges, Southern Lofty and S.E. regions.

Flowers Oct.-Jan.

Grows in or near water of creeks and fresh water swamps.

The cosmopolitan *G. fluitans* (L.) R.Br., with which Black confused this species is widespread in Aust., but not as yet reported in S.Aust. It lacks cross-veins in the leaves, has 1st glumes 2-3 mm long and acuminate lemmas.

35. LAMARCKIA Moench

Meth. 201 (1794).

(After the French biologist, J.B.A.P.M. de Lamarck, 1744-1829.)

Annual; leaf-blades flat; ligule long, glabrous; panicle unilateral; spikelets compressed, the fertile ones with 1 bisexual floret; the rhachilla prolonged and bearing a small empty awned lemma or one reduced to an awn; glumes subequal, acuminate, 1-nerved, persistent, as long as the florets; fertile lemma broader, 4-nerved, bearing a fine straight awn just below the terminal notch; sterile spikelets intermixed with the others and consisting of 2 acute glumes and several short, truncate, awnless empty lemmas arranged in 2 rows above them. 1 species from the Mediterranean.

61. *L. aurea* (L.) Moench, *Meth.* 201 (1794). **Golden-top.** (Ill. N.T. Burbidge (1970) *Australian grasses* 3, pl. 42). Small glabrous annual, with flat leaf-blades and long glabrous ligule; panicle unilateral, 3-4 cm long, compact, ovate-oblong, finally golden, the fertile spikelets hidden, except for their awns, by the numerous barren ones; glumes 3-4 mm long; lemma 2.5 mm long, pubescent near tip, the awn c. 6 mm long, the upper stalked empty lemma with a much shorter awn.—*Cynosurus aureus* L., *Sp.Pl.* 73 (1753).

Native to the Mediterranean. Naturalised in all Australian States except N.T. and Tas. In S.Aust. from the Flinders Ranges, Eyre Pen. and Murray regions.

Flowers Aug.-Nov.

Weed of disturbed areas.



Fig. 104—*Lamarckia aurea*. 1 fertile and 2 sterile spikelets.

36. *LOLIUM* L.*Sp.Pl.* 83 (1753).

(Latin name for darnel.)

Glabrous annual or perennial herbs; leaf-blade flat; ligule membranous; very short, truncate, inflorescence usually a spike; spikelets sessile and distichous in the alternate notches of the cylindrical continuous (non-articulate) rachis of the spike and appressed to it by one of their sides (back of the glumes and lemmas), 3-12-flowered; glume 1 except in the terminal spikelet which has 2 glumes, stiff, convex, several-nerved; lemmas 5-nerved, rounded on back. Twelve species from temperate parts of Europe and Asia.

1. Florets lanceolate, not swollen in fruit; grain linear-oblong.
2. Lemmas awned *L. multiflorum* 2.
2. Lemmas awnless.
 3. Glume usually distinctly shorter than the spikelet. *L. perenne* 3.
 3. Glume almost as long as or longer than the spikelet.
 4. Tall grass, 30 cm-1 m high; glume more than 10 mm long; lemmas more or less obtuse *L. rigidum* 4.
 4. Low grass, c. 10-20 cm high; glume c. 7 mm long; lemma acute, the uppermost shortly awned *L. loliaceum* 1.
1. Florets oblong, swollen in fruit; grain ovoid-oblong *L. temulentum* 5.

*1. *L. loliaceum* (Bory & Chaub.) Hand.-Mazz., *Annln naturh. Mus. Wien* 28:32 (1914). **Stiff rye-grass.** A rigid annual, with numerous flowering culms usually 15-30 cm high, without barren leafy shoots at base; spikes stiff, stout, 5-15 cm long (and resembling those of *Hemarthria uncinata* and *Monerma cylindrica*); spikelets very narrow, scarcely exserted, with 3-5 lanceolate-obtuse florets, not swollen in fruit; glume as long as or longer than the florets, lemmas with or without an awn.—*Rotboellia loliacea* Bory & Chaub. in Bory, *Exped. sci. Mor.* 3 Bot. 46 (1832); *L. subulatum* Vis., *Fl. Dalm.* 1:90 (1842); *L. rigidum* var. *rotboellioides* Heldr. ex Boiss., *Fl. Orient.* 5:680 (1881).

Native to the Mediterranean. Introduced into all Australian States except N.T. Recorded in S.Aust. from the Nuyts Archipelago and the Eyre Pen., Yorke Pen., Northern and Southern Lofty and S.E. regions.

Flowers Oct.-Nov.

*2. *L. multiflorum* Lam., *Fl. Franc.* 3:621 (1778). **Italian rye-grass.** (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 70). Annual or biennial, leaves inrolled when young; spike 15-25 cm long; spikelets awned, spreading in flower, 10-20-flowered; glume much shorter than the florets; lemmas 5-7 mm long with an erect awn of about the same length; the florets lanceolate.—*L. italicum* A. Braun, *Flora* 17:259 (1834); *L. perenne* var. *multiflorum* Parnell, *Grasses Brit.* 302 (1845).

Native to Europe, North Africa and Asia, but widely naturalised. Occurs in all Australian States except N.T.; in S.Aust. from the Yorke Pen., Southern Lofty and S.E. regions.

Flowers June (one record), but probably mainly summer.

Cultivated as a pasture grass and for hay. Known to hybridise with other species of *Lolium*. In the absence of lemmas can sometimes be identified by having a rolled young leaf and not folded. Sometimes treated as a variety of *L. perenne*.

*3. *L. perenne* L., *Sp.Pl.* 83 (1753). **Rye-grass, perennial rye-grass.** (Ill. N. T. Burbidge (1968) *Australian grasses* 2, pl. 52). Biennial or short-lived perennial, with barren leafy shoots rising

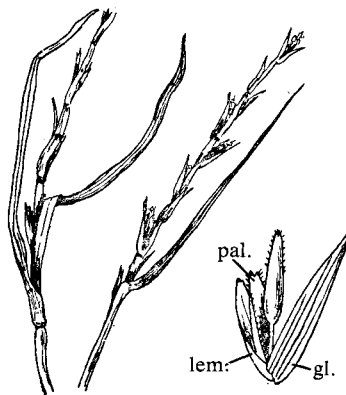


Fig. 105—*Lolium loliaceum*.

from base, 25-50 cm high; leaves to 3 mm broad, folded when young; spike 7-25 cm long; spikelets not awned, not spreading in flower, 3-12-flowered; glume rather shorter than spikelet; lemmas 6-9 mm long; the florets lanceolate-oblong.

Native to Europe, North Africa and Asia; naturalised in all Australian States except N.T. Recorded in S.Aust. from the Flinders Ranges, Eyre Pen., Northern and Southern Lofty and S.E. regions.

Flowers Sept.-Jan. and 1 record for May.

When lemmas are not present may be confused with *L. multiflorum*. Grown as a pasture grass.

*4. *L. rigidum* Gaudin, *Agrost. Helv.* 1:334 (1811). **Wimmera rye-grass.** (Ill. N. T. Burbidge (1966) *Australian grasses* 1, pl. 45). Annual, with stiff stems usually 30 cm-1 m high; spikes 10-25 cm long; spikelets not awned, 3-9-flowered, oblanceolate; glume a little shorter than the spikelet; lemmas c. 7 mm long; the florets lanceolate.

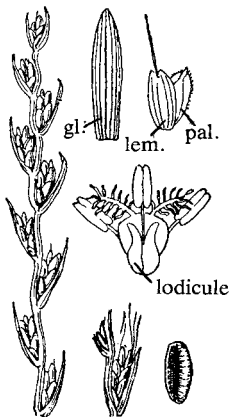


Fig. 106—*Lolium temulentum*.

Native to the Mediterranean, naturalised in all Australian States except N.T. and Tas. Recorded in S.Aust. from the Eyre Pen., Yorke Pen. and Southern Lofty regions.

Flowers Oct.-March.

A valued pasture grass.

*5 *L. temulentum* L., *Sp.Pl.* 83 (1753). **Darnel, drake.** (Ill. Meredith (1955) *The grasses and pastures of South Africa* fig. 30). Stiff, stout annual, with a rigid spike 15-20 cm long; spikelet oblong-cuneate, 3-9-flowered, broad-topped in fruit; glume equalling or longer than the florets; lemma awnless or awned below the summit, coriaceous, swollen in fruit, with the edges of the palea extending outwards beyond it; the awn, when present, may be longer than the lemma or reduced to a mucro, grains thick, ovoid-oblong.

Native to Europe, North Africa and Asia, naturalised in all Australian States except N.T. Recorded in S.Aust. from the Yorke Pen., Southern Lofty, Kangaroo I. and S.E. regions. Rare and of doubtful status.

Flowers Oct.-Jan.

A weed of cultivated fields and disturbed areas. Its poisonous properties may be due to infection with a fungus.

37. PLAGIOCHLOA Adams. & Sprague

Jl S. Afr. Bot. 7:89 (1941)

(Greek *plagios*, oblique; *chloë*, grass; referring to the insertion of the spikelets on the rhachis.)

(Descriptions from Meredith (1955) *The grasses and pastures of South Africa*.)

Variable perennials with leaf-blades expanded at first but soon rolled; ligule a hairy rim; inflorescence a spike or spike-like panicle or raceme; spikelets 3-14-flowered, usually in 2 rows and placed obliquely to the rhachis; glumes 4-5- or rarely 7-nerved, shorter than the spikelets, shortly awned or awnless, glabrous or hairy; lemmas 7-9-nerved, hairy, the hairs club-shaped, awnless or shortly awned. 5 to 7 species from South Africa.

*1. *P. acutiflora* (Nees) Adams. & Sprague, *Jl S. Afr. Bot.* 7:90 (1941). **Desmazeria.** A slender, straggling perennial, with culms 10-30 cm long; leaves glabrous or hairy; inflorescence a spike-like panicle 1-2.5 cm long; spikelets 4-5 mm long, usually 5-6-flowered; glumes acute, acuminate or minutely awned, glabrous or with a few hairs on the keel; lemmas acute, with bulb-shaped hairs on the keels and margins.—*Brizopyrum acutiflorum* Nees, *Fl. Afr. Aust.* 1:371 (1841); *Desmazeria acutiflora* (Nees) Hemsl., *Bot. Challenger Exped.* 1 (2):91 (1884).

Native to south-western South Africa, naturalised in Vic. and S.Aust. (near Kingston, S.E. region according to Black, 1943).

Flowers (in South Africa) Oct.-Nov.

Habitat in South Africa and Vic. in seasonally wet depressions.

38. POA L.

Sp.Pl. 67 (1753).

(Greek *poa*, grass.)

Glabrous annuals or perennials; leaf-blades usually flat; inflorescence a panicle; spikelets often compressed laterally, 2-7-flowered; rhachilla disarticulating between florets; glumes boat-shaped, subequal, 1-3-nerved, shorter than the florets, persistent; lemmas broad, usually obtuse, 5-9-nerved, keeled, awnless, almost always woolly on the lower part of the midnerve and marginal nerves. Often with hairs (the web) on the callus below the lemmas. Over 200 species, cosmopolitan, especially in temperate and cool climates. In *Poa*, species are poorly defined. (Keys and species descriptions adapted from Vickery (1970) *Contr. N.S.W. natn. Herb.* 4:145-243).

1. Small annuals with soft herbaceous leaves; ligules thinly membranous, glabrous; web (hairs at base of each floret) absent.
2. Panicle narrow with the spikelets mostly rather erect and appressed to the branches; lemmas usually 9-11-nerved *P. fax* 6
2. Panicle triangular to ovate with more or less stiffly spreading capillary branches; lemma manifestly 5-nerved *P. annua* 1.
1. Perennials; ligules and web various
3. Plants bulbous or nodular or otherwise with manifestly thickened internodes at the base.
4. Plants bulbous at the base with elongate-conical or pear-shaped bulbs composed of the enlarged and fleshy inner basal leaf-sheaths *P. bulbosa* 2.
4. Plants nodular or with thickened internodes at the base.
5. Leaf-sheaths glabrous; spikelets turgid, very broadly oblong-ovate; culms from a shortly creeping branching rhizome *P. drummondiana* 5.
5. Leaf-sheaths pubescent or scabrous; spikelets compressed; plants tufted from a contracted rootstock *P. crassicaudex* 4.
3. Plants not bulbous nor manifestly thickened at the base.
6. Blades pubescent or hirsute on the lower surface.
7. Blades always inrolled, with dense, rather short, soft hairs *P. rodwayi* 14.
7. Blades often flat, or folded or loosely inrolled.
8. Blades from densely hairy and greyish-green to rather sparsely hairy, but the hairs generally long and fine, sometimes long and short hairs intermingling; lower internodes not swollen *P. morrisii* 11.
8. Blades loosely or densely pubescent; lower internodes often somewhat swollen *P. crassicaudex* 4.
6. Blades smooth or scabrous on the lower surface but not manifestly pubescent or hirsute.
9. Ligule thinly membranous, usually not or scarcely and inconspicuously puberulous or scabrous on the back or ciliate at the apex, 2 mm or more in length or rarely less.

10. Mature spikelets c. 8-10 mm long, strongly compressed; lemma usually more or less woolly-hairy all over the back in the lower part; sheaths tubular below *P. fordeana* 7.
10. Mature spikelets 2.5-6 mm long, compressed but somewhat turgid; lemma hairy on the keel and marginal nerves in the lower part but not in the internerves; sheaths open *P. pratensis* 13.
9. Ligule firmly membranous, usually more or less puberulous or scabrous on the back and/or ciliolate at the apex, 0.1-2 mm long or rarely longer, or more or less reduced to cilia.
11. Blades (or at least some of them) flat and usually expanded at least when alive, or folded and the margins sometimes inrolled on drying, either broad or narrow.
12. Stems often leafy and branching from the aerial nodes, or stoloniferous.
13. Aerial shoots often extravaginal (recognisable by having 1 or more leaves at the base with neither blade nor ligule); lemmas usually pubescent on the internerves on the lower back *P. tenera* 15.
13. Aerial shoots usually intravaginal; lemmas glabrous or with sparse hairs on the keels and nerves, very rarely on the internerves *P. umbricola* 16.
12. Leaves and shoots mostly from the base, the plants tufted or rhizomatous.
14. Plants commonly developing horizontal rhizomes which initiate new shoots more or less remote from the parent tussock; extravaginal shoots with scales usually present.
15. Lower leaf-sheaths not purplish; lemmas glabrous on the internerves *P. pratensis* 13.
15. Lower leaf-sheaths usually exhibiting some greater or lesser degree of purplish colouration; lemmas often more or less pubescent on the internerves *P. clelandii* 3.
14. Plants tufted and not normally developing rhizomes.
16. Panicle usually contracted and more or less linear, or if sometimes with widely spreading branches then usually at least some of the branches short and with spikelets almost to their bases *P. poaeformis* 12.
16. Panicle at length wide-spreading and branches devoid of spikelets in the lower part.
17. Sheaths often purplish at the base; loosely or densely caespitose with numerous extravaginal shoots with firm broad scales *P. clelandii* 3.
17. Sheaths not or rarely purplish at the base.
18. Sheaths scabrous or smooth, not pubescent .. *P. labillardieri* 9.
18. Sheaths usually more or less pubescent or scabrous-pubescent *P. crassicaudex* 4.
11. Blades closely folded and/or usually the margins also rolled and overlapping so that the blade is more or less angular-terete, narrow.

- 19. Blades more or less rigid.
 - 20. Small plant with elongate slender rhizomes *P. halmaturina* 8.
 - 20. Rhizomes not or rarely developed. *P. poaeformis* 12.
- 19. Blades not rigid.
 - 21. Culms at times branching to form fascicles of aerial shoots, or stoloniferous and trailing *P. tenera* 15.
 - 21. Tussocks not stoloniferous, aerial shoots not or very rarely produced.
 - 22. Lemmas hairy in the lower part on the keels and lateral nerves but usually not on the internerves.
 - 23. Tussocks generally large and coarse *P. labillardieri* 9.
 - 23. Tussocks small and fine-leaved. *P. meionectes* 10.
 - 22. Lemmas hairy on the internerves on the lower back, with or without longer and/or denser hairs on the keels and lateral nerves.
 - 24. Blades beset with very dense fine scabrous emergences *P. rodwayi* 14.
 - 24. Blades closely or sparsely beset with scabrous emergences but not so densely and finely as in the preceding *P. crassicaudex* 4.

*1. *P. annua* L., *Sp.Pl.* 68 (1753). **Winter grass, annual meadow-grass.** Soft tufted glabrous annual; culms erect to prostrate; leaf-blades flat or folded when young, thin, soft, to 12 cm long, smooth or very minutely scaberulous; panicle triangular to ovate, 1-12 cm long, the branches spreading to 5 cm long, devoid of spikelets in the lower parts; spikelets 3-10-flowered, ovate or oblong; glumes 1.5-4 mm long; lemmas 2.5-4 mm long, prominently 5-nerved, the internerves usually glabrous, the nerves usually densely hairy; web absent.

Native to Europe, but now cosmopolitan. In Australia occurs in all States except N.T. In S.Aust. from the Nuyts Archipelago and the Flinders Ranges, Eyre Pen., Yorke Pen., Northern and Southern Lofty, Murray and S.E. regions.

Flowers most of the year, but especially spring.

Occurs as a weed of cultivated ground.

*2. *P. bulbosa* L., *Sp.Pl.* 70 (1753). **Bulbous meadow-grass, bulbous blue-grass.** Tufted bulbous-based perennial, 5-40 cm high; culms erect or spreading; leaf-blades flat, folded or inrolled, to 10 cm long, glabrous but sometimes scabrous on the keel and the nerves on the lower surface; sheaths glabrous; panicle contracted and usually dense, ovate or oblong, c. 2-6 cm long, the branches more or less erect; spikelets 3-6-flowered, ovate to broadly oblong, compressed; glumes 2-3 mm long; lemmas 2.5-3.5 mm long, finely 5-nerved, densely fringed with long hairs on the keel and marginal nerves, the median nerves or the inter-nerves glabrous on the lower lemma, but increasingly hairy on the upper lemmas.

Native to the Mediterranean and Europe. Naturalised in W.Aust., N.S.W., Vic. and S.Aust. (Flinders Ranges, Eyre Pen., Yorke Pen., Northern and Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Sept.-Oct.

3. *P. clelandii* Vickery, *Contr.N.S.W.natn.Herb.* 4:193 (1970). Tufted perennial or occasionally with a short rhizome clothed with firm broad scales; culms to 75 cm high; leaf-blades

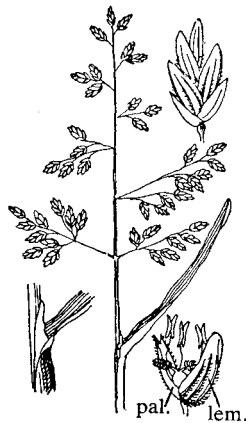


Fig. 107—*Poa annua*.

flat, inrolling on drying, to 25 cm long, usually glabrous; panicle more or less lanceolate, loosely contracted with erect or nearly spreading branches, to 20 cm long; spikelets 3-5-flowered, purplish, greenish or straw-coloured; glumes c. 1-2 mm long; lemmas 1.75-3 mm long, variably pubescent on the lower part of the back including the internerves.

Recorded only from Vic. and S.Aust. (Northern and Southern Lofty and S.E. regions). In the Southern Lofty region this species is very common and widespread.

Flowers Sept.-Jan.

4. *P. crassicaudex* Vickery, *Contr.N.S.W.natn.Herb.* 4:233 (1970). Loosely or rather densely tufted perennial, with the basal internodes sometimes more or less strongly swollen to form elongate or globular yellowish nodules; culms to 90 cm high; leaf-blades flat to inrolled, mostly 15-30 cm long; sheaths pubescent or scabrous; panicle sometimes somewhat contracted or all branches spreading, to 17 cm long, with the spikelets rather crowded towards the end of the short branches; spikelets 3-5-flowered, purplish or green or straw-coloured, compressed; glumes c. 2-3 mm long; lemmas 2-4 mm long, distinctly 5-nerved, usually pubescent on the internerves in the lower part of the back, densely and longer hairy on the keel in the lower half and on the lateral nerves and margins; web usually developed.

Occurs in Vic. and S.Aust. (Flinders Ranges, Eyre Pen., Yorke Pen. and all regions to the south).

Flowers Sept.-Dec.

5. *P. drummondiana* Nees, *Hook.Lond.J.Bot.* 2:418 (1843). **Shaking grass, knotted poa.** Perennial, with a short creeping branching rhizome, the tips of its branches developing into culms, some of the lower internodes swollen to form nodules; culms 25-80 cm high, erect or geniculate; leaf-blades flat or becoming folded, 8-30 cm long; sheaths glabrous; panicle with spreading branches or somewhat contracted, more or less lanceolate or subpyramidal in outline, to 20 cm long, branches at length spreading, to 11 cm long, usually bare for rather more than half

their length; spikelets plump, lightly to strongly laterally compressed, lanceolate-ovate when young, very broadly oblong-ovate when mature, usually 7-12 mm long; glumes 2-6 mm long; lemmas 3-6 mm long, 5(-7)-nerved, variously hairy; web usually absent.—*P. nodosa* Nees in Lehm., *Pl.Preiss.* 2:105 (1846).

Occurs in Vic. and S.Aust. (Eyre Pen., Yorke Pen. and Northern and Southern Lofty regions). Also the Murray Valley according to Black (1943).

Flowers Sept.-Nov.

6. *P. fax* Willis & Court, *Muelleria* 1:45 (1956). **Scaly poa, scaly meadow-grass.** Small erect annual, 5-30 cm high; leaf-blades flat, thin, flaccid, mostly 2-5 cm long; panicle 3-15 cm long, usually narrow and linear, with few short appressed branches rarely to 2 cm long; spikelets very strongly compressed, ovate to oval-oblong, 5-13-flowered, to 13 mm long, pale or greenish or purplish; glumes c. 2-5 mm long;



Fig. 108—*Poa drummondiana*.

lemmas mostly 3.5-4.5 mm long, usually 9-11-nerved, usually silky-woolly hairy on the nerves and margins below; web absent.—*P. lepida* non Nees ex Steud., sensu F.Muell., *Fragm. Phyt.Aust.* 8:130 (1873).

Occurs in W.Aust., N.S.W., Vic. and S.Aust. (Nuyts Archipelago and the Eyre Pen., Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Sept.-Nov.

7. *P. fordeana* F.Muell., *Fragm. Phyt.Aust.* 8:130 (1873). **Forde poa.** Perennial with creeping rhizomes giving rise to shoots singly or in loose fascicles; culms often curved and ascending at the

base, 20-100 cm high, occasionally branched from the lower nodes; leaf-blades flat, thin erect or gently spreading, 5-30 cm long; panicle 6-45 cm long, at first contracted and linear, at maturity narrowly or broadly oblong to pyramidal-acute, with the branches and spikelets divaricately spreading or somewhat reflexed; spikelets linear to linear-lanceolate, moderately compressed, usually 5-8-flowered, 5-11 mm long, usually greenish or straw-coloured; glumes often c. 1-4 mm long; lemmas often c. 4 mm long, 5-nerved with the nerves fairly evident, usually more or less woolly-hairy on the back in the lower part; web obsolete.—*Glyceria fordeana* (F.Muell.) Benth., *Fl.Aust.* 7:657 (1878).

Occurs in Qld, N.S.W., Vic. and S.Aust. (Lake Eyre, Flinders Ranges, Eyre Pen. and Murray regions).

Flowers Sept.-Dec. and 1 record for June.

Grows in inland wet situations.

8. ***P. halmaturina*** J. M. Black, *Trans.R.Soc.S.Aust.* 66:248 (1943). Small rigid glabrous perennial, with dense tufts of shoots and elongate slender rhizomes clothed with rather thin long pointed scales; culms erect, 5-10 cm high; leaf-blades inrolled-terete, usually glabrous below but scabrous above; panicle 1.5-3 cm long, contracted and almost spike-like with 1-3 short erect branches; spikelets 2-4-flowered, 4-5 mm long; glumes c. 3 mm long, 3-nerved; lemmas c.3-3.5 mm long, hairy on the keel and nerves and often on the internerves; web copious.

Occurs only in S.Aust. (Kangaroo I. and S.E. regions).

Flowers Nov.-Feb.

Considered by Vickery to be very close to *P. poaeformis* but sufficiently distinguished by the long scaly rhizomes and low size.

9. ***P. labillardieri*** Steud., *Synops.Pl.glum.* 262 (1854). **Tussock grass.** Coarse, densely tufted, green to greyish, usually scabrous perennial, very rarely producing a rhizome; culms 30-120 cm high; leaf-blades to 80 cm long, flat or rather loosely inrolled, scabrous to scabrous-pubescent; panicle 10-25 cm long, rather narrow with erect or erectly and loosely spreading branches; spikelets mostly 3-4-flowered, greenish or purplish, strongly compressed, c. 2-3 mm long; lemmas 2.5-4.5 mm long, usually hairy on the keel and lateral veins towards the base; web usually copious.—*P. billardieri* Steud. in error, Benth., *Fl.Aust.* 7:651 (1878).

Occurs in Qld, N.S.W., Vic., Tas. and S.Aust. (Flinders Ranges, Northern and Southern Lofty and S.E. regions).

Flowers Oct.-Feb.

Vickery stated: "Field observations indicate that *P. poiformis* occurs only in sites adjacent to the ocean and estuaries where it is under some degree of influence of salt spray. From the landward side *P. labillardieri* approaches and may even intermingle with it. I have usually had no difficulty in distinguishing them in the field by the smoothness and slightly greater succulence of the leaves of *P. poiformis* and its more dense, contracted panicles with usually rather larger spikelets and lemmas and rather rougher lemmas". She considered that herbarium material could occasionally not be identified. There are specimens in AD from Mount Lofty identified by Vickery as *P. poiformis*.

Only var. ***labillardieri*** occurs in S.Aust.

10. ***P. meionectes*** Vickery, *Contr.N.S.W.natn.Herb.* 4:250 (1972). Tufted perennial; culms 10-60 cm high; leaf-blades fine, inrolled, finely scabrous; panicle delicate, 1-10(-15) cm long, loosely spreading, the branches filiform, bearing few spikelets; spikelets green or purplish, 3-5-flowered, rather small, compressed; glumes 1.5-2 mm long; lemmas 5-nerved, 2-3.5 mm long, glabrous or minutely hairy on the keel; web usually absent.—*P. exilis* Vickery, *Contr.N.S.W.natn.Herb.* 4:212 (1970), nom.illeg.

Occurs in N.S.W., Vic. and S.Aust. (only recorded from Millicent and Rivoli Bay in the S.E. region).

Flowers Oct. (one record).

11. ***P. morrisii*** Vickery, *Contr.N.S.W.natn.Herb.* 4:239 (1970). Softly hairy, usually loosely tufted, greyish-green perennial, c. 50-90 cm high, rarely with rhizomes; leaf-blades expanded or loosely inrolled, to 30 cm long, variously hairy; panicle 9-25 cm long, somewhat contracted or at length broadly spreading; glumes 3-nerved, rather short; lemmas 2-2.4 mm long, usually loosely hairy on the internerves with denser hairs on the keel, lateral nerves and margins; web rather scanty or obsolete.

Occurs mainly in Vic., recorded in S.Aust. from the S.E. region.

Flowers Oct., Nov.

Vickery stated that it could be separated from *P. rodwayi* "By its coarser and more robust habit and often expanded leaf-blades" and from *P. crassicaudex* "by its more hairy and velvety (to the touch) foliage and by the culms not being swollen at the base".

12. ***P. poaeformis*** (Labill.) Druce, *Rep.Botl Soc.Exch.Club Br.Isl.* 1916, suppl. 2:640 (1917). **Coast tussock grass, blue tussock grass.** (Ill. Vickery (1970) *Contr.N.S.W.Natn.Herb.* 4:pl.15). Densely tufted perennial, erect, 20-90 cm high, rarely with rhizomes; leaf-blades more or less rigid, somewhat thick, usually strongly convolute and terete or angular-terete, the lower surface smooth, the inner scabrous; panicle 8-30 cm long, commonly contracted, if with spreading

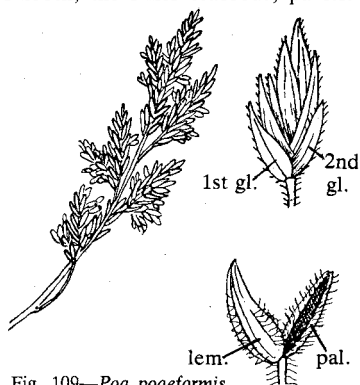


Fig. 109—*Poa poaeformis*.

branches then at least some of the branches short and with spikelets almost to their bases; spikelets pale-greenish to straw-coloured, usually 3-5-flowered; glumes distinctly 3-nerved, 3-5 mm long; lemmas usually 4-5 mm long, usually scabrous on the keel above and hairy on keel, lateral nerves and margins below; web usually long and copious.—*Arundo poaeformis* Labill., *Nov.Holl.Pl.Sp.* 27 (1804); *P. australis* non R.Br., sensu J. M. Black, *Fl.S.Aust.* 123 (1943), partly; *P. laevis* R.Br., *Prod.Fl.Nov.Holl.* 179 (1810); *P. australis* var. *billardieri* Hook.f., *Fl.Tasm.* 2:123 (1858).

Occurs on Lord Howe I., W.Aust., N.S.W., Vic., Tas. and S.Aust. (coasts, except of the Nullarbor region, and inland in the Southern Lofty region).

Flowers Sept.-Jan.

Typically a coastal species (see note following *P. labillardieri*) with rare records for inland localities.

*13. ***P. pratensis*** L., *Sp.Pl.* 67 (1753). **Meadow poa, Kentucky blue grass.** Variable perennial, 10-90 cm high with slender creeping rhizomes bearing pointed scale-leaves; culms erect or geniculate; leaf-blades linear, flat or folded, to 30 cm long, glabrous or slightly hairy; panicle ovate to pyramidal or oblong, contracted to open; spikelets ovate to oblong, somewhat compressed, 2.5-6 mm long, 2-5-flowered, usually green but rarely purplish; glumes 1.5-4 mm long; lemmas 2-4 mm long, hairy on the keel and marginal nerves; web copious.

Native to Europe and Asia, naturalised in all Australian States except N.T. In S.Aust. occurs in the Yorke Pen., Southern Lofty, Kangaroo I. and S.E. regions.

Flowers Oct.-Dec.

Prefers rich soils in cooler and moister areas. Commonly planted in lawns and useful as a fodder grass.

14. ***P. rodwayi*** Vickery, *Contr.N.S.W.natn.Herb.* 4:235 (1970). Green to greyish-white tufted perennial, 25-60 cm high, rarely forming rhizomes; leaf-blades fine and convolute, 8-30 cm long, densely scabrous-pubescent to scabrous; panicle somewhat loosely contracted or at length spreading, 5-15 cm long; spikelets 3-5-flowered; glumes rather short; lemmas 2.5-3.5 mm long, usually loosely pubescent on the internerves with longer and denser hairs on the keel and at the base of the lateral nerves and margins; web sparse or obsolete.

Occurs in Tas. and ?Vic., with specimens from the S.E. region of S.Aust. identified by Vickery as close to, if not, *P. rodwayi*.

Flowers (specimens identified as close to, if not, *P. rodwayi* from S.Aust.) Oct.

Closest, in S.Aust., to *P. morrisii*. Vickery stated "Some of the most densely hairy specimens approach forms of *P. morrisii*, but the closely convolute leaves usually serve to distinguish it".

15. ***P. tenera*** F. Muell. ex Hook. f., *Fl. Tasm.* 2:124 (1858). **Slender tussock grass**. Green flaccid trailing perennial, or sometimes forming tussocks, with long stolons; shoots (or some of them) at first enclosed in delicate scales; leaf-blades often flat, linear, smooth or scabrid, 5-20 cm long; culms very slender and weak; panicle 2-12 cm long, delicately spreading with filiform branches bearing few spikelets towards the apices; spikelets compressed, 2-4-flowered, green or rarely purplish; glumes 1-3-nerved, thin and rather delicate; lemmas 2-3 mm long, distinctly 5-nerved, minutely pubescent on the internerves, nerves and margins or glabrous; web often obsolete.—*P. caespitosa* var. *tenera* (F. Muell.) Benth., *Fl. Aust.* 7:653 (1878); *P. humifusa* J. M. Black, *Trans. R. Soc. S. Aust.* 66:248 (1943).

Occurs in N.S.W., Vic., Tas. and S.Aust. (Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Oct.-Jan. and 1 record for May.

16. ***P. umbricola*** Vickery, *Contr. N.S.W. natn. Herb.* 4:194 (1970). Rather straggling leafy perennial, with the culms branching upwards with fascicles of shoots, perhaps often laxly stoloniferous; leaf-blades 2-15 cm long, flat or loosely inrolled, firm but not rigid, smooth below, minutely scaberulous above; panicle at length spreading with slender branches; spikelets compressed, 3-4-flowered, greenish to purplish, c. 3.5 mm long; glumes 3-nerved; lemmas c. 2.5-3 mm long, often glabrous; web scanty or absent.

Occurs only in S.Aust. in the southern Lofty region near Adelaide.

Flowers Nov., Dec.

On its affinities Vickery stated: "The straggling branching habit of this species, together with the generally narrower and more attenuate blades and usually glabrous lemmas seem to distinguish this species from *P. clelandii*. The coarser, firmer foliage and apparent lack of extravaginal aerial shoots serves to differentiate it from the more delicate *P. tenera*".

39. PUCCINELLIA Parl.

Fl. Ital. 1:366 (1850).

(After Benedetto Puccinelli, 1808-1850, Professor of Botany at Lucca.)

Tufted or creeping perennials or annuals; leaves flat; inflorescence a panicle; spikelets subterete, 3-10-flowered; rachilla disarticulating between the florets; glumes unequal, 1-3-nerved, shorter than the florets, persistent; lemmas obtuse, rather faintly 5-nerved, rounded on back, awnless. Estimates vary from 25-100 species, from most temperate areas. (Key and descriptions adapted from Willis (1970) *A handbook to plants in Victoria* and Clapham, Tutin & Warburg (1962) *Flora of the British Isles*).

1. Spikelets very densely clustered in a compact narrow-oblong (sometimes spreading later) panicle, each 2-7 mm long, 2-8-flowered; lemmas 2.5 mm long or less.
2. Panicle branches 4-6 together, usually all long and bare below; midrib of lemma not reaching tip *P. distans* 1.
2. Panicle branches 2-4 together, at least the very short ones with spikelets to base; midrib of lemma reaching tip *P. fasciculata* 2.
1. Spikelets loosely arranged in a panicle at first narrow and erect (later often spreading diffusely), each 6-10 mm long, 6-12-flowered; lemmas 2-3 mm long, often loosely divergent *P. stricta* 3.

*1. ***P. distans* (L.) Parl., *Fl. Ital.* 1:367 (1850). Reflexed poa.** A tufted glabrous perennial, 15-60 cm high; leaf-blades narrow, flat or with inrolled margins; ligule 1 mm, obtuse; panicle loose, pyramidal or lanceolate, 4-20 cm long, the branches slender, unequal, all devoid of spikelets below, spreading or reflexed after flowering, the lower ones 4-6 at each node; spikelets 3-6-flowered, 4-6 mm long; 1st glume 1-nerved, subacute, 2nd glume 3-nerved, obtuse; lemmas 5-nerved, 2-2.5 mm long, midrib not reaching tip.—*Poa distans* L., *Mant.* 32 (1767); *Glyceria distans* (L.) Wahlb., *Fl. Upsal.* 36 (1820).

Native to Europe and Siberia, naturalised in S.Aust. (Southern Lofty and S.E. regions).

Flowers Sept.-Jan.

In Britain occurs in salt-marshes, muddy estuaries and occasionally on sandy ground inland.

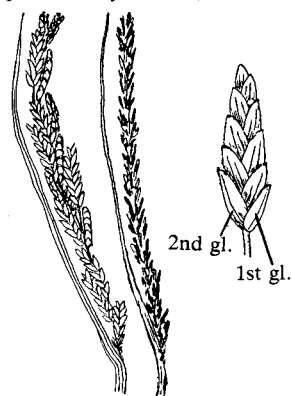
*2. ***P. fasciculata* (Torr.) Bickn., *Bull. Torrey bot. Club* 35:197 (1908). Borrer's saltmarsh-grass.** A tufted perennial, 5-50 cm high; leaf-blades minutely scabrid, narrow, flat; ligule very short; panicle lanceolate, unilateral, 3-16 cm long, the branches spreading, at least the 1 or 2 very short ones covered with spikelets to the base, the lower ones 2-4 at each node; spikelets usually 4-8-flowered, 4-7 mm long; glumes ovate, obtuse or subacute; lemmas 1.5-2 mm long, with a very small rigid apiculus formed by the excurrent midrib.—*Poa fasciculata* Torr., *Flor. nth. middl. U.S.* 1:107 (1823).

Native to Europe, temperate Africa, Asia and North America, naturalised in Vic. and S.Aust. (Yorke Pen. and the S.E. (Upper) regions).

Flowers Nov.-Feb.

Grows near the sea in mud-flats and salt-marshes.

3. ***P. stricta* (Hook.f.) C. Blom, *Acta Horti gothoburg.* 5:89 (1930). Australian saltmarsh-grass.** A tufted glabrous annual, 15-60 cm high; leaves erect, the sheaths rather loose, the uppermost usually clasping base of panicle; the blades setaceous; ligule 1-2 mm long, oblong or ovate; panicle very narrow, 5-15 cm long, the branches quite erect at first, only spreading somewhat



when ripe; spikelets narrow, linear, 6-12-flowered, 6-10 mm long, on short stiff pedicels; glumes 1-3 mm long, the 1st 1-nerved, the 2nd 3-nerved; lemmas obtuse, glabrous except for a few short hairs at the base of the nerves, 5-nerved, 2-3 mm long, minutely denticulate at the apex.—*Glyceria stricta* Hook.f., *Fl. Nov. Zel.* 1:304 (1853); *Poa syrtica* F. Muell., *J. Trans. Vict. Inst.* 1855:45 (1855).

Occurs in all Australian States except N.T. and Qld. Recorded in S.Aust. from Nuyts Archipelago and the Lake Eyre, Eyre Pen., Northern and Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers Sept.-Jan.

Occurs in salt-marshes near the sea and near brackish water inland.

40. *SCLEROCHLOA* Beauv.

Agrost. 97 (1812).

(Greek *sklēros*, hard; *chloë*, grass.)

Annuals; leaf-blade flat; ligule ovate-oblong; inflorescence a dense panicle; spikelets compressed laterally, 3-5-flowered, the rachilla thick, rigid, not disarticulating between the florets or at the base; the short thick pedicels apparently not articulate below the spikelets which persist for a long time; glumes obtuse, unequal; lemmas cartilaginous, rounded on back, prominently nerved. 1 species from Europe and Asia.

*1. ***S. dura* (L.) Beauv., *Agrost.* 98 (1812). Hard meadow-grass.** Small stiff glabrous annual, 3-12 cm high, stems covered by the broad leaf-sheaths up to the short unilateral spike-like panicle

Fig. 110—*Puccinella stricta*.

which is 2-4 cm long and surpassed by the flat leaf-blades; spikelets 3-5-flowered, 7-9 mm long; 1st glume 2.5 mm long, 3-nerved, the 2nd 4 mm long, 7-nerved; lemmas truncate, 6 mm long, 5-nerved.—*Cynosurus durus* L., *Sp.Pl.* 72 (1753).

Native to Europe and Asia, naturalised in Vic. and S.Aust., Recorded from Kapunda and Spalding in the Northern Lofty region, but not collected since 1934.

Flowers Nov.

In Vic. recorded on waste ground.

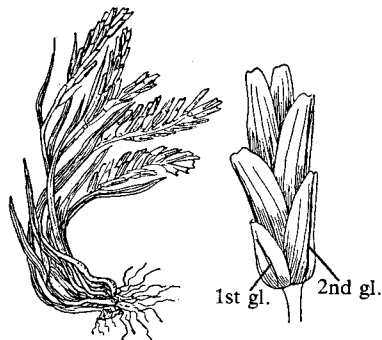


Fig. 111—*Sclerochloa dura*.

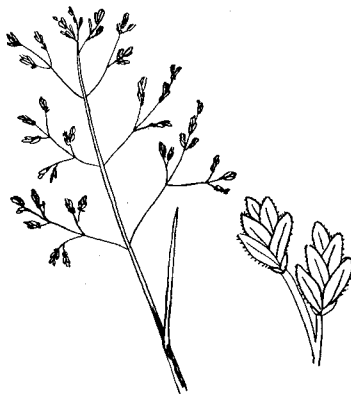


Fig. 112—*Sphenopus divaricatus*.

41. SPHENOPUS Trin.

Fund. Agrost. 135 (1822).

(From Greek, *spên*, wedge; *pous*, foot; alluding to the pedicels thickened under the spikelet.)

Annuals; leaves filiform-channelled; inflorescence a loose panicle; spikelets very small, few-flowered, compressed laterally; glumes persistent, minute, obtuse, much shorter than florets; lemmas obtuse, awnless, 3-nerved; rhachilla disarticulating. 2 to 3 Mediterranean species, living in salt-marshes.

*1. *S. divaricatus* (Gouan) Reichb., *Fl. Germ. Excurs.* 1:45 (1830). Small delicate annual, usually 5-20 cm high; leaves filiform-channelled; ligule lanceolate; panicle loose, with capillary branches, solitary or twin, naked towards the base, the pedicels thickened upwards; spikelets 2-2.5 mm long, mostly 3-flowered; 2 glumes minute, unequal, membranous, obtuse, under 1 mm long; lemmas ovate, c.1.5 mm long.—*Poa divaricata* Gouan, *Illustr.* 4 (1773); *S. gouanii* Trin., *Fund. Agrost.* 135 (1822).

Native to the Mediterranean; naturalised in saline ground in S.Aust. in northern Yorke Pen., and at Port Adelaide (Southern Lofty region).

Flowers Oct., May.

42. VULPIA C.C. Gmel.

Fl. Bad. 1:8 (1806).

(After J. S. Vulpus, 1760-1840, a German chemist.)

Glabrous annuals; leaves short, convolute; ligule very short, truncate; inflorescence a little-branched, 1-sided panicle; spikelets compressed laterally, spreading fan-wise at summit, with 3-8 rather distant and divergent stipitate florets; rhachilla disarticulating; glumes persistent, very unequal, acute, the 1st small, 1-nerved, the 2nd keeled, not awned (in S.Aust. species); lemmas subulate, firm, narrow, rounded on back, obscurely 5-nerved, terminating in a conspicuous slender, straight awn. About 30 species from the Americas and Mediterranean. (Key partly from Willis (1970) *A handbook to plants in Victoria*.)

1. Lemmas ciliate on the margins, at least on the upper parts of the uppermost lemmas.
2. Inflorescence very bristly; lemmas covered all over the dorsal surface with stiff shortish hairs and their margins ciliate in their full length from base to apex *V. ciliata* 2.
2. Inflorescence not bristly; lemmas furnished with long hairs only in the apical third *V. megalura* 3.
1. Lemmas scabrous or glabrous on margins.
3. Panicle long-exserted; 1st glume 2-5 mm long, at least half the length of 2nd *V. bromoides* 1.
3. Panicle only very shortly exserted or its base enclosed in upper leaf-sheath; 1st glume 0-2 mm long, less than half the length of 2nd (usually less than a third).
4. Inflorescence erect; glumes 1 or 2, the 2nd linear-lanceolate; lemma with wide hyaline margin *V. membranacea* 4.
4. Inflorescence nodding; glumes 2, both setaceous or the upper subulate; lemma without hyaline margin *V. myuros* 5.

*1. *V. bromoides* (L.) Gray, *Nat. arr. Brit. Pl.* 2:124 (1821). **Squirrel-tail fescue, rat's-tail fescue.** (Ill. N. T. Burbidge (1968)) *Australian plants* 2, pl. 38). Glabrous slender annual, usually somewhat decumbent at the base, 10-50 cm high; leaf blades setaceous; culms strongly ribbed; panicle exserted beyond leaf-sheaths, erect, narrow, 2-10 cm long; spikelets 4-7-flowered, 6-10 mm long; 1st glume 2.5-4 mm long, subulate; the 2nd about twice as long, lanceolate; lemmas 6-8 mm long, terete, with an awn to twice as long.—*Festuca bromoides* L., *Sp. Pl.* 75 (1753); *V. sciurioides* (Roth) Roth ex C. C. Gmel., *Fl. Bad.* 1:9 (1806).

Native to Europe, Asia, Africa and North America, naturalised in all Australian States except N.T. Recorded in S.Aust. from the Flinders Ranges, Eyre Pen., Northern and Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers Oct.-Jan.

Described by N. T. Burbidge (1968) as common in native pastures, especially on the better drained soils, with the young growth only being grazed. May cause irritation to sheep and reduce the value of the wool.

*2. *V. ciliata* (Pers.) Link, *Hort. bot. Berol.* 1:147 (1827). **Fringed fescue.** Glabrous slender annual, 10-40 cm high; leaf-blades setaceous; culms not strongly ribbed; panicle sheathed at the base by the uppermost leaves, 6-20 cm long; spikelets 3-7-flowered; 1st glume c. 0.5 mm long, the 2nd 2-3 mm long; lemmas c. 6 mm long, with long cilia on the margins and an awn 8-10 mm long.—*Festuca ciliata* Pers., *Syn. Pl.* 1:94 (1805).

Native to the Mediterranean, naturalised in Vic. and S.Aust. where it has been recorded from the S.E. (Upper) and Southern Lofty regions.

Flowers Oct.-Nov.

*3. *V. megalura* (Nutt.) Rydb., *Bull. Torrey bot. Club* 36:538 (1909). **Fox-tail fescue.** Erect annuals usually less than 60 cm high; leaf-blades setaceous; culms not strongly ribbed; panicle 5-20 cm long not bristly; 1st glume 0.5-2 mm long, the 2nd 3-7 mm long; lemmas with cilia confined to the apical third of the margin of at least the uppermost lemmas.—*Festuca magalura* Nutt., *Proc. Acad. nat. Sci. Philad.* new ser. 1:188 (1848).

Native to the Americas, naturalised in Qld, N.S.W., Vic. and S.Aust. (Encounter Bay in the Southern Lofty region).

Flowers Sept.-Nov.

*4. *V. membranacea* (L.) Dumort., *Obsns Gram. Fl. Belg.* 100 (1823). **Dune fescue.** A slender annual, usually somewhat decumbent at the base, 10-60 cm high; leaf-blades setaceous; culms ribbed; panicle only very shortly exserted or its base enclosed in the base of the uppermost leaf,

erect, dense, simple or rarely slightly branched at the base, 2-12 cm long; spikelets 10-15 mm long; 1st glume 0 or very small, 2nd linear-lanceolate, 10-15 mm long; lemmas subulate, 8-15 mm long, with an awn 2-3 times as long as the lemma.—*Stipa membranacea* L., *Sp.Pl.* 560 (1753).

Native to Europe and the Mediterranean, naturalised in W.Aust., Qld, N.S.W., Vic. and S.Aust. (only recorded from the Upper S.E. region).

Flowers Oct.-Nov.

Occurs on dunes near the sea.

*5. *V. myuros* (L.) C.C. Gmel., *Fl.Bad.* 1:9 (1806). **Rat's-tail fescue.** (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 41). Glabrous slender annual, 20-50 cm high, sometimes dwarfed in dry country; leaf-blades setaceous, the sheaths covering the stem to the base of the panicle; culms obscurely ribbed; panicle spike-like, narrow, unilateral and often arched, sometimes interrupted towards the base, 5-30 cm long; spikelets 4-6-flowered, 7-10 mm long; 1st glume 0.5-2 mm long, the 2nd 4-5 mm long; glumes setaceous or the 2nd subulate; lemmas glabrous, 6-7 mm long; awn 10-15 mm long.—*Festuca myuros* L., *Sp.Pl.* 74 (1753).

Native to Europe, North Africa and Asia, naturalised in N.S.W., Vic., Tas, and S.Aust. (Flinders Ranges, Eyre Pen., Yorke Pen., Northern and Southern Lofty, Murray and S.E. regions).

Flowers Aug.-Dec.

A weed of disturbed ground, of no grazing importance, but a cause of skin irritation to stock.



Fig. 113—*Vulpia myuros*.

TRIBE 11.—AVENEAE

43. AIRA L.

Sp.Pl. 63 (1753).

(Greek name for darnel.)

Glabrous annual herbs; leaves short, narrow; ligule lanceolate, glabrous; inflorescence a compound panicle; spikelets 2-flowered, the rachilla not continued; glumes 2, as long as or longer than the spikelet; persistent, membranous, keeled, 1-nerved; lemma subterete, acuminate, bifid, hyaline, with a fine dorsal geniculate awn; callus very short, bearded. 12 species from Europe, Asia and Africa. (Description partly from Clapham, Tutin & Warburg (1962) *Flora of the British Isles*).

*1 *A. caryophylla* L., *Sp.Pl.* 66 (1753). **Silvery hair-grass.** (Ill. N.T. Burbidge (1966) *Australian grasses* 1, pl. 15). Slender, erect annual, 10-30 cm high; sheaths scabrid; panicle 2-10 cm long, loose, broadly ovate, branches very much longer than spikelets; spikelets 2.5-3 mm long; glumes longer than florets, serrate on keel; lemmas scabrid towards the top.

Native to Europe, Africa and Asia, naturalised in all Australian States except N.T. Recorded in S.Aust. from the Eyre Pen., Yorke Pen., Northern and Southern Lofty, Murray and S.E. regions.

Flowers Sept.-Dec.

Widespread in grass lands, not of significance for grazing.

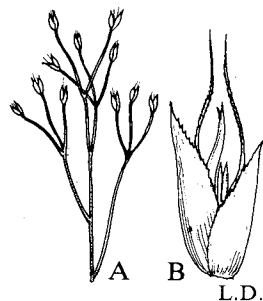


Fig. 114—*Aira caryophylla*. A, inflorescence natural size; B, spikelet.

44. AMPHIBROMUS Nees

Hook.Lond.J.Bot. 2:420 (1843).(Greek *amphi*, about; *Bromus*, a grass genus; near the genus *Bromus*.)

Perennials; leaf-blade flat or convolute; ligule glabrous, lanceolate and prominent; inflorescence an elongate panicle; spikelets compressed laterally, several-flowered, the rachilla articulate between the lammas and ending in a short hairy bristle; glumes acute or obtuse, persistent, glabrous except on the minutely denticulate margins, the 1st sub-3-nerved, the 2nd sub-5-nerved, both shorter than the spikelet; lemmas stiff, rounded on back, 5-7 nerved, more or less toothed at the summit, with a bent dorsal awn more or less twisted on the column; the basal callus short, blunt, bearded. 9 species from South America, New Zealand and Australia.

1. Glumes unequal; spikelets 3-4-flowered; lemma ending in 2 long and 2 short bristle-like teeth into which the nerves are produced; awn about 15 mm long *A. archeri* 1.

1. Glumes subequal; spikelets 4-7-flowered.
2. Lemma irregularly toothed, the nerves not reaching the summit; awn 12-18 mm long *A. neesii* 2.

2. Lemma ending in 4 acute, equal, lanceolate teeth, into which the nerves are produced; awn 10-15 mm long *A. recurvatus* 3.

1. *A. archeri* (Hook.f.) P.F. Morris, *Victorian Nat.* 51:146 (1934). **Pointed swamp wallaby-grass.** Stems weak, often under 1 m high; leaves mostly filiform, rather stiff, scabrous; panicle narrow, but loose, with distant capillary erect branches naked towards the base, the whole panicle c. 15-30 cm long; spikelets few on each branch, 3-4-flowered, 9-12 mm long (without the awns); 1st glume 4-5 mm long, the 2nd 6-8 mm long; lower lemmas 7-8 mm long, 5-nerved, the 4 lateral scabrous nerves prominent in the upper part and running into 4 unequal bristle-like teeth or short awns; the 2 inner teeth c. 2 mm long, the 2 outer at first only minute points, but all lengthening as the delicate uniting tissue breaks down; awn reddish, 15-17 mm long, inserted above middle; palea ovate-oblong, scarcely more than half as long as the lemma; the back of the lemma sometimes splits below the 2 longer teeth down to the base of the awn, which then appears terminal instead of dorsal.—*Danthonia archeri* Hook f., *Fl.Tasm.* 2:122 (1858).

Occurs in Vic., Tas. and S.Aust. (Southern Lofty and S.E. regions).
Flowers Oct.-Jan.

Said by Black to be a rare grass. All specimens probably belong to var. **papillosus** P. F. Morris, *Victorian Nat.* 51:147 (1934). This variety is characterised by having papillose lemmas, but the S.Aust. material varies from densely papillose to scarcely papillose and the limited number of specimens suggest that this variety may be poorly defined.

2. *A. neesii* Steud., *Synops.Pl.glumac.* 1:328 (1854). **Swamp wallaby-grass.** (Ill. N. T. Burbidge (1968) *Australian grasses* 2, pl. 15). Stems weak, 40 cm to over 1 m high; leaf-blades flat and narrow or filiform-involute, 5-25 cm long, scabrous above; panicle narrow but very loose, with distant capillary erect branches naked towards base; the lower branches 2-10 cm long; whole panicle 15-30 cm long; spikelets 10-15 mm long without the awns, 4-7-flowered, the 1st glume 4-5 mm long, the 2nd 5-6 mm long; lower lemmas 5-7 mm long, with 5-7 scabrous nerves, the summit rounded, ciliolate, jagged, with 2 very short obtuse or acute central teeth, the lower part of the back minutely papillose, the awn attached just above the middle and 12-18 mm long; palea slightly shorter, acute curved.—*Avena nervosa* non Lam., sensu R.Br., *Prod.Fl. Nov. Holl.* 178 (1810); *Amphibromus nervosus* sensu J. M. Black, *Fl.S.Aust.* 73 (1922).



Fig. 115—*Amphibromus archeri*. A, spikelet, x 3; B, lemma, x 3.

Avena nervosa non Lam., sensu R.Br., *Prod.Fl. Nov. Holl.* 178 (1810); *Amphibromus nervosus* sensu J. M. Black, *Fl.S.Aust.* 73 (1922).

Occurs in all Australian States except N.T. and Qld. Recorded in S.Aust. from the Flinders Ranges, Eyre Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers Oct.-Jan.

Grows in swampy places. Said by N. T. Burbidge (1968) to be palatable, but of limited significance.

3. *A. recurvata* Swall., *Amer.J.Bot.* 18:413 (1931). **Dark swamp wallaby-grass.** Stems erect to 50 cm high; leaf-blades involute-subulate or flat towards base; panicle narrow and rather dense, 8-15 cm long, the lower branches erect, 1-3 cm long; spikelets 7-10 mm long (without awns), 4-7-flowered; 1st glume 3-5 mm, the 2nd 4-5 mm long; lemmas 4-5 mm long, 5-nerved, minutely scabrous, the summit usually reddish and consisting of 4 small lanceolate subequal ciliolate teeth; palea nearly as long; awn bent, reddish, 10-15 mm long, attached above middle of glume.

Occurs in Vic., Tas. and S.Aust.; only recorded from the S.E. region.

Flowers Dec.-Jan.

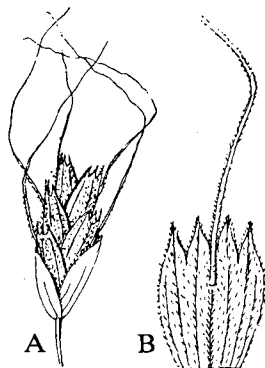


Fig. 116—*Amphibromus recurvata*. A, spikelet, x 3; B, lemma, x 5.

45. ANTHOXANTHUM L.

Sp.Pl. 28 (1753).

(Greek *anthos*, flower; *xanthos*, yellow; colour of the panicle after flowering.)

Sweetly scented perennials or annuals; leaf-blade flat; ligule membranous; inflorescence a raceme or narrow spike-like panicle; spikelets 1-flowered, compressed laterally, sessile; glumes unequal, acute, persistent, the 1st small, 1-nerved, the 2nd 3-nerved; empty lemmas 2, acute, persistent, smaller than glumes, notched and awned, hairy, villous; fertile lemma 1, still smaller, glabrous; palea 1-nerved; stamens 2. About 20 species from Europe, Africa and Asia.

*1. *A. odoratum* L., *Sp.Pl.* 28 (1753). **Scented vernal grass.** (Ill. N.T. Burbidge (1968) *Australian grasses* 2, pl. 36). Perennial, with flat, glabrous or hairy leaf-blades; stems slender, 30-80 cm high; panicle 4-7 cm long; spikelets 7-8 mm long; glumes green-nerved, glabrous or villous, the 1st about half as long as the 2nd; 1st lemma with a short dorsal awn, the 2nd with a bent awn from near the base and about as long as the spikelet.

Native to Europe and Asia, naturalised in all Australian States except N.T. Recorded from the Southern Lofty and S.E. regions.

Flowers Oct.-Jan.

Not regarded as palatable.

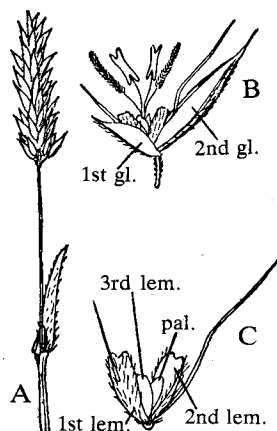


Fig. 117—*Anthoxanthum odoratum*. A, inflorescence; B, spikelet; C, spikelet, glumes removed.

46. ARRHENATHERUM Beauv.

Agrost. 55 (1812).

(Greek *arrhēn*, male; *athēr*, awn; alluding to the awn of the male floret.)

Tall slender perennials; leaf-blade linear; ligule hyaline; inflorescence a panicle; spikelets compressed laterally, 2-flowered, both florets sessile and hairy at base, the lower one male, with an exserted bent dorsal awn and twisted column, the



Fig. 118—*Arrhenatherum elatius*.



Fig. 119—*Avellinia michelii*. A, habit, $\times \frac{1}{2}$; B, spikelet, $\times 2\frac{1}{2}$.

upper one bisexual and fertile, with a short straight awn; rhachilla ending in a slender bristle; glumes unequal, membranous, acute, glabrous, the 1st 1-nerved, the 2nd 3-nerved; lemmas acute, thin, 5-nerved. 6 species from Europe and the Mediterranean.

*1. *A. elatius* (L.) J. & C. presl, *Fl. Czech.* 17 (1819). **False-oat.** (Ill. N.T. Burbidge (1970) *Australian grasses* 3., pl.14). Erect, stout, almost glabrous perennial to over 1 m high, with 2-3 bulbous swellings at base of stem; leaves flat, with short truncate ligule; panicle narrow but loose, 12-30 cm long; the 1st glume 6 mm long, the 2nd 9 mm long and as long as the florets; male lemma with awn rising from near the base and 18 mm long; bisexual lemma shortly awned near the summit.—*Avena elatior* L., *Sp.Pl.* 79 (1753); *Holcus avenaceus* Scop., *Fl. Carn.* 276 (1772); *Arrhenatherum avenaceum* (Scop.) Beauv., *Agrost.* 55 (1812).

Native to Europe and Asia, naturalised in all Aust. States except N.T. Recorded in S.Aust from the Northern and Southern Lofly and S.E. regions.

Flowers Dec.

The variety in S.Aust. is var. **bulbosum** (Willd.) Spenner, *Fl. Friburg* 1:113 (1825) (**onion twitch**), characterised by having swollen tuberous basal nodes.—*Avena bulbosa* Willd., *Neue Schr. Ges. naturf. Freund. Berl.* 2:116 (1799); *Avena tuberosa* Gilib., *Excercit. Phytol.* 2:538 (1792).

Formerly used as a pasture grass, but has become a weed in parts.

47. *AVELLINIA* Parl.

Pl. Nov. 59 (1842).

(After Giulio Avellino, a Neapolitan botanist.)

Small annuals; leaves more or less setaceous; ligule of hairs; inflorescence a loose panicle; spikelets solitary, pedicellate; rhachilla disarticulating above the glumes and between the florets, usually 3-4 flowered; glumes very unequal, the 1st very short and bristle-like, 1-nerved, the 2nd 3-nerved; lemmas all fertile., with inrolled margins so as to appear cylindrical and very narrow, inconspicuously 1-3-nerved, shortly bifid, awned; awn scabrid, short, straight; palea bifid, 2-keeled. 1 species from the Mediterranean. (Airy Shaw (1966) *A dictionary of the flowering plants and ferns*, gives the correct name as *Colobanthium* Reichb., but this name has not been widely used.)

*1. *A. michelii* (Savi) Parl., *Pl. Nov.* 61 (1842). **Avellinia.** Small slender annual, 5-30 cm high; leaves pubescent, to 5 cm long; panicle narrow, to 10 cm long; spikelets c. 5 mm long; 1st glume 1-1.5 mm long, 2nd 4-5 mm long; lemmas 4 mm long; awn c. 2 mm long.—*Bromus michelii* Savi, *Bot. Etrusc.* 1:78 (1808); *Koeleria michelii* (Savi) Coss., *Expl. Scient. Alger.* 2:120 (1867).

Native to the Mediterranean, naturalised in W.Aust., Vic. and S.Aust. (Lake Eyre, Eyre Pen., Yorke Pen., Northern and Southern Lofly, Murray, Kangaroo I. and S.E. regions).

Flowers Sept.-Nov.

48. AVENA L.

Sp.Pl. 79 (1753).

(The Latin name for oat.)

Annuals; leaf-blade flat; ligule hyaline; inflorescence a panicle; spikelets compressed laterally, 2-3-flowered, the upper florets stalked; glumes 2, large, persistent, keeled, membranous, 7-9-nerved; lemmas stiff, convex, faintly nerved, bifid, with a long bent and twisted awn rising from its back. About 70 species, cosmopolitan.

1. Lemmas covered with long silky hairs on their lower half, column of awn twisted and turning back.
2. Lemmas with 2 long bristles *A. barbata* 1.
2. Lemmas shortly bifid.
3. 2nd floret not scarred at base, not or only tardily separating (rhachilla not articulated); glumes more than 25 mm long, awns 5-7.5 cm long; the 3rd lemma (if present) awnless ... *A. ludoviciana* 3.
3. 2nd floret with a callus-scar at the base, breaking off readily (rhachilla articulated); glumes c. 25 mm long, awns less than 5 cm long; the 3rd lemma (if present) awned *A. fatua* 2.
1. Lemmas glabrous; column of awn scarcely twisted and not turning back *A. sativa* 4.

*1. *A. barbata* Pott ex Link, *Schrad.J.Bot.* 2:315 (1799). **Bearded oat.** (Ill. N.T. Burbidge (1966) *Australian grasses* 1, pl. 14). Annual, with flat leaves and a loose 1-sided panicle; spikelets large, very open, drooping from long pedicels, with 2-3 florets; glumes rather unequal; lemmas with long white hairs and ending in 2 long scarious bristles, so that the floret is at least twice as long as the 1st glume; all florets awned.—*A. alba* non Vahl, sensu Willis, *A handbook to plants in Victoria* 124 (1970).

Native to the Mediterranean, naturalised in W.Aust., N.S.W., Vic. and S.Aust. (Nuyts Archipelago and the Flinders Ranges, Eyre Pen., Northern and Southern Lofty, Kangaroo I. and S.E. regions).

Flowers can occur at most times but usually Sept.-Jan.

A common weed of disturbed land.

*2. *A. fatua* L., *Sp.Pl.* 80 (1753). **Wild oat.** (Ill. N. T. Burbidge (1968) *Australian grasses* 2, pl. 12). Annual, with flat leaves and a loose pyramidal panicle; spikelets large, very open, drooping from long filiform pedicels, with 2-3 florets, all or the 2 lower ones awned; rhachilla villous, articulated between florets; glumes subequal, c. 25 mm long, longer than the florets; lemmas golden-brown, covered with long hairs, rarely subglabrous, shortly bifid so as to end in 2 fine teeth; awn twice as long as the spikelet.

Probably native to the Mediterranean, but widely naturalised, including all Australian States. Recorded in S.Aust. from Nuyts Archipelago and the Lake Eyre, Gairdner-Torrens, Flinders Ranges and Northern and Southern Lofty regions.

Flowers can occur at any time, but usually Sept.-Dec.

A common weed of disturbed land. Palatable when young.

*3. *A. ludoviciana* Dur., *Bull.Soc.Linn.Bord.* 20(1):41 (1855). **Wild oat.** Annual, to 1.5 m high with flat glabrous or scabrid leaves and a loose pyramidal panicle 15-45 cm long; spikelets 25-30 mm long, very open, drooping from long filiform pedicels, with 2-3 florets, the 2 lower ones awned;



Fig. 120—*Avena*. A. *fatua*: A, inflorescence; B, spikelet; C, floret. A. *barbata*: D, floret.

rhachilla not articulated between the florets; lemmas ovate, the 1st two-thirds clothed with long silky hairs.—*A. sterilis* L. subsp. *ludoviciana* (Dur.) Gillet & Magne, *Fl. Franc.* 532 (1875).

Native to Europe and Asia, naturalised in Qld, N.S.W., Vic. and S.Aust. Recorded from the wheat belt by Symon (1964) *Trans.R.Soc.S.Aust.* 88:5.

A weed of cereal fields.

*4 *A. sativa* L., *Sp.Pl.* 79 (1753). **Cultivated oat.** Annual, 30-60 cm high, with flat leaves and a loose pyramidal panicle to 20 cm long; spikelets usually 2-flowered; rhachilla glabrous or hairy below the 1st floret, the 2nd floret not disarticulating readily; glumes usually 25-30 mm long; lemmas glabrous, shortly 2-toothed at the top, the 1st floret usually with a dorsal awn twice as long as the spikelet, the 2nd floret awned or awnless.

Native to Europe, naturalised in all Australian States except N.T. Recorded in S.Aust. from the N.W., Yorke Pen., Northern and Southern Lofty and S.E. regions.

Flowers Sept.-May.

Widely cultivated and occasionally naturalised.

49. DESCHAMPSIA Beauv.

Agrost. 91 (1812).

(After Dr Deschamps, of Saint-Omer.)

Tufted, glabrous perennials; leaf-blades usually flat; inflorescence a loose panicle, much-branched; spikelets compressed laterally, 2-flowered, the 1st floret sessile, the 2nd stalked; the rhachilla continued in a hairy bristle which sometimes bears a rudimentary floret; callus small, shortly bearded around the base of the florets; glumes subequal, acute, membranous, persistent, 1-3-nerved; lemmas thin, truncate-denticulate, glabrous, with a slender dorsal awn. About 60 species of temperate and cold areas.

1. *D. caespitosa* (L.) Beauv., *Agrost.* 91 (1812). (Ill. N. T. Burbidge (1966) *Australian grasses* 1, pl. 9). Stout, glabrous, tufted perennial, 30 cm to over 1 m high; leaves long, stiff, setaceous-involute or flattened towards the base; ligule lanceolate, glabrous, 3-6 mm long; panicle 15-25 cm long, the long lower spreading branches whorled; glumes 3-6 mm long, the 1st 1-nerved, the 2nd 3-nerved; lemmas rather shorter, with a straight awn inserted near the base and about as long as them, the upper stalked lemma slightly exceeding the glumes.—*Aira caespitosa* L., *Sp.Pl.* 64 (1753).

Occurs in temperate and arctic regions of Europe, Asia, Africa, North America, New Zealand, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty region).

Flowers Sept.-Jan.

Not considered to be of significance in grazing.

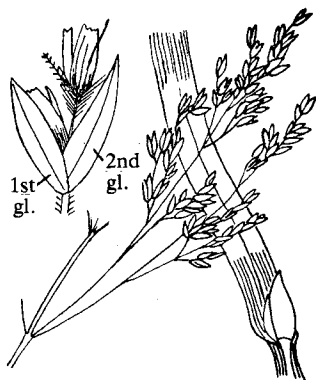


Fig. 121—*Deschampsia caespitosa*.

50. HOLCUS L.

Sp.Pl. 1047 (1753).

(Latin form of Greek *holkos*, some species of grass.)

Pubescent perennials; leaf-blade flat; ligule truncate; inflorescence a compound panicle; spikelets laterally compressed, 2-flowered; both florets stalked, the 1st one bisexual and awnless, the 2nd male with a dorsal awn; glumes subequal, deciduous with the 2 florets keeled, the 1st 1-nerved, the 2nd 3-nerved; lemmas smaller, obtuse; the

pedicel disarticulates below the lemmas so that the spikelet falls off as a whole. About 8 species from Europe, Asia and North Africa.

*1 *H. lanatus* L., *Sp.Pl.* 1048 (1753). **Yorkshire fog.** (Ill. N. T. Burbidge (1968) *Australian grasses* 2, pl. 25). Erect to 1 m, softly villous perennial; leaves flat, soft, with a truncate, torn ligule; panicle 8-15 cm long, 2-3 cm broad, ovoid-oblong, pubescent, varying from light pink to violet; spikelets crowded; glumes 4-5 mm long, boat-shaped, downy, enclosing the flowers the 2nd obtuse, mucronate; lemmas rather smaller, the male one with a short dorsal awn.

Native to the temperate areas of Europe, Asia and North Africa, naturalised in all Australian States except N.T. Recorded in S.Aust. from the Southern Lofty, Murray and S.E. regions.

Flowers can occur throughout the year, but usually Aug.-Dec.

Occurs in wet localities in settled districts.

51. KOELERIA Pers.

Syn.Pl. 1:97 (1805).

(After G. L. Koeler, a German botanist.)

Glabrous or pubescent annuals or perennials; leaf-blades flat; inflorescence a narrow panicle; spikelets compressed laterally, 2-6-flowered; rhachilla of spikelet disarticulating; glumes slightly unequal, persistent, membranous, the 1st 1-nerved, narrow, the 2nd 3-nerved; lemmas 3-5-nerved, the lowest sessile, the others pedicellate on the lengthened articles of the rhachilla, the lateral nerves faint, shortly awned in the notch or sometimes merely acuminate, the upper flowers gradually smaller and the terminal one barren or reduced to a bristle; palea narrow, with 2 sharp erect teeth. About 60-100 species cosmopolitan. Agreement has not been reached on the boundaries of this genus.

*1 *K. phleoides* (Vill.)Pers., *Syn.Pl.* 1:97 (1805). **Annual cat's tail.** (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 53). Ascending annual, with somewhat hairy leaves; panicle dense, spike-like, 1-15 cm long, when large slightly lobed, cylindrical or oblong, silvery; spikelets 3-4 mm long, 4-6-flowered; glumes sprinkled with some long hairs, shorter than the flowers, subequal, c. 3-4 mm long; lemmas c. 3 mm long, 5-nerved, papillose or almost smooth on back, notched at summit and with a straight awn 1-2 mm long, rising between the 2 teeth of the notch; palea about three-quarters as long.—*Festuca phleoides* Vill. in Gilib., *Syst. Pl.Europ.* 1, *Fl.Delph.* 7 (1785); *Lophochloa phleoides* (Vill.)Reichb., *Fl.Germ.Excurs.* 42 (1830).

Native to the Mediterranean, naturalised in all Aust. States except N.T. Recorded in S.Aust. from the Nuyts Archipelago and the Flinders Ranges, Eyre Pen., Yorke Pen., Northern and Southern Lofty, Murray and S.E. regions.

Flowers Sept.-Jan.

Put, by some authors, in *Lophochloa* but probably better known as *Koeleria*. Resembles *Polypogon monspeliensis* which is more bristly and has 1-flowered spikelets.

A weed of disturbed places. Of negligible grazing value.

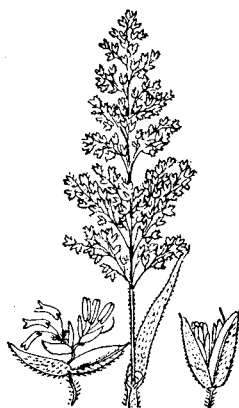


Fig. 122—*Holcus lanatus*.

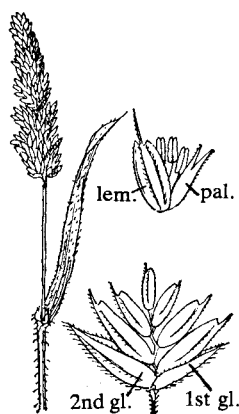


Fig. 123—*Koeleria phleoides*.

52. PERIBALLIA Trin.

Fund. Agrost. 133 (1820).(Perhaps from the Greek *peri*, around; *ballō*, to throw; unexplained by the author.)

Glabrous annuals; leaf-blade flat; inflorescence an open panicle; spikelets 2-flowered, the rhachilla not continued; glumes 2, persistent, spreading, membranous, keeled, 1-nerved; lemmas awnless, truncate, 5-nerved and very shortly and irregularly toothed at summit, slightly longer than the glumes; callus very short, bearded. ?Monotypic.

*1. *P. minuta* (L.) Aschers. and Graebner, *Syn. Mitteleur. Fl.* 2:298 (1899). **Small hair-grass.** Erect, 3-10 cm high, with slender stems and short linear leaves; panicle small, 1-3 cm long, loose, with capillary spreading branches; spikelets ovoid, coloured, shining, distant; glumes green and purplish, 1.5 mm long, a little shorter than the florets, the upper florets shortly stalked; lemmas truncate-denticulate, awnless.—*Aira minuta* L., *Sp. Pl.* 64 (1753); *Molineria minuta* (L.) Parl., *Fl. Ital.* 1:237 (1850); *Molineriella minuta* (L.) Rouy, *Fl. Franc.* 14:102 (1913).

Native to the Mediterranean, naturalised in W. Aust., N.S.W., Vic. and S. Aust. (Flinders Ranges, Southern Lofty and Murray regions).

Flowers Aug.-Oct.



Fig. 124—*Periballia minuta*.

53. TRisetum Pers.

Syn. Pl. 1:97 (1805).

(Latin *tres*, three; *seta*, bristle; the lemma bears a dorsal awn and in some species there is also a short awn or mucro on each side of the 2 terminal teeth.)

Perennials or annuals; leaf-blade flat; inflorescence a contracted or lax panicle; spikelets compressed laterally, 2-6-flowered; rhachilla disarticulating, the articles above the lowest sessile floret being usually villous along one side and at the summit so that the upper florets appear bearded at the base; glumes persistent, membranous, the 1st 1- or 3-nerved, the 2nd 3-nerved; lemmas 3-5-nerved, the

lowest sessile, the others pedicellate, acutely 2-toothed, sometimes with fine bristles from the teeth, with an awn rising slightly below the terminal notch; awn straight or geniculate; palea narrow, with 2 sharp erect teeth. About 75 species from temperate areas.

*1. *T. pumilum* (Desf.) Kunth, *Rev. Gram.* 102 (1829). **Tiny bristle-grass.** (Ill. Meredith (1955) *The grasses and pastures of S. Africa*, fig. 55). Annual, usually small, with ascending stems; leaf-sheaths pubescent; spikelets 3-4-flowered, 4 mm long, in a spike-like but rather loose panicle of 1.5 cm; rhachilla with tufts of hairs half as long as the lemmas and ending in a hairy bristle; glumes subequal, densely pubescent, 3-nerved, shorter than the florets; lemmas 5-nerved, 2-toothed, with a slender awn rising just below the notch formed by the teeth and about half as long as the lemma.—*Avena pumila* Desf., *Fl. Atlant.* 1:103 (1798); *Trisetaria pumila* (Desf.) Maire, *Bull. Soc. Hist. nat. Afr. N.* 33:93 (1942); *Lophochloa pumila* (Desf.) N.L. Bor., *Grasses of Burma, Ceylon, India and Pakistan* 445 (1960).

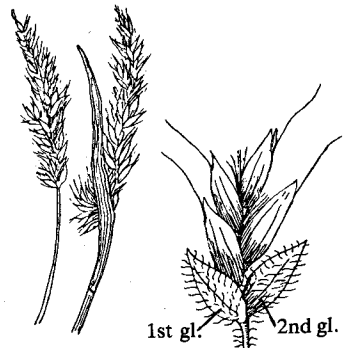


Fig. 125—*Trisetum pumilum*.

Native to the Mediterranean, Asia and possibly S. Africa, naturalised in W.Aust., N.S.W., Vic. and S.Aust. (N.W., Lake Eyre, Gairdner-Torrens, Flinders Ranges, Eastern, Eyre Pen. and Murray regions).

Flowers July-Oct.

TRIBE 12—PHALARIDEAE

54. PHALARIS L.

Sp.Pl. 54 (1753).

(Old Greek name, from *phalos*, shining; alluding to the shining appearance of the lemma, or possibly in the alternative sense of the word meaning the ridge of a helmet.)

Annuals or perennials; leaf-blades flat; ligule conspicuous, oblong, glabrous; inflorescence a spike-like panicle; spikelets with 1 fertile flower, compressed laterally; glumes 2, equal, folded and flat, enclosing the rest of the spikelet, usually light green, with 3 conspicuously darker green nerves, strongly keeled, the keel more or less winged; sterile lemmas 2 (rarely absent), linear, smaller than the glumes; fertile lemma 1, 5-nerved, becoming crustaceous and shining; palea keeled, with 1 ciliate nerve. About 20 species from temperate areas. (Vickery, *Fl. N.S.W.* 19(2):283-293 (1975); descriptions partly from Gardner (1952) *Flora of Western Australia* 1).

1. Spikelets of 2 kinds; 1 fertile surrounded by 6 sterile, the group falling entire *P. paradoxa* 4.
1. Spikelets all fertile and alike, falling singly.
 2. Annual without rhizome.
 3. Panicle ovoid or ovoid-oblong; spikelets 7-8 mm long *P. canariensis* 2.
 3. Panicle oblong-cylindrical; spikelets 5-6 mm long *P. minor* 3.
 2. Perennial with a rhizome *P. aquatica* 1.

*1. *P. aquatica* L., *Amoen.Acad.* 4:264 (1755). **Toowoomba canary-grass.** Glabrous perennial, to 50 cm or more high, with erect culms; panicle cylindrical, dense, somewhat tapered towards the ends and sometimes broader below, 5-12 cm long; spikelets 6-7 mm long; glumes subequal, 3-nerved, the lateral nerves prominent, the keel produced into a wing; sterile lemmas subequal, to one-third the length of the glumes; fertile lemma appressed-silky hairy.—*P. tuberosa* L., *Mant.Pl.* 2:557 (1771) var. *stenoptera* (Hack.) Hitchc., *J.Wash.Acad.Sci.* 24:292 (1934); *P. stenoptera* Hack., *Reprum Nov.Spec.Regni veg.* 5:333 (1908).

Native to the Mediterranean; cultivated and naturalised in many countries and all Australian States except N.T. and Tas. Recorded in S.Aust. from near Adelaide (Southern Lofty region) and the S.E. region.

Flowers Nov.-Jan.

*2. *P. canariensis* L., *Sp.Pl.* 54 (1753). **Canary-grass.** Glabrous annual, to 50 cm high, with erect or geniculate culms; panicle ovoid or ovoid-oblong, dense, 1.5-4 cm long; spikelets 7-8 mm long; glumes with a winged keel, prominently 3-nerved, with broad membranous margins; sterile lemmas equal, half as long as the floret; fertile lemma hairy.

Native to the Mediterranean, naturalised in W.Aust., Qld., N.S.W., Vic. and S.Aust. (Flinders Ranges, Yorke Pen., Northern and Southern Lofty regions).

Flowers Sept.-Dec.

Grown for bird-seed and occasionally becoming naturalised.

*3. *P. minor* Retz., *Obs.Bot.* 3:8 (1783). **Lesser canary-grass.** (Ill. Meredith (1955) *The grasses and pastures of S. Africa*, fig. 61). Glabrous annual, to 50 cm or more high, with erect or geniculate culms; panicle oblong-cylindrical, dense, 2-6 cm long; spikelets 5-6 mm long; glumes with a winged keel, 3-nerved, with broad membranous margins; sterile lemmas 1 (the 1st missing), bristle-like, nearly half as long as the floret; fertile lemma hairy.

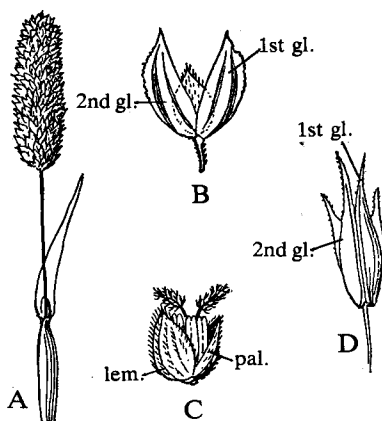


Fig. 126—*Phalaris*. *P. minor*: A, inflorescence; B, spikelet; C, flower. *P. paradoxia*: D, spikelet.

Native to the Mediterranean, naturalised in all Australian States except N.T. Recorded in S.Aust. from the Flinders Ranges, Eyre Pen., Yorke Pen., Southern Lofty, Murray and S.E. regions.

Flowers Oct.-Dec. or later.

Grown for bird-seed and naturalised more widely than *P. canariensis*.

*4. *P. paradoxa* L., *Sp.Pl.*, ed.2, 2:1665 (1763). **Paradoxa grass, paradoxical canary-grass.** (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 54). Glabrous annual, 30-50 cm high, with erect culms; panicle cylindrical, dense, 3-6 cm long; fertile spikelets terminal on the secondary branches and surrounded by an involucre-like group of 6 sterile spikelets; glumes of the fertile spikelets subequal, keeled, many-nerved, the margins not membranous; sterile lemmas (of fertile spikelets) minute and scale-like; fertile lemma almost glabrous.

Native to the Mediterranean, naturalised in all Australian States, except N.T. and Tas. Recorded in S.Aust. from the Southern Lofty and Kangaroo I. regions.

Flowers Nov.-Feb.

Of slight value for fodder.

TRIBE 13—AGROSTIDEAE

55. AGROSTIS L.

Sp.Pl. 61 (1753).

(Greek *agrōstis*, name of a grass.)

Annuals or perennials; leaf-blades flat, usually expanded or folded; inflorescence a loose or contracted panicle; spikelets 1-flowered, laterally compressed, with or without a short glabrous or hairy bristle continuing the rhachilla, rising at the base of the short callus and behind the palea; glumes 2, keeled, awnless, usually persistent; lemmas shorter, broad, membranous, truncate, awnless or with a slender dorsal awn; callus small, glabrous or bearded with a tuft of hairs not half as long as the lemma; palea hyaline, usually shorter than the lemma. Over 150 species, cosmopolitan. (Vickery (1941) *Contr.N.S.W.natn. Herb.* 1:101-119).

1. Bristle (rudimentary joint of rhachilla) present.
 2. Callus glabrous; awn absent; glumes c. 2.7 mm long *A. limitanea* 7.
 2. Callus bearded; awn present or, if absent, glumes c. 2 mm long.
 3. Lemma glabrous.
 4. Awn absent; glumes c. 2 mm long, teeth of lemma very short.
 5. Glumes scabrous on the keels, obscurely ciliate on the margins in the upper part, minutely and distantly scaberulous on the sides *A. aequata* 2.
 5. Glumes scabrous on the keels and sides, obscurely ciliate on the margins especially in the upper part *A. rudis* 8.
 4. Awn exserted, geniculate; glumes 5-7 mm long; teeth of lemma long. *A. billardieri* 4.
 3. Lemma hairy on back.

6. Glumes 2-3 mm long; panicle branches often drooping when young

A. avenacea 3.

6. Glumes c. 5 mm long; panicle branches not drooping

A. aemula 1.

1. Bristle absent.

7. Ligule 6 mm long, oblong

A. gigantea 6.

7. Ligule 2 mm long, truncate

A. capillaris 5.

1. *A. aemula* R.Br., *Prod.Fl.Nov.Holl.* 172 (1810). **Blown grass.** (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 10). Glabrous annuals, 25-60 cm high; leaf-blades linear, flat, scabrous, usually 3-4 mm broad; ligule 3-7 mm long, lanceolate, rather obtuse, laciniate, scabrous; panicle divaricately spreading, shortly exserted at maturity, rhachis and branches of panicle scabrous; spikelets 4-5 mm long, the glumes acuminate, scabrous on the nerves; lemmas c. 2 mm long, truncate, villous on back, the 4 short teeth or the 2 outer ones rather longer; awn 5-7 mm long, rising from about the middle of the back; palea rather shorter than the lemmas; callus shortly bearded; bristle short, hairy.

Occurs in all Australian States except N.T. Recorded in S.Aust. from the Eyre Pen., Yorke Pen., Northern and Southern Lofty and S.E. regions.

Flowers Sept.-Jan.

Not of significance in grazing.

2. *A. aequata* Nees, *Hook.Lond.J.Bot.* 2:412 (1843). Annuals, 60-70 cm high; leaf-blades narrow, flat, 1-5-2-5 mm broad; ligule 2-3 mm long, obtuse or laciniate, scabrous; panicle loose, 15-25 cm long, with spreading capillary branches, the lower whorled, the upper in pairs; rhachis and branches of panicle more or less scabrous; spikelets c. 2 mm long, glumes barely 2 mm long, scabrous on keels; lemmas shorter, truncate, glabrous, with 5 very short teeth and no awn; tuft a quarter as long as lemma; bristle short, plumose; palea as long as lemma.—*Deyeuxia aequata* (Nees) Benth., *Fl.Aust.* 7:578 (1878); *Calamagrostis aequata* (Nees) J. M. Black, *Fl.S.Aust.* 70 (1922).

Occurs in Vic. and Tas. Included by Black (1943) as likely to occur in S.Aust. and since collected twice in the extreme south of the S.E. region.

Flowers Feb.-March.

Considered by some authors to be a synonym for *A. rudis*.

3. *A. avenacea* Gmel., *Syst.Nat.* 1:171 (1791). **Blown grass.** (Ill. N. T. Burbidge (1968) *Australian grasses* 2, pl. 17). Glabrous annual, 20-70 cm high; leaf-blades linear, mostly flat, 2-4 mm broad; ligule 3-10 mm long, obtuse or rounded at summit; panicle often drooping when young, finally exserted from uppermost sheath and very loose, 10-30 cm long, with long whorled branches; rhachis and branches of panicle more or less scabrous; spikelets 2-5-3-5 mm long; glumes narrow, scabrous on keel, light-green or straw-coloured; lemmas nearly 2 mm long, truncate, villous on back, 4-nerved, with 4 short equal teeth at summit and a geniculate exserted awn 5-7 mm long rising from about the middle of the back; palea rather shorter; callus shortly bearded; bristle hairy.—*Avena filiformis* Forst.f., *Fl.Insul.Aust.Prod.* 9 (1786); *Agrostis filiformis* (Forst.f.) Spreng., *Fl.Hal.Mant.* 32 (1807), non Vill. (1787); *Calamagrostis filiformis* (Forst.f.) Cockayne, *Rep.Bot.Surv.TongariroNat.Park* 35 (1908); *Agrostis forsteri* Rich. ex Roem. and Schult., *Syst.Veg.* 2:359 (1817); *Deyeuxia forsteri* (Rich. ex Roem. and Schult.) Kunth, *Rev.Gram.* 1:77 (1829).

Occurs in New Zealand and all Australian States. Recorded in S.Aust. from the Lake Eyre, Flinders Ranges, Eastern, Yorke Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers usually Sept.-Jan.

Grazed when young.

4. *A. billardieri* R.Br., *Prod.Fl.Nov.Holl.* 1:24 (1804). var. **billardieri.** **Blown grass.** Glabrous annual, 15-45 cm high; leaf-blades flat, linear, very scabrous on the nerves, usually c. 20 cm long and 4-6 mm broad; ligule 4-8 mm long, obtuse, laciniate, scabrous; panicle divaricately branched, finally shortly exserted from uppermost sheath, becoming very loose and straw-coloured, 10-30

cm long, rhachis and branches of panicle very scabrous; spikelets 5-7 mm long; glumes scabrous on keel, the 1st rather longer; lemmas more than half as long (3.5-4.5 mm), glabrous except

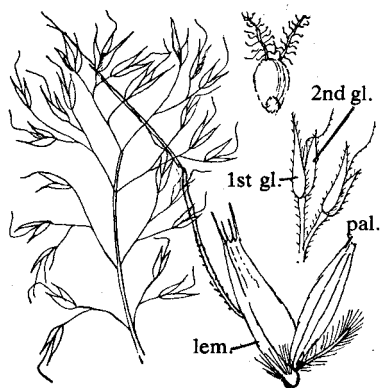


Fig. 127—*Agrostis billardieri*.

minute hairs on upper part of nerves, 4-nerved and 4-toothed, the 2 outer teeth much longer; awn geniculate, 7-8 mm long, rising from middle or below middle of back of lemma which is slightly longer than palea; callus shortly bearded; bristle plumose, half length of palea.—*Deyeuxia billardieri* (R.Br.) Kunth, *Rev.Gram.* 1:77 (1829); *Calamagrostis aemula* Steud. var. *billardieri* (R.Br.) Maiden and Betche, *Census N.S.W.Pl.* 21 (1916).

Occurs in New Zealand, N.S.W., Vic., Tas. and S.Aust. (Eyre Pen., Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Oct.-Feb.

A coastal variety, growing on the dunes.

Var. *filifolia* Vickery, *Contr.natn.Herb.N.S.W.* 1:110 (1941). Differs from var. *billardieri* in having narrow almost filiform leaves, 1-1.5 mm broad.

Occurs in Vic. and Tas. and recorded in S.Aust.

from Beachport and near Yallum in the S.E. region. Not littoral.

Flowers Sept.-Dec.

Var. *robusta* Vickery, *Contr.natn.Herb.N.S.W.* 1:110 (1941). Differs from var. *billardieri* in being taller (c. 60 cm high); leaves narrow, inrolled on drying and c. 25 cm long.

Occurs in Vic., Tas. and S.Aust. (S.E. region). Not littoral.

Flowers Feb.-March.

*5. *A. capillaris* L., *Sp.Pl.* 62 (1753). **Brown-top bent.** Tufted or rhizomatous perennial, usually 20-50 cm high; leaf blades flat, slightly scabrid; ligule c. 1 mm long, truncate or rounded; panicle 1-20 cm long, effuse, ovoid, cylindrical or pyramidal, loose during flowering; spikelets 2-3.5 mm long; glumes 2-2.5 mm long, lanceolate, acute, scabrous on keel; lemmas almost as long as the glumes, truncate, 3-nerved, glabrous or finely scabrid towards the base, awnless or with a very short awn from near the top; palea about half as long as the lemma; no beard or bristle.—*A. tenuis* Sibth., *Fl.Oxon.* 36 (1794); *A. vulgaris* With., *Bot.Arr.Veg.Brit.Isles* ed.3, 2:132 (1796).

Native to the northern hemisphere, naturalised in New Zealand and all Australian States, except N.T. and Qld. Recorded in S.Aust. from the Southern Lofty and S.E. regions.

Flowers Nov.-Feb.

The name of this species was discussed by S. Rauschert (1977) *Reprium nov.Spec.Regni veg.* 88:318.

*6. *A. gigantea* Roth, *Tent.Fl.Germ.* 1:31 (1788). **Red-top bent, creeping bent-grass.** Rhizomatous glabrous perennial, usually under 1 m high; leaf-blades flat, scabrous, 2-5 mm broad; ligule oblong, 5-6 mm long; panicle 5-20 cm long, oblong, lobed, loose during flowering; spikelets 2 mm long; glumes lanceolate, acute, toothed on the keel above; lemmas a quarter shorter than the glumes, truncate, glabrous, 4-nerved and minutely 4-toothed, awnless or rarely minutely awned; palea half as long; no beard or bristle on callus or a very short beard.—*A. alba* non L., sensu J. M. Black, *Fl.S.Aust.* 69 (1922).

Native to the northern hemisphere, naturalised in all Australian States except N.T. Recorded in S.Aust. from Nuriootpa (Northern Lofty region) and the Southern Lofty and S.E. regions.

Flowers Jan. (2 records).

Grows near water.

7. *A. limitanea* J. M. Black, *Trans. R. Soc. S. Aust.* 55:137 (1931). Glabrous tufted perennial, 30-45 cm high; stems and leaves erect, rather stiff, the blades involute-subulate and somewhat scabrous; ligule lanceolate, 4-6 mm long; panicle soon becoming loose, 8-20 cm long, with whorled capillary much divided branches; spikelets c. 3 mm long; glumes scabrous on keel, the 1st one rather longer; lemmas 1.75 mm long, glabrous, awnless, 4-5-nerved, denticulate at summit; palea rather shorter; callus glabrous; bristle about half as long as palea.

Occurs only in S. Aust. and known only from one collection from near Riverton in the Northern Lofty region.

Flowers March (1 record).

8. *A. rudis* Roem. & Schult., *Syst. Veg.* 2:360 (1817). **Bent.** Scabrous annuals, 60-80 cm high; leaf-blades flat, linear, 3-5-5 mm broad; ligule 1-3 mm long, obtuse; panicle very spreading, 20-25 cm long, with verticillate branches; rhachis and branches of panicle scabrous; glumes c. 2-5 mm long, scabrous on the keels and sides; lemmas glabrous, shortly 4-toothed, 5-nerved, sometimes with a short hair-like awn attached below the apex; palea slightly shorter than the lemma.—*A. scabra* R.Br., *Prod. Fl. Nov. Holl.* 172 (1810).

Occurs in Tas., ?Vic. and ?S. Aust. A few specimens from the S.E. region have been identified as *A. rudis*.

Flowers Dec.

Considered by some authors to be synonymous with *A. aequata*.

56. ALOPECURUS L.

Sp. Pl. 60 (1753).

(Greek *alōpēx*, a fox; *oura*, tail; shape of the spike-like panicle.)

Near glabrous, annuals or perennials; leaf-blade flat; ligule membranous; inflorescence a dense soft spike-like panicle; spikelets 1-flowered, laterally compressed; glumes 2, equal, compressed-keeled, 3-nerved; lemmas rather shorter, obtuse, 5-nerved, with a short dorsal awn bent and twisted below the bend; palea wanting; rhachilla of spikelet articulate below the glumes so that the whole spikelet falls off when ripe. About 50 species from temperate areas of the northern hemisphere.

1. Annuals; glumes united to one another to the middle *A. myosuroides* 2.
1. Perennials; glumes free almost to the base.
 2. Glumes obtuse, c. 3 mm long *A. geniculatus* 1.
 2. Glumes acute, 5-6 mm long . . . *A. pratensis* 3.

*1. *A. geniculatus* L., *Sp. Pl.* 60 (1753). **Marsh fox-tail.** Glabrous perennial, with ascending stems 15-40 cm high; panicle cylindrical, slender, 3-5 cm long, the lower branches bearing 2-4 spikelets; glumes 3-3.5 mm long, ciliate on the keel and lateral nerves with long hairs, almost free; lemmas truncate; awn 5-8 mm long, inserted below the middle of the lemma.—*A. australis* Nees, *Hook. Lond. J. Bot.* 2:412 (1843).

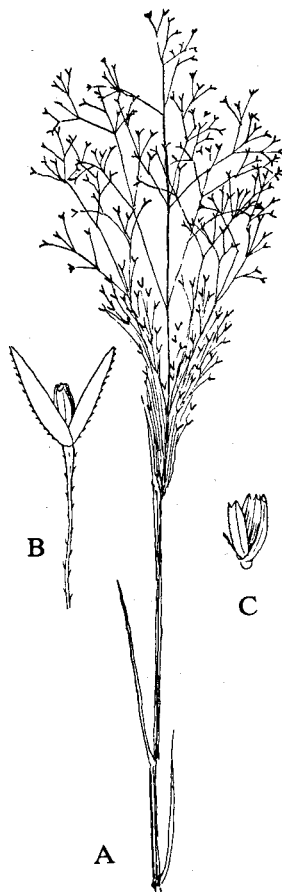


Fig. 128—*Agrostis limitanea*. A, inflorescence, $\times \frac{1}{2}$; B, spikelet, $\times 5$; C, flower, $\times 5$.

Probably native only to the northern hemisphere where it occurs in all continents, naturalised in all Australian States except N.T. Recorded in S.Aust. from the Lake Eyre, Gairdner-Torrens, Southern Lofty, Murray and S.E. regions.

Flowering records for Feb. and Aug.

*2. *A. myosuroides* Huds., *Fl. Angl.* 23 (1762). **Slender fox-tail, black twitch.** Glabrous annual, 20-70 cm high; panicle cylindrical, slender, attenuated at both ends, 5-9 cm long, the branches usually bearing only 1 spikelet; glumes 6-7 mm long, shortly ciliate on keel, united to the middle; lemmas acute; awn 10-12 mm long, inserted near the base of the lemma.—*A. agrestis* L., *Sp. Pl.* ed.2, 1:89 (1762).

Native to the northern continents, naturalised in W.Aust., Qld, Vic. and S.Aust. It was collected in 1918 in the S.E. region but there is no more recent specimen in AD. Similarly in Vic., where it was formerly regarded as widely spread, its status is uncertain. (Willis (1970) *A handbook to plants in Victoria.*)

*3. *A. pratensis* L., *Sp. Pl.* 60 (1753). **Meadow fox-tail.** Glabrous perennial, 30-90 cm high; leaves long; panicle 5-8 cm long, dense, cylindrical, blunt, silky; glumes 5-6 mm long, ciliate on the keel, united at the base; lemmas acute; awn slender, protruding, inserted above the base.

Native to Europe and Asia, naturalised in all Australian States except N.T. There are a few records in S.Aust. from the Southern Lofty and Murray regions.

Flowers Sept.-Dec.

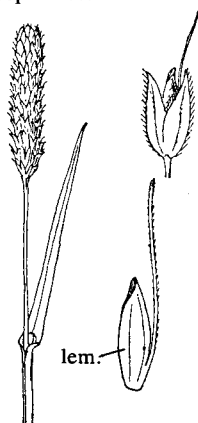


Fig. 129—*Alopecurus pratensis*.

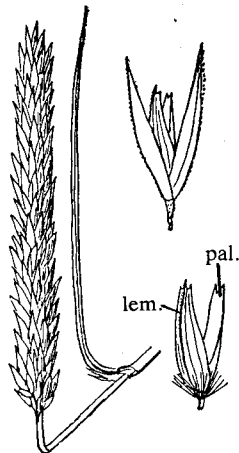


Fig. 130—*Ammophila arenaria*.

57. AMMOPHILA Host

Ic. Descr. Gram. Aust. 4:24 (1809).

(Greek *ammos*, sand; *philos*, loving.)

Glabrous erect perennials; leaf-blade inrolled; ligule very long, tapering; inflorescence a more or less cylindrical panicle; spikelets 1-flowered, compressed laterally, the rhachilla produced in a short hairy bristle; glumes stiff, almost equal, persistent, keeled; lemmas a little shorter, on a minute hairy callus. 2 species in North America, N. Africa and Europe.

*1. *A. arenaria* (L.) Link, *Hort. Bot. Berol.* 1:105 (1827). **Marram grass.** (Ill. Meredith (1955) *The grasses and pastures of South Africa*, fig. 65). Perennial, 60-120 cm high, with creeping rhizome and erect stems; ligule 2-3 cm long, bifid; panicle dense, 7-25 cm long; spikelets over-

topping the lemmas; straw-coloured, 12-15 (rarely to 20) mm long; lemmas stiff, 3-toothed at the summit, glabrous.—*Arundo arenaria* L., *Sp.Pl.* 82 (1753); *A. arundinacea* Host, *Ic.Descr.Gram.Aust.* 4:24 (1809).

Native to Europe, naturalised in all Australian States except N.T. and Qld. Recorded in S.Aust. along the coast from Eyre Pen. to the S.E. region.

Flowers Sept.-Feb.

An important dune-binder along coasts.

58. AMPHIPOGON R.Br.

Prod.Fl.Nov.Holl. 175 (1810).

(Greek, *amphi*, both; *pōgōn*, beard; because both the lemma and palea have ciliate awns.)

Tussocky or tufted perennials; leaf-blade stiff and often hairy, inrolled; ligule a fringe of hairs; inflorescence a dense panicle; spikelets 1-flowered, subsessile; glumes 2, persistent, 3-nerved; lemma on a short hairy callus, divided into 3 awned lobes; palea with 2 slender awns; styles united near the base. 7 species in Australia. (Partly from Willis (1970) *A handbook to plants in Victoria.*)

1. Panicle oblong to narrow-cylindrical; plant tufted *A. caricinus* 1.
1. Panicle capitate; plant rhizomatous *A. strictus* 2.

1. *A. caricinus* F. Muell., *Linnaea* 25:445 (1853). **Long-grey-beard grass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 12a). Plants tufted or with very short more or less oblique rhizomes, to 60 cm high; leaf-blades usually 8-15 cm long; panicle oblong to narrow-cylindrical, 2-4 cm long, less than 1 cm broad; spikelets 9-10 mm long; lemma 6-8 mm long (including awns), the cilia continuing (without reduction) right to awn-tips; anthers c. 3 mm long.—*A. strictus* non R.Br., sensu J. M. Black, *Fl.S.Aust.* 81 (1943).

Occurs in all Australian mainland States. Recorded in S.Aust. from the N.W., Flinders Ranges, Eyre Pen., Yorke Pen., Southern Lofty, Murray and S.E. regions.

Flowers Oct.-April.

A dry area species, unpalatable.

2. *A. strictus* R.Br., *Prod.Fl.Nov.Holl.* 175 (1810). **Grey-beard grass.** (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 46). Plants with contracted horizontal rhizomes, to 50 cm high; leaf-blades less than 8 cm long (usually less than 5 cm); panicle capitate, ovoid to broadly oblong, up to 2 cm long, but 1 cm broad or more; spikelets c. 9-12 mm long; lemma 8-12 mm long (including awns), the cilia diminishing toward the scabrous awn-tips; anthers c. 4 mm long.

The only variety in S.Aust. is:—

Var. *setifer* Benth., *Fl.Aust.* 7:598 (1878).

Occurs in W.Aust., Vic. and S.Aust., (Northern and Southern Lofty, Murray and S.E. regions).

Flowers Oct.-April.

59. DEYEUXIA Clarion ex Beauv.

Agrost. 43 (1812).

(After Nicolas Deyeux, 1753-1837, Professor at the School of Pharmacy and Faculty of Medicine, Paris.)

Tufted perennials; leaf-blade flat or folded; ligule membranous; inflorescence a dense panicle; spikelets 1-flowered, usually with the rhachilla prolonged into a short hairy or glabrous bristle; callus bearing a tuft of hair which surrounds, but is much shorter than, the lemma; glumes 2, 1-

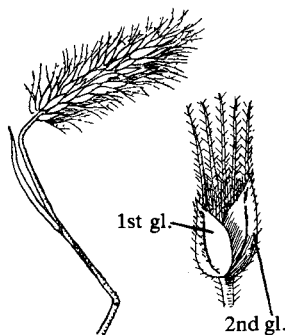


Fig. 131—*Amphipogon caricinus*.

nerved and keeled, equal or nearly so, scabrous on keel, longer than the lemma; lemma membranous, rather stiff and more or less toothed at the summit, 4- or 5-nerved (in the latter case including the nerve which descends from the base of the awn); awn fine, dorsal, bent and twisted in lower part; palea nearly as long, 2-nerved. About 200 species from temperate areas.

1. Awn attached near middle of lemma.
2. Bristle present; spikelet 5 mm long *D. densa* 1.
2. Bristle absent; spikelet 4 mm long *D. minor* 2.
1. Awn almost basal *D. quadriseta* 3.

1. ***D. densa*** Benth., *Fl. Aust.* 7:582 (1878). **Bent-grass.** Stout or slender, glabrous grass, 50-100 cm high; leaves narrow; ligule 2-5 mm long, obtuse; panicle narrow but lobed towards the base, 8-18 cm long; glumes 4-5-5 mm long; lemma slightly shorter, acute, shortly 4-toothed, 4-nerved towards the summit and with a 5th nerve descending from the base of the awn, scabrous on nerves and tuberculate in upper part or all over; awn 5-6 mm long, attached a little above the middle and shortly exserted; tuft short; bristle hairy, about one-third as long as the lemma.—*Calamagrostis densa* (Benth.) Maiden & Betche, *Census N.S.W. plants* 21 (1916), nom. illegit.

Occurs in Vic., Tas. and S.Aust Southern Lofty and S.E. regions).

Flowers Oct.-Jan.

2. ***D. minor*** F. Muell. ex Benth., *Fl. Aust.* 7:582 (1878). **Bent-grass.** A slender grass, shorter than the preceding; leaves filiform; ligule rather long, truncate; panicle spike-like, cylindrical or slightly bilobed, 2-4 cm long; glumes broad, c. 4 mm long; lemma shorter, 3-3-5 mm long, broad, with 4 prominent scabrous nerves (the 5th only reaching to the insertion of the awn), 4-toothed at summit, finely tuberculate in lower half; awn inserted near middle of lemma, 4 mm long; tuft one-third as long as the lemma.—*Calamagrostis minor* (F. Muell. ex Benth.) J. M. Black, *Trans.R.Soc.S.Aust.* 43:27 (1919).

Occurs in N.S.W., Vic., Tas. and S.Aust. (Southern Lofty and Kangaroo I. regions).

Flowers Nov.-Dec.

3. ***D. quadriseta*** (Labill.) Benth., *Fl. Aust.* 7:581 (1878). **Reed bent-grass.** (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 45). Glabrous perennial, with rigid stems to 1 m high; nodes glabrous; leaves stiff, flat or finally inrolled; ligule long, truncate, glabrous; panicle dense and cylindrical, sometimes slightly lobed, 5-15 cm long; glumes narrow, acute, subequal 4-5-5 mm long, the lower one slightly longer; lemma shorter, usually minutely scabrous, 4-nerved and with 4 teeth, of which 2 are often longer; awn almost basal, 5-5 mm long, shortly exserted beyond the glumes; tufts about half as long as lemma; bristle wanting.—*Avena quadriseta* Labill., *Nov. Holl. Pl. Sp.* 1:25 (1805); *Agrostis quadriseta* (Labill.) R. Br., *Prod. Fl. Nov. Holl.* 171 (1810); *Calamagrostis quadriseta* (Labill.) Spreng., *Syst. Veg.* 1:253 (1824).

Occurs in all Australian States except N.T. and Qld.
Recorded in S.Aust. from the ?Flinders Ranges, Yorke Pen., Southern Lofty, Kangaroo I. and S.E. regions.

Flowers Oct.-May.

60. DICHELACHNE Endl.

Prod. Fl. Norfolk. 20 (1833).

(Greek *dichēlos*, cloven-footed; *achnē*, glume; lemma 2-lobed.)

Tufted annuals; leaf-blade flat or setaceous-convolute; ligule white, membranous, 1-2 mm long; inflorescence a dense spike-like panicle or loose and almost secund; spikelets 1-flowered; the rachilla not continued in a bristle; glumes 2, persistent, hyaline, narrow, keeled by the single nerve, the

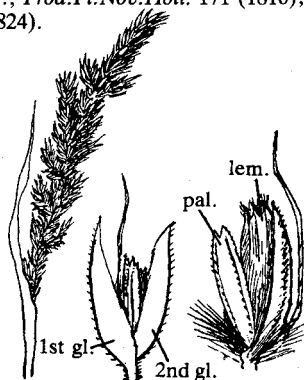


Fig. 132—*Deyeuxia quadriseta*.

2nd glume rather longer than the 1st; lemma on a short, blunt, hairy callus, with a slender awn affixed on the back of the lemma a little below the hyaline 2-lobed summit; tip of lemma delicate, often splitting to the base of the awn so that the awn appears to rise between 2 conspicuous erect lanceolate lobes; anthers glabrous; lodicules 2. 3 species mainly from Australia and New Zealand. (Largely from Veldkamp (1974) *Blumea* 22:5-12.)

1. Panicle very dense and contracted at anthesis, sometimes lobed at base, axis and branches obscured by the spikelets and awns; awn more than 3.5 times as long as the lemma; anthers 1-3.
2. Glumes long-acuminate, 4.75-11.5 mm long; awn 2-4 cm, inserted 1-3 mm below the apex of the 3.75-8 mm long lemma *D. crinita* 1.
2. Glumes acuminate, 3.25-5 mm long; awn 0.8-1.75 cm, inserted 0.5-1 mm below the apex of the 2.75-4 mm long lemma *D. micrantha* 2.
1. Panicle rather loose, only slightly contracted at anthesis, axis and branches distinctly visible; awns up to 4 times as long as the lemma; anthers 3 *D. rara* 3.

1. ***D. crinita*** (L.f.) Hook.f., *Fl. Nov. Zel.* 1:293 (1853). (**Long hair**) plume-grass. (Ill. N.T. Burbidge (1970) *Australian grasses* 3, pl. 49). Tall tufted perennial, to 120 cm high; leaf-blades flat, glabrous or pubescent, to 22 cm long, 2.5 mm broad; panicle dense, spike-like, to 20 cm long, silvery and very hairy; glumes 4.75-11.5 mm long; lemma 3.75-8 mm long (including callus of 0.4-0.5 mm); awn untwisted, often flexuous, 2-4 cm long.—*Anthoxanthum crinitum* L.f., *Suppl.* 90 (1781).

Occurs in New Guinea and all Australian States except N.T. Recorded in S.Aust. from the Flinders Ranges, Eyre Pen., Northern and Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers Oct.-Dec.

Most frequently grows in the open. Not usually grazed.

2. ***D. micrantha*** (Cav.) Domin, *Bibliotheca bot.* 85:353 (1915). (**Short-hair**) plume-grass. (Ill. N.T. Burbidge (1966) *Australian grasses* 1, pl. 25). Tufted perennial, to 110 cm high; leaf-blades flat, glabrous or pubescent, to 23 cm long and 5 mm broad; panicle dense, sometimes looser at base, spike-like, to 19 cm long and 3.5 cm broad; glumes 3-5 mm long; lemma 2.25-4.25 mm long (including callus of 0.2-0.5 mm); awn twisted, 1-1.75 cm long.—*Stipa micrantha* Cav., *Icon.* 5:42 (1799); *Agrostis sciurea* R.Br., *Prod. Fl. Nov. Holl.* 171 (1810); *D. sciurea* (R.Br.) Hook.f., *Fl. Nov. Zel.* 1:293 (1853).

Occurs in all Australian States except N.T. Recorded in S.Aust from the Northern and Southern Lofty and S.E. regions.

Flowers Oct.-Feb.

Usually occurs in dry woodland. Not grazed.

3. ***D. rara*** (R.Br.) Vickers, *Contr. N.S.W. natn. Herb.* 1:337 (1951) subsp. ***asperula*** Veldk., *Blumea* 22:8 (1974). Tufted perennial, to 130 cm high; leaf-blades flat, inrolled when dry, often scabrid, usually 10-17 cm long, 1.4-5 mm broad; panicle loose, slightly contracted at anthesis, axis and branches distinctly visible, up to 23 by 8 cm; lower glume 4-6.5 mm long, upper glume 6-8.25 mm long; lemma 5.25-8 mm long (incl. callus of 0.5 mm); awn twisted, 1.5-2.5 cm long.—*Agrostis rara* R.Br., *Prod. Fl. Nov. Holl.* 170 (1810).



Fig. 133—*Dichelachne crinita*.

Occurs in New Zealand, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty region).

Flowers usually Dec.

In S.Aust. this species has formerly been confused with *D. micrantha* and it may prove to be more widespread than recognised here.

61. ECHINOPOGON Beauv.

Agrost. 42 (1812).

(Greek *echinos*, hedgehog; *pōgōn*, beard; alluding to the bristly head.)

Scabrous annuals; leaf-blade flat; ligule white, hyaline, toothed; inflorescence a dense, bristly spike-like panicle; spikelets 1-flowered, almost sessile, the rhachilla produced into a short bristle behind the floret; glumes 2, 1-nerved, persistent, acute, keeled; lemma about as long, 5-7-nerved, with 2 acute lobes and a straight untwisted awn rising between them, the lemma bearded at base on the very short callus; styles distinct. 7 species from Australia and New Zealand.

1. *E. ovatus* (Forst.f.) Beauv., *Agrost.* 42 (1812). **Rough-bearded grass, hedgehog-grass.** (Ill.C.A. Gardner (1952) *Flora of Western Australia* 1, pl. 45). Erect annual, with slender scabrous stems 15-70 cm tall; leaf-blades flat, scabrous, to 16 cm long; panicle ovoid or oblong, 2-4 cm long; spikelets 3.5-5 mm long; glumes c. 4 mm long, ciliate on the keel; awns 3-15 mm long.—*Agrostis ovata* Forst.f., *Fl. Insul. Aust. Prod.* 8 (1786).

Occurs in all Australian States except N.T. Recorded in S.Aust. from the Northern and Southern Lofty, Kangaroo I. and S.E. regions.

Flowers Oct.-Jan.

Grows in shade.

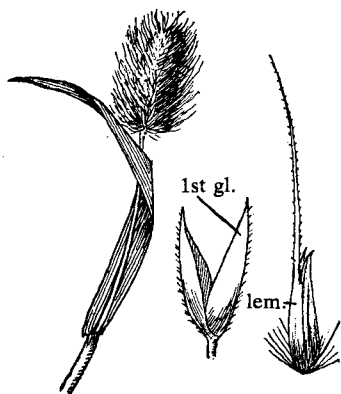


Fig. 134—*Echinopogon ovatus*.

62. GASTRIDIDIUM Beauv.

Agrost. 21 (1812).

(Diminutive of Greek *gastēr*, abdomen; spikelets swollen at base.)

Tufted annual grasses; leaf-blade flat; ligule hyaline; inflorescence a spike-like panicle; spikelets 1-flowered, compressed laterally, swollen and globular at base; glumes persistent, unequal, keeled, acute, cartilaginous and shining on the swollen base, much longer than the

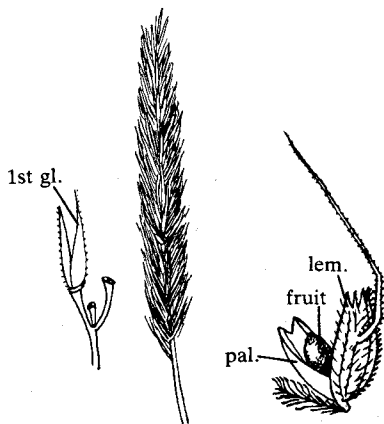
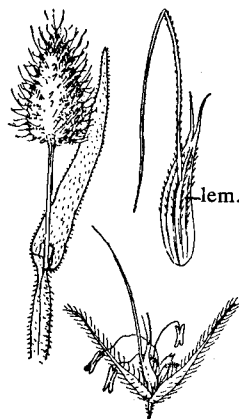
membranous truncate lemma; rhachilla prolonged behind the palea as a plumose bristle; glumes and lemma awned or awnless. 2 species from Europe and North Africa.

*1. *G. phleoides* (Nees & Meyen) C.E. Hubb., *Kew Bull.* 1954:375 (1954). **Nit-grass.** (Ill.C.A. Gardner (1952) *Flora of Western Australia* 1, pl. 45). Glabrous annual, with slender stems to 50 cm high; leaf-blades narrow, rough on the edges; ligule lanceolate; panicle silvery, spike-like, 4-10 cm long, 5-8 mm broad, tapering at each end; spikelets 1-flowered; 1st glume 5-6 mm long, the 2nd 4-5 mm long; lemma much shorter (1-2.5 mm), pubescent, usually with a short fine awn rising from below the toothed summit.—*Lachnagrostis phleoides* Nees & Meyen, *Nova Acta Leop. Carol.* 19, supp.1:146 (1843); *G. ventricosum* non (Gouan) Schinz & Thell., sensu J. M. Black, *Fl. S. Aust.* 99 (1943).

Native to Europe and North Africa, naturalised in W.Aust., N.S.W., Vic. and S.Aust. (Eyre Pen., Northern and Southern Lofty and S.E. regions).

Flowers mainly Nov.-Feb.

Weed of disturbed land.

Fig. 135—*Gastridium phleoides*.Fig. 136—*Lagurus ovatus*.63. *LAGURUS* L.*Sp.Pl.* 81 (1753).(Greek *lagōs*, a hare; *oura*, a tail; alluding to the shape of the panicle.)

Hairy annuals; leaf-blades flat; ligule membranous; inflorescence a dense ovoid spike-like panicle; spikelets 1-flowered, rhachilla produced behind the palea in a bristle; glumes persistent, villous, 1-nerved, keeled, tapering into a plumose awn; lemma thin, glabrous, with a slender dorsal awn and a shorter one on each side. A monotypic genus from the Mediterranean.

*1. *L. ovatus* L., *Sp.Pl.* 81 (1753). **Hare's tail grass.** (Ill. N.T. Burbidge (1966) *Australian grasses* 1, pl. 38). Annual; leaves flat, short, softly pubescent, the uppermost sheath swollen; panicle dense ovoid, spike-like, silky-white, 2-4 cm long; spikelets 8-10 mm long; glumes equal, tapering into a plumose awn, 9-10 mm long (including awn); lemma much shorter, with 2 short terminal awns and 1 bent dorsal awn 15 mm long.

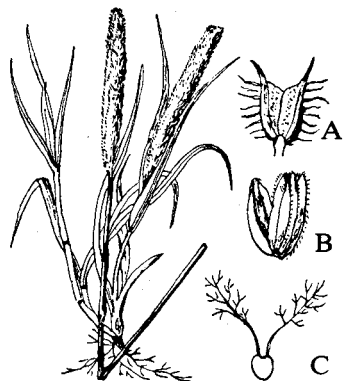
Native to the Mediterranean, widely introduced and naturalised in all Australian States except N.T. Recorded in S.Aust. from Wedge I. (Spencer Gulf) and the Yorke Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers Sep.-Dec. the inflorescences persisting for several months.

Weed of disturbed areas especially near the sea.

64. *PENTAPOGON* R.Br.*Prod.Fl.Nov.Holl.* 173 (1810).(Greek *pente*, five; *pōgōn*, beard; the lemma has 5 awns.)

Erect annuals or short-lived perennials; leaf-blade inrolled; ligule membranous; inflorescence a panicle; spikelets 1-flowered; glumes 2, persistent, scabrous on keel, pointed, awnless; lemma 2-lobed at apex, with a long central awn and 2 short erect capillary awns terminating each lobe; central awn with rigid twisted column and an inclined bristle; callus short, surmounted by a tuft of white hairs. 1 Australian species (Willis (1970) *A handbook to plants in Victoria* 1).

Fig. 137—*Pentapogon quadrifidus*.Fig. 138—*Phleum pratense*. A, glumes; B, lemma and palea; C, ovary and styles.

1. *P. quadrifidus* (Labill.) Baill., *Hist.Pl.* 12:280 (1893). **Five awned spear-grass.** (Ill. N. T. Burbidge (1968) *Australian grasses* 2, pl. 21). Erect, usually 30-60 cm high; leaf-blades 8-18 cm long, glabrous, pubescent or scabrid; panicle 5-15 cm long, to 25 mm broad, moderately dense to rather open, light brownish; spikelets narrow; 1st glume 1-nerved, 6-8 mm long, the 2nd 3-nerved, 9-15 mm long; lemma c.4 mm long (excluding awn); column of central awn 5-10 mm long, bristle 10-15 mm long; lateral awns 7-8 mm long.—*Agrostis quadrifida* Labill., *Nov.Holl.Pl.Sp.* 1:20 (1805); *P. billardieri* R.Br., *Prod.Fl.Nov.Holl.* 173 (1810).

Occurs in N.S.W., Vic., Tas. and S.Aust (Southern Lofty and S.E. regions).

Flowers only recorded in Jan.

Grows in rather open localities.

65. *PHLEUM* L.

Sp.Pl. 59 (1753).

(Greek *phleōs*, some kind of reed or grass.)

Annuals or perennials; leaf-blades flat; ligule white, membranous; inflorescence a dense spike-like panicle; spikelets laterally compressed, 1-flowered; glumes 2, equal, 3-nerved, membranous, truncate, keeled, mucronate or awned; lemma much shorter, keeled, truncate or toothed, 3-5nerved, awnless. About 15 species from America, Europe and Asia.

*1. *P. pratense* L., *Sp.Pl.* 59 (1753). **Timothy grass, cat's tail.** (Ill. N. T. Burbidge (1968) *Australian grasses* 2, p. 33). Erect, rather stout perennial, 50-100 cm high; leaf-blades 4-8 mm broad, long, flat, scabrous; panicle cylindrical, 7-12 cm long, under 1 cm broad; spikelets flat, 4 mm long (excluding awn); glumes villous-ciliate on keel, awned, the awn 1-1.25 mm long.

Native to Europe, naturalised in all Australian States except N.T. and Qld. Recorded in S.Aust. from the Southern Lofty and S.E. regions. Grown as a fodder grass and established in some parts.

Flowers Feb. (one record).

66. *POLYPOGON* Desf.

Fl.Atlant. 1:66 (1798).

(Greek *polys*, many; *pōgōn*, a beard; alluding to the bristly panicle.)

Glabrous annuals or perennials; leaf-blades flat; ligule long, glabrous; inflorescence a dense spike-like panicle; spikelets 1-flowered, laterally compressed; glumes equal, 1-nerved, notched, keeled, hairy, with or without a rather long straight slender awn rising

between the 2 lobes of the notch; lemma much smaller, hyaline, truncate, 4-toothed, with or without a short caducous awn; spikelets falling off as a whole, owing to the pedicel disarticulating a short distance below the glumes, leaving the short callus (sometimes called the upper joint of the pedicel) attached to the spikelet. About 15 species from tropical and temperate areas.

1. Annual; glumes (and sometimes the lemma) awned.
 2. Glumes with 2 long, subacute lobes..... *P. maritimus* 1.
 2. Glumes with 2 very short, blunt lobes..... *P. monspeliensis* 2.
1. Perennial; glumes and lemma awnless *P. semiverticillatus* 3.

*1. *P. maritimus* Willd., *Neue Schr. Ges. naturf. Freund. Berl.* 3:443 (1801). **Coast beard-grass.** Annual; stems erect or spreading, 20-30 cm high; leaves to 5 cm long and 2-4 mm broad; panicle dense, bristly, 1-6 cm long; 2 mm long, long-ciliate, glumes divided for a quarter of their length into 2 rather acute lobes, awn arising from base of notch, often pink or purplish, c. 4 mm long; lemma awnless.

Native to the Mediterranean, naturalised in W.Aust., Vic., Tas. and S.Aust. (Eyre Pen., Southern Lofty, Murray and S.E. regions).

Flowers Nov.

An occasional weed in sandy coastal areas.

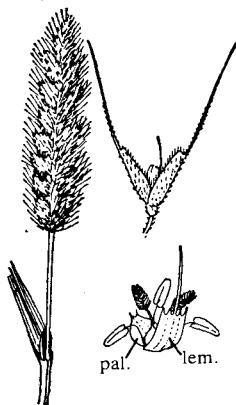


Fig. 139—*Polypogon monspeliensis*.

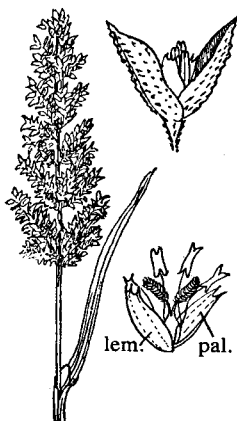


Fig. 140—*Polypogon semiverticillatus*.

*2. *P. monspeliensis* (L.) Desf., *Fl. Atlant.* 1:67 (1798). **(Annual) beard-grass.** (Ill. N.T. Burbidge (1970) *Australian grasses* 3, pl. 40). Annual; stems erect or spreading, 4-50 cm high; leaves flat, linear to linear-lanceolate, 4-6 mm broad; panicle dense or somewhat lobed, bristly, white or yellowish, 1-12 cm long, 6-14 mm broad; spikelets 2-2.5 mm long; glume scabrous on keel, pubescent, shortly notched, awn 2-3 times as long as glume, 4-7 mm long, pale yellow-green, almost terminal; lemma very shortly awned.—*Alopecurus monspeliensis* L., *Sp. Pl.* 61 (1753).

Native to Europe, Asia and North Africa naturalised in North and South America, New Zealand and all Australian States except N.T. Recorded in S.Aust. from the Flinders Ranges, Eyre Pen., Yorke Pen., Northern and Southern Lofty, Murray and S.E. regions.

Flowers Oct.-March or rarely later.

Grows best in shaded damp places. Not significantly grazed.

*3. *P. semiverticillatus* (Forsk.) Hyl., *Uppsala Univ. Arsskr.* 7:74 (1945). **Water bent.** (Ill. Meredith (1955) *The grasses and pastures of South Africa*, fig. 69). Tufted or stoloniferous

perennial, 10-100 cm high; leaves short, 3-10 mm broad, scabrous; panicle moderately dense, lobed, 4-10 cm long, the branches bearing spikelets to their bases; spikelets 2 mm long; glumes equal, falling with the spikelet, scabrous on the keel and shortly pubescent on the sides, awnless; lemma half as long, truncate, 4-nerved and with 4 minute teeth at summit, awnless; palea as long as lemma; no beard or bristle.—*Phalaris semiverticillata* Forsk., *Fl. Aegypt.-Arab.* 17 (1775); *Agrostis semiverticillata* (Forsk.) C. Chr., *Dansk. Bot. Archiv.* 4(3):12 (1922); *A. verticillata* Vill., *Prosp.* 16 (1779).

Native from the Mediterranean to Asia, naturalised in W. Aust., N.S.W., Vic. and S. Aust. (Flinders Ranges, Eyre Pen., Northern and Southern Lofty and S.E. regions).

Flowers most of the year, especially Sept.-March.

Weed of disturbed areas. Often treated as a species of *Agrostis*, but anomalous then as the spikelets and pedicels fall as a unit (as in *Polypogon*) and the spikelet does not disarticulate above the glumes (as in other species of *Agrostis*).

TRIBE 14.—MONERMEAE

67. MONERMA Beauv.

Agrost. 116 (1812).

(Greek *monos*, one; *erma*, support; the florets having only one glume each.)

Slender glabrous annuals; leaf-blade flat or inrolled; ligule short; inflorescence a slender spike; spikelets 1-flowered, sessile, solitary, distichous and half-embedded in the alternate notches of the rachis of the spike; glume 1 (except in the terminal spikelet which has 2 glumes), stiff, 5-nerved, closing the cavity of the rachis; lemma shorter, hyaline, 2-nerved; each spikelet falling off entire attached to its joint of the rachis (but often rather tardy). Monotypic, Mediterranean to the Middle East.

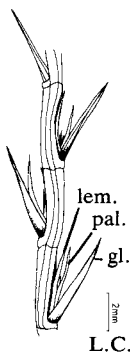


Fig. 141—*Monerma cylindrica*, portion of spike.

*1. *M. cylindrica* (Willd.) Coss. & Durieu, *Expl. Scient. Alger. (Bot.)* 2:214 (1855). **Common barb-grass.** (Ill. N.T. Burbidge (1970) *Australian grasses* 3, pl. 72). Stems stiff, erect, 10-50 cm high; leaf-blades narrow, flat or inrolled; spike stiff, straight or slightly curved, 5-20 cm long, c. 2 mm thick; glume green, linear-lanceolate, 7 mm long; lemma and palea white.—*Rottboellia cylindrica* Willd., *Sp. Pl.* 1:464 (1797); *Lepturus cylindricus* (Willd.) Trin., *Fund. Agrost.* 123 (1820).

Native to the Mediterranean and Middle East, naturalised in all Australian States except N.T. and Qld. Recorded in S. Aust. from the Eyre Pen., Yorke Pen., Southern Lofty, Murray and S.E. regions.

Flowers Oct.-Jan.

Weed of disturbed places, especially areas subject to flooding.

68. PARAPHOLIS C. E. Hubbard

Blumea, supp. 3:14 (1946).

(Greek *para*, near; *Pholiurus*, a closely related genus.)

Slender glabrous annuals; leaf-blade subulate; inflorescence a slender articulated spike; spikelets 1-flowered, sessile, solitary, distichous and half-embedded in the alternate notches in the rachis of the spike; glumes 2, side by side in front of the lemma, stiff, 5-nerved, closing the cavity in the rachis; lemma shorter than the glumes, hyaline, sub-1-nerved (with very short lateral nerves); each spikelet falling off entire attached to its joint of the rachis. 4 species from Europe, North Africa and Asia. (Key to species from Willis (1970) *A handbook to plants in Victoria*.)

1. Culms less than 10 cm high; uppermost leaf-sheath prominently dilated; spikes more or less arcuate (sometimes curved in a half-circle), usually purplish; glumes erect, rarely slightly spreading, manifestly exceeding the lemma; anthers less than 1 mm long. *P. incurva* 1.
1. Culms more than 12 cm high; leaf-sheaths never dilated; spikes all straight, rigidly erect, usually green; glumes spreading at an angle of about 30° to rhachis at maturity, hardly exceeding lemma; anthers 2-4 mm long *P. strigosa* 2.

*1. *P. incurva* (L.) C. E. Hubbard, *Blumea*, supp. 3:14 (1946). **Coast barb-grass.** (Ill. N.T. Burbidge (1970) *Australian grasses* 3, pl. 73). Glabrous annual, 5-30 cm long; leaf-blades short, subulate, leaf-sheath prominently dilated; spikes more or less curved, sometimes sickle-shaped, usually 3-10 cm long and c. 2 mm thick, usually purplish; the 2 glumes closing the hollow in the rhachis, usually c. 6 mm long and manifestly longer than the single floret; anthers less than 1 mm long; rhachilla continued in a minute bristle behind palea.—*Aegilops incurva* L., *Sp.Pl.* 1051 (1753); *Lepturus incurvatus* Trin., *Fund.Agrost.* 123 (1820); *Pholiurus incurvus* (L.) Schinz & Thell, *Vjschr.naturf.Gesch.Zurich* 66:265 (1921).

Native to Europe, North Africa and Asia, naturalised in all Australian States except N.T. and Qld. Recorded in S.Aust. from Nuyts Archipelago and the Nullarbor, Flinders Ranges, Eyre Pen., Northern and Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers Sept.-Nov.

Grows particularly on areas of high salinity subject to occasional flooding.

*2. *P. strigosa* (Dumort.) C. E. Hubbard, *Blumea*, supp. 3:14 (1946). **Slender barb-grass.** *Lepturus strigosus* (Dumort., *Obsns Gram.Fl.Belg.* 146 (1823).

Native to Europe, naturalised in Vic. Although not reported from S.Aust, this species is included as it has been collected close to the border within Vic. Willis, (1970) *A handbook to plants in Victoria*, suggested that it had been overlooked through its similarity to *Monerma cylindrica*.



Fig. 142—*Parapholis incurva*.

69. PHOLIURUS Trin.

Fund.Agrost. 131 (1820).

(Greek *pholis*, scale of a snake; *oura*, tail; alluding to the overlapping glumes.)

Glabrous annuals; leaf-blade flat; inflorescence a slender not-articulated spike; spikelets articulated at the base, 2-flowered, sessile, solitary, distichous and half-embedded in the alternate notches in the rhachis of the spike; glumes 2, nearly opposite, stiff, 5-nerved, closing the cavity in the rhachis; lemma shorter than the glumes, hyaline, with the lateral nerves extending to the apex; each spikelet falling off entire, leaving the rhachis entire. Monotypic genus from S.E. Europe.

*1. *P. pannonicus* (Host) Trin., *Fund.Agrost.* 131 (1820). Glabrous annual, 10-20 cm high; leaf-blades flat, very narrow; spike 5-15 cm long, 2 mm thick, straight or almost so; glumes 6-7 mm long; 1st floret sessile, with the back of its lemma pressed against the hollow of the rhachis, the 2nd smaller, on a short extension of the rhachilla.—*Rotboelia pannonica* Host, *Gram.Austriacorum* 1:t.24 (1801); *Lepturus pannonicus* (Host) Kunth, *Rev. Gram.* 1:151 (1829).

Native to S.E. Europe. Not recorded in the literature in Vic. or W.Aust. and in S.Aust. known only from the Yorke Pen. region (northern) and from Nuriootpa (Barossa Valley—Northern Lofty region).

70. PSILURUS Trin.

Fund. Agrost. 93 (1820).(Greek *psilos*, slender; *oura*, tail; the spike is very slender.)

Glabrous annuals; leaf-blade flat; ligule membranous, minute; inflorescence a slender articulated spike; spikelets 1-flowered, sessile, solitary, distichous and hidden in the alternate notches in the rhachis of the spike; glume 1, minute; lemma much longer than the glume, closing the cavity in the rhachis, stiff and leathery, awned. Monotypic, Europe.

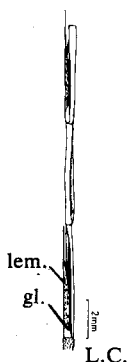


Fig. 143—*Psilurus incurvus*, portion of spike.

*1. *P. incurvus* (Gouan) Schinz & Thell., *Vjschr. naturf. Gesch. Zurich* 58:40 (1913). **Bristle-tail grass.** (Ill. N. T. Burbidge (1966) *Australian grasses* 1, pl. 49). Glabrous annual, with filiform stems leafy to the spike; leaf-blade setaceous-involute; spike 6-18 cm long and scarcely 1 mm thick; spikelets distichous, rather distant, sessile, hidden in the shallow excavation of the rhachis; spikelets subulate, with 1 fertile flower; glume 1, minute, ovate, acute, scarcely 1 mm long, next to this is the lemma, coriaceous, linear-lanceolate, c. 4 mm long, facing and closing the hollow in the rhachis; palea strongly ciliate on nerves, containing linear empty awned lemma.—*Nardus incurvus* Gouan, *Hort. reg. Monspel.* 33 (1762); *N. aristata* L., *Sp. Pl.*, ed. 2, 1:78 (1762); *P. aristatus* (L.) Duval-Jouve, *Bull. Soc. Bot. Fr.* 13:132 (1866); *P. nardoides* Trin., *Fund. Agrost.* 93 (1820).

Native to Europe, naturalised in N.S.W., Vic. and S.Aust., where it has occasionally been recorded from around Adelaide (Southern Lofty region).

Flowers Oct. (three records).

Not grazed.

TRIBE 15.—PAPPOPHOREAE

71. ENNEAPOGON Desv. ex Beauv.

Agrost. 81 (1812).(Greek *ennea*, nine; *pōgōn*, beard; alluding to the 9 plumose awns of the lemmas.)

Perennials or annuals; leaf-blades narrow; spike-like panicle ovoid or oblong (in some species there are in addition to the usual terminal panicle axillary inflorescences almost entirely enclosed by the leaf-sheaths and, in some also, much modified spikelets are produced at the base of the stems and enclosed by the more or less enlarged basal sheaths); spikelets 2-3-flowered, the lowest floret bisexual, the 1 or 2 upper ones usually rudimentary, glumes 2, membranous, subequal, persistent, 5-21-nerved, about as long as the florets without the awns; lemmas stiff, rounded on back, with 9 nerves ending in 9 plumose awns, bearded at base, the rhachilla disarticulating below the florets but not between them; palea as long as or longer than lemma. About 30 species from warm parts of the world. (N.T. Burbidge (1941) *Proc. Linn. Soc., Lond.* 153:52-91).

1. Glumes 13-21-nerved; panicle often loose; lemma nearly globular *E. avenaceus* 1.
1. Glumes 5-11-nerved; panicle rather dense to very dense; lemma not globular.
2. Lemma smooth evenly indurated at maturity or the nerves slightly prominent below the origin of the awns; both glumes lanceolate, acuminate, rather densely pubescent with both simple and glandular hairs *E. polyphyllus* 8.
2. Lemma prominently nerved throughout, or if nerves are indistinct then the glumes sparingly and minutely pubescent with simple hairs and the upper narrowly truncate or ragged at apex.

3. Panicle more than 4 times as long as broad; axillary inflorescences well developed *E. cylindricus* 4.
3. Panicle less than 4 (usually much less) times as long as broad; axillary inflorescences absent.
4. Glumes of the spikelets in the lower part of the inflorescence similar to those of the spikelets in the upper part.
5. Glumes lanceolate, more or less acute *E. nigricans* 6.
5. Glumes elliptical, very obtuse and ragged at the apex.
6. Lemma convex on back and elliptical in profile; plant almost glabrous *E. clelandii* 3.
6. Lemma straight on back, cuneate in profile; plant pubescent.
7. Palea evenly pubescent or glabrous between the nerves *E. lindleyanus* 5.
7. Palea with a glabrous patch between the nerves *E. oblongus* 7.
4. Glumes of spikelets in the upper part of a mature inflorescence much longer than (to twice as long as) those of the spikelets in the lower part *E. caeruleus* 2.

1. *E. avenaceus* (Lindl.) C. E. Hubbard, *Kew Bull.* 1934:450 (1934). **Bottle-washers.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 33a). Mostly annual, prominently pubescent with simple and glandular hairs; panicle rather loose or scanty, lanceolate-ovate or lanceolate-oblong, 3-5 cm long, dark or pale; spikelet with 2 or 3 fertile florets; glumes 5-8 mm long, broadly ovate, acute, 13-21-nerved; lemmas nearly globular, smooth and shining, nerves obliterated or very slightly prominent just below the base of the awns, the lowest lemma 2-3 mm long (excluding awns), awns 6-12 mm long.—*Pappophorum avenaceum* Lindl. in T. L. Mitchell, *J. Trop. Austral.* 320 (1848).

Occurs in all Australian mainland States. Recorded in S.Aust. from the N.W., Lake Eyre, Nullarbor, Gairdner-Torrens, Flinders Ranges, Eastern, Eyre Pen. and Murray regions.

Flowers throughout the year.

Regarded as a valuable grazing species, especially owing to its ready regeneration after rain at all times of the year.

2. *E. caeruleus* (Gaud.) N. T. Burb., *Proc. Linn. Soc., Lond.* 153:87 (1941). Slender tufted perennial, to 30 cm high, slightly pubescent with both simple and glandular hairs and with prominent basal sheaths; leaf-blades usually persistent; nodes hairy; panicle ovate or oblong, 1-3 cm long, c. 8 mm broad, blackish or pallid; glumes of the spikelets in the upper part of the inflorescence much longer than (to twice as long as) those of the spikelets in the lower part, all pubescent with both simple and glandular hairs, elliptic-lanceolate, obtuse and ragged at the apex, 5-9 nerved, uppermost glumes 4-7 mm long, lemma prominently nerved; awns 4-6 mm long; highly modified solitary spikelets in the basal sheaths.—*Pappophorum caeruleus* Gaud. in Freyc., *Voy. Bot.* 409 (1824).

Occurs in W.Aust., N.T., Qld and S.Aust. (N.W., Gairdner-Torrens, Flinders Ranges and Eastern regions).

Flowers throughout the year.

3. *E. clelandii* N. T. Burb., *Proc. Linn. Soc., Lond.* 153:80 (1941). **Cleland's nineawn.** Rigid, spreading or erect, nearly glabrous perennial; internodes almost glabrous; leaf-blades and sheaths glaucous and glabrous, but sometimes scaberrulous; panicle dense, on very long peduncle, oblong, c. 1-3.5 cm long and 8-15 mm wide; glumes 5-7-nerved, 3-4 mm long, dark, elliptic to elliptic-lanceolate, very obtuse and ragged at apex, sparsely and sometimes minutely glandular-pubescent; lemma with prominent rib-like nerves, at maturity dorsally convex and elliptical in side view when in its natural position, 2 mm long.

Occurs in N.T. and S.Aust., where it has been recorded from the N.W., Flinders Ranges and Murray regions.

Flowers throughout the year.

Regarded by Lazarides (1970) *The grasses of Central Australia* as moderately palatable but seldom common enough to be of significant value.

4. *E. cylindricus* N. T. Burb., *Proc.Linn.Soc., Lond.* 153:89 (1941). **Jointed nineawn.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 33b). Perennial, pubescent throughout with both simple and glandular hairs and with prominent basal sheaths; stems breaking up at the nodes; terminal panicles shortly exserted, narrow-linear-cylindric, to 15 cm long, rather dense or interrupted and always contracted near the base; axillary inflorescences abundantly developed; solitary, highly modified spikelets borne in the axils of the enlarged woolly basal sheaths; glumes 2.5-3.5 mm long, minutely pebescant, elliptic to elliptic-lanceolate, obtuse and ragged at apex, 5-7-nerved; lemma prominently ribbed; awns 2.5-4 mm long.

Occurs in all mainland States except Vic. Recorded in S.Aust. from the N.W., Lake Eyre, Gairdner-Torrens, Flinders Ranges and Eastern Regions.

Flowers throughout the year.

A valuable grazing species.

5. *E. lindleyanus* (Domin) C. E. Hubbard, *Kew Bull.* 1934:450 (1934). **Wiry nineawn.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 35a). Pubescent perennial, with numerous simple branches rising from the upper part of the stem and continued as long exserted peduncles bearing the smallest panicles of the genus, 0.5-2 cm long, from elliptic to almost globular; glumes obtuse, 3-5-nerved, 1.5-2 mm long; lemma 1.5-2 mm, with prominent nerves and awns of about the same length; palea pubescent all over or glabrous.—*Pappophorum lindleyanum* Domin, *Bibliotheca bot.* 85:379 (1915).

Occurs in W.Aust., N.T., Qld and S.Aust. (N.W. and Flinders Ranges regions).

Flowers in S.Aust. only recorded in Nov. and Aug.

Not considered to be of grazing significance.

6. *E. nigricans* (R.Br.) Beauv., *Agrost.* 82 (1812). **Nigger-heads.** (Ill. N. T. Burbidge (1968) *Australian grasses* 2, pl. 42). Perennial, to 45 cm high, slightly pubescent; stems mostly simple; leaf-blades usually persistent; panicle ovate or oblong, dark or pale, often grey, on long peduncle, dense, 2-6 cm long, 1-1.5 cm wide; glumes lanceolate, 5-7-nerved, sparsely pubescent with minute simple hairs, the 1st 4 mm long, the 2nd 5 mm long, truncate and ragged at the apex; lemma 2 mm long, with the nerves usually distinct, rarely nearly obliterated; awns 4-6 mm long.—*Pappophorum nigricans* R.Br., *Prod.Fl.Nov.Holl.* 185 (1810).

Occurs in all Australian mainland States except N.T. Recorded in S.Aust. from all regions except the Nullarbor and Kangaroo I.

Flowers throughout the year.

Much grazed.

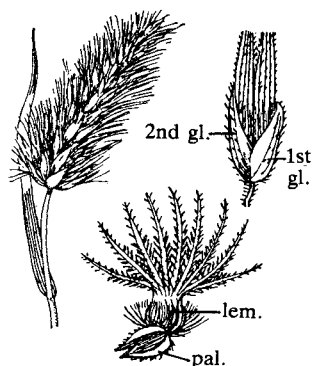


Fig. 144—*Enneapogon nigricans*.

7. *E. oblongus* N. T. Burb., *Proc.Linn.Soc., Lond.* 135:85 (1941). **Purple-head nineawn.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 35b). Perennial; stems slender, to 40 cm high, frequently branching from the upper nodes; nodes bearded; leaves more or less hairy; panicle purplish or pale, on a long exserted peduncle; glumes dense, ovoid or oblong, 1-3 cm long, c. 1 cm broad, the spikelets spreading at right angles to the rachis; glumes very obtuse, 3-4 mm long, 5-9-nerved, pubescent with simple and glandular hairs;

dense, ovoid or oblong, 1-3 cm long, c. 1 cm broad, the spikelets spreading at right angles to the rachis; glumes very obtuse, 3-4 mm long, 5-9-nerved, pubescent with simple and glandular hairs;

lemma prominently nerved, 2.5-4 mm long, dorsally straight, but the ciliate margin curved so that in profile the lemma appears asymmetrically cuneate, the awns 3-6 mm long; palea pubescent except for a bare patch at summit between the nerves.—*Pappophorum lindleyanum* var. *glaucum* Domin, *Bibliothca bot.* 85:380 (1915); *P. nigricans* var. *barbinode* Domin, *J.Linn.Soc. (Bot.)* 41:277 (1912).

Occurs in W.Aust., N.T., Qld and S.Aust. (N.W. and Flinders Ranges regions).

Flowers recorded only in May and Aug. in S.Aust.

Moderate grazing value.

8. ***E. polyphyllus*** (Domin) N. T. Burb., *Proc.Linn.Soc., Lond.* 135:69 (1941). **Leafy nineawn.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 33c). Annual or perennial, densely pubescent all over with both simple and glandular hairs; stems simple or branched, ultimately disarticulating at the nodes; leaf-blades numerous, erect, finally disarticulating; panicle lanceolate, dense, shortly exserted, 5-9 cm long, dense, axillary ones sometimes present; glumes 5-7 mm long, lanceolate, acuminate or acute, 7-11-nerved; lemma 2-3 mm long, more or less elliptic, hardened when mature with the nerves obliterated or indistinct; awns 6-7 mm long.—*Pappophorum nigricans* var. *polyphyllus* Domin, *Bibliothca bot.* 85:381 (1915), *P. nigricans* var. *pallidum* non (R.Br.) Domin, *sensu* Domin, *Bibliothca bot.* 85:381 (1915).

Occurs in all Australian mainland States except Vic. Recorded in S.Aust. from the N.W., Lake Eyre, Gairdner-Torrens, Flinders Ranges and Eastern regions.

Flowers throughout the year.

A valued grazing species which regenerates at any time of the year after rain.

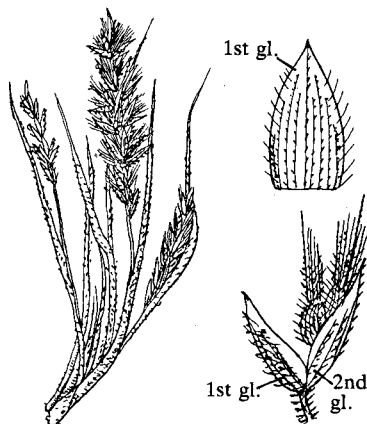


Fig. 145—*Enneapogon polyphyllus*.

TRIBE 16.—ERAGROSTIDEAE

72. DACTYLOCTENIUM Willd.

Enum.Hort.Berol. 1029 (1809).

(Greek *daktylos*, finger; *ktenion*, a little comb; the spikes are digitate and comb-like.)

Annuals or perennials, with prostrate to erect stems; leaf-blades flat; ligule membranous; inflorescence an umbel of spikes; spikelets 3-5-flowered, compressed laterally, sessile and crowded in 2 rows along one side of the narrow rachis of the spike and almost at right angles to it, the rachis projecting in an erect point beyond the spikelets; terminal floret barren; rachilla disarticulating; glumes 1-nerved, shorter than the florets, broad and boat-shaped, the 1st persistent, the 2nd deciduous; lemmas also broad, stiff, keeled, acuminate, curved outwards along the keel, 3-nerved. 10 species from warm areas.

1. Spikes 15-40 mm long; spikelets 2.5-3 mm long *D. aegyptium* 1.

1. Spikes 5-12 mm long; spikelets 5 mm long *D. radulans* 2.

*1. ***D. aegyptium*** (L.) Beauv., *Agrost.* pl. 15 (1812).—*Cynosurus aegyptius* L., *Sp.Pl.* 72. (1753).

Collected in 1936 growing in sandy soil along the coast near Port Pirie, also in coastal districts of north-east Qld and on the River Adelaide in N.T., since also recorded in W.Aust. Its occurrence in S.Aust. has not been confirmed. It is a weed of tropical countries.

2. ***D. radulans*** (R.Br.)Beauv., *Agrost.* 72 (1812). **Finger grass, button grass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 28a & b). Annual, sometimes prostrate or 10-40 cm high; leaf-blades flat, scabrous, sometimes ciliate with long hairs; spikes 4-10, digitate, 5-12 mm long, finally spreading and deciduous with the spikelets attached; rachis of spike keeled on back; spikelets 5 mm long, the 1st glume 2.5 mm long, the 2nd 3 mm long, mucronate, both scabrous on keel; lemmas 4.5 mm long, scabrous on keel.—*Eleusine radulans* R.Br., *Prod.Fl. Nov.Holl.* 186 (1810); *D. aegyptium* non (L.)Beauv., sensu J. M. Black, *Fl.S.Aust.* 85 (1922); *E. aegyptiaca* non Pers., sensu Benth., *Fl.Aust.* 7:615 (1878).



Fig. 146—*Dactyloctenium radulans*.

Occurs in all Australian mainland States. Recorded in S.Aust. from the N.W., Lake Eyre, Gairdner-Torrens, Flinders Ranges, Eastern, Eyre Pen., Yorke Pen. and Northern and Southern Lofty regions.

Flowers Jan.-July.

Regarded by Lazarides (1970) as one of the most valuable pasture grasses in Central Australia, although it can be toxic to cattle in poor condition.

73. *DIPLACHNE* Beauv.

Agrost. 80 (1812).

(Greek *diploos*, double; *achnē*, a glume (lemma); the lemma is 2-lobed.)

Usually tufted perennials; leaf-blade flat or involute; ligule membranous, sometimes very small; inflorescence a panicle of long, slender, simple spike-like branches; spikelets dorsally compressed, cylindrical, subsessile, several-flowered, the uppermost flowers barren, the rachilla disarticulating; glumes subequal, hyaline, 1-nerved (keeled), persistent, obtuse or minutely notched, much shorter than the florets; lemmas membranous, rounded or flat on back, closely imbricate, 3-nerved with the 2 lateral nerves near the margin, notched at summit and with a short mucro rising between the lobes; palea rather broad, flat. 15 species from most of the world. (C. A. Gardner (1952) *Flora of Western Australia* 1.)

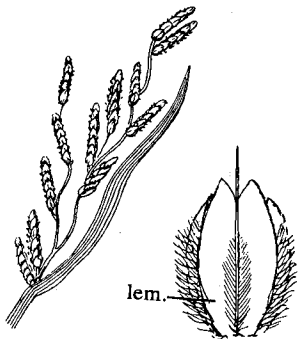


Fig. 147—*Diplachne fusca*.

1. Spikelets 8-20 mm long, 8-14-flowered

2. Spikelets dark; lemma lobes acute, with a mucro or awn usually longer than the lobes

D. fusca 1.

2. Spikelets becoming pale; lemma lobes rounded, with a mucro not longer than the lobes

D. muelleri 2.

1. Spikelets scarcely 8 mm long; usually 5-6-flowered

D. parviflora 3.

1. ***D. fusca*** (L.)Beauv., *Agrost.* 80 (1812). **Brown beetle-grass.** (Ill. N. T. Burbidge (1968) *Australian grasses* 2, pl. 5). Perennial, 20 cm to 1 m high, almost glabrous; leaves long, with loose sheaths; panicle 10-40 cm long, with erect branches; spikelets linear, lead-coloured, 6-14-flowered, 10-15 mm long; 1st glume 3.5-4 mm long, the 2nd 4.5-5 mm long; lemma 4.5 mm long, the midnerve produced into an awn or mucro usually a little longer than the acute lateral lobes,

the nerves silky-villous in the lower half; palea also ciliate with long hairs on the nerves.—*Festuca fusca* L., *Sp.Pl.* ed.2, 1:109 (1762).

Occurs in Africa, South East Asia and all Australian mainland States. Recorded in S.Aust. from the N.W., Lake Eyre, Flinders Ranges, Eastern, Yorke Pen. and Murray regions.

Flowers April-Oct.

Grows in or near wet places. Highly palatable.

2. **D. muelleri** Benth., *Fl. Aust.* 7:619 (1878). (Ill. C. A. Gardner (1952) *Flora of Western Australia* 1, pl. 32a). Perennial, 30-50 cm high, glabrous; leaves long, with loose sheaths; panicle 10-12 cm long, with erect branches; spikelets broadly linear, becoming pale with age but at first dull lead-coloured, 8-13-flowered, 12-15 mm long; 1st glume 4 mm long, the 2nd 5 mm long; lemma 4-5 mm long, the midnerve produced into a short mucro not longer than the rounded lateral lobes, pubescent on the midnerve and towards the margins; palea ciliate on the nerves and pubescent on the margins.

Occurs in W.Aust., N.T., Qld, N.S.W. and S.Aust. (Lake Eyre, Flinders Ranges, Southern Lofty and Murray regions).

Flowers Nov.-June.

3. **D. parviflora** (R.Br.) Benth., *Fl. Aust.* 7:620 (1878). **Small-flowered beetle-grass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 31b). Perennial, 60-120 cm or more high, glabrous; leaves with loose sheaths, blade to 30 cm or more long; panicle 20-30 cm long, with numerous branches to 13 cm long and divaricate at maturity; distinctly pedicellate spikelets usually olive-green but becoming pale with age, 5-9-flowered, usually 7-8 mm long; 1st glume 1.75-2 mm long, the 2nd 2.25-2.5 mm long; lemma 2.5-3 mm long, usually with a prominent mucro, hairy on the midnerve and margins; palea glabrous.—*Triodia parviflora* R.Br., *Prod.Fl.Nov.Holl.* 182 (1810).

Occurs in W.Aust., N.T., Qld, N.S.W. and S.Aust. (Yorke Pen., Southern Lofty and Murray regions).

Flowers Jan. (one record in S.Aust.), recorded by Lazarides as March-May.

In Central Australia occurs in or near water and is palatable.

74. ELEUSINE Gaertn.

Fruct. 1, 7:t.1 (1789).

(From Eleusis, a city in Attica, where Demeter, the Roman Ceres, the goddess of cereals and harvests was worshipped.)

Annuals or perennials; leaf-blade flat or folded; ligule membranous; inflorescence an umbel of spikes, rachis flattened, bearing the densely imbricate alternately unilateral spikelets; spikelets sessile, laterally compressed, rachilla disarticulating above the glumes and between the florets, 3-6-flowered; glumes subequal or unequal, membranous, obtuse or obscurely mucronate, with a crested ridged keel, 1-5-nerved; lemmas very similar, 3-nerved to sub-5-nerved; palea slightly shorter, 2-keeled. (From C. A. Gardner (1952) *Flora of Western Australia* 1.) 9 species from tropical and subtropical areas of the world.

1. Spikes 20-90 mm long, to c. 5 mm wide; spikelets 4-7 mm long *E. indica* 1.

1. Spikes up to 25 mm long, 5-7 mm wide; spikelets 2-3 mm long *E. tristachya* 2.

*1. **E. indica** (L.) Gaertn., *Fruct.* 1:8 (1789). **Crowsfoot grass.** (Ill. Meredith (1955) *The grasses and pastures of South Africa*, fig. 102). Annual or perennial, to 90 cm high; leaf-blades conduplicate, sheaths and bases of blades with few long hairs; inflorescence a finger-like cluster of 2-5 spikes, the lower shortly spaced near the top of the culm, the upper tightly clustered, each

spike 2.9 cm long, to c. 5 mm wide, sessile, green; spikelets 4.7 mm long, lanceolate, 3-5-flowered, flattened; glumes shorter than the lemmas, oblong-lanceolate, keeled; lemmas lanceolate, keeled, 3.4 mm long, not incurved.—*Cynosurus indicus* L., *Sp.Pl.* 72 (1753).

Native to tropical and subtropical countries; naturalised in all mainland Australian States except Vic. Recorded in S.Aust. only from around Adelaide (Southern Lofty region).

Flowers Feb.-March.

This species may be confused with *Leptochloa digitata*, but can be identified by the prominently keeled glumes and lemmas.



Fig. 148—*Eleusine indica*.
A, inflorescence, $\times \frac{1}{2}$; B,
spikelet, $\times 5$.

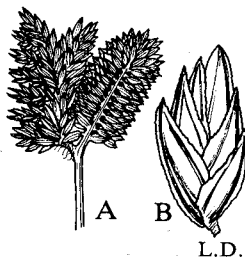


Fig. 149—*Eleusine tristachya*. A, inflorescence,
natural size; B, spikelet,
 $\times 10$.

*2. *E. tristachya* (Lam.) Lam., *Tabl. Encycl.* 1:203 (1792). **American crowfoot grass, goose grass.** (Ill N. T. Burbidge (1968) *Australian grasses* 2, pl. 56). Short-lived tufted perennial, to 30 cm high; leaf-blades glabrous, 5-12 cm long, strongly keeled, c. 2 mm wide when flattened out, obtuse and more or less boat-shaped at apex; ligule a short fimbriate collar c. 0.5 mm high; inflorescence a finger-like cluster of 2-4 rigidly diverging spikes at apex of culm; each spike to 25 mm long (often much less), 7-10 mm wide, sessile, sometimes purplish; spikelets 2-3 mm long, narrowly ovoid, several-flowered, hard, rigid, sessile and closely overlapping, disposed in 2 dense rows along one side of the broad rachis which ends in a spikelet; glumes glabrous, rather obtuse, 1-nerved, unequal, the 1st c. 2 mm long, the 2nd 2.5 mm long; lemma c. 3 mm long, keeled, acute, glabrous, 3-nerved.—*Cynosurus tristachyos* Lam., *Encycl.* 2:188 (1786); *E. coracana* non (L.) Gaertn., sensu J. M. Black, *Fl.S.Aust.* 518 (1948). (Description from Willis (1970) *A handbook to plants in Victoria* ed. 2, 1).

Native to South America, naturalised in the eastern States of Australia and recorded in S.Aust. from Adelaide (Southern Lofty region) and Meningie (S.E. region).

Flowers Dec.-June.

Confused in the literature with Indian millet (*E. coracana*). It occurs as a weed and is of no grazing value.

75. ELYTROPHORUS Beauv.

Agrost. 67 (1812).

(Greek *elytron*, a sheath; *phoros*, bearing, alluding to the glumes.)

Glabrous annuals of wet places; leaf-blades expanded, ligule a membrane sometimes minutely hairy; inflorescence of dense globose or cylindrical clusters of spikelets on a common axis, the

whole forming an interrupted or uninterrupted spike-like panicle, the clusters of spikelets usually subtended by 2-many bracts; spikelets small, compressed laterally, 4-6-flowered; glumes subequal, persistent, mucronate, 1-nerved; lemma rounded on back, 3-nerved, tapering into a short awn; palea bifid at summit, with 2 broad, dorsal, hyaline, denticulate wings, which embrace the base of the adjoining flower in the spikelet, the 2 narrow inner wings enclosing the grain. 4 species in Africa, Asia and Australia.

1. *E. spicatus* (Willd.) Camus in Lecomte, *Flor. gen. l'Ind.-Chin.* 7:547 (1923). **Spike-grass.** Small annual, 8-30 cm high, with flat leaf-blades to 10 cm long and loose sheaths; inflorescence clusters globular, 6-10 mm diameter; glumes c. 3 mm long, ciliate on margins; lemma 4 mm long (including the point or awn of c.2 mm).—*Dactylis spicata* Willd., *Neue Schr. Ges. Naturf. Freund. Berl.* 3:416 (1801); *E. articulatus* Beauv., *Agrost.* 67 (1812).

Occurs in Africa, southern Asia and all Australian States except Vic. In S.Aust. recorded from the Lake Eyre region and by J. M. Black (1943) from the Murray region.

Flowers June (1 record).

Not of economic importance.



Fig. 150—*Elytrophorus spicatus*. A, habit, x $\frac{1}{2}$; B, flower, x 3.

76. ERAGROSTIS Wolf

Gen. Pl. 23 (1776).

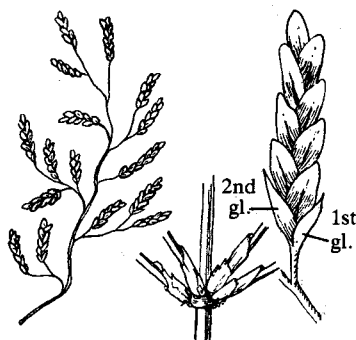
(Greek *erōs*, love; *agrōstis*, grass; alluding to the elegance of the spikelets.)

Annuals or perennials, usually tufted; leaf-blade flat or variously inrolled; ligule usually a minute fringe of hairs; inflorescence a panicle; spikelets of several or many florets, the rachilla fragile or persistent; glumes 2, persistent, usually equal and 1-nerved, hyaline, keeled, shorter than the florets, lemmas unawned, 3-nerved, more or less imbricate, usually obtuse when flattened, but often acute in profile; palea prominently 2-nerved, often persistent on the rachilla after the lemma and grain have fallen. About 300 species, cosmopolitan.

1. Rachilla disarticulating between the lemmas which fall off with their paleas and ripe grain.
 2. Panicle loose.
 3. Spikelets 6-10 mm long *E. curvula* 8.
 3. Spikelets 1-4 mm long *E. japonica* 14.
 2. Panicle dense; pedicels of lateral spikelets 0.25-0.5 mm long.
 4. Panicle very dense; florets oblong *E. confertiflora* 7.
 4. Panicle sometimes slightly spreading; florets globular *E. kennedyae* 15.
1. Rachilla persistent or subpersistent with the paleas remaining attached.
 5. Spikelets terete, very narrow (c. 1-1.5 mm broad).
 6. Spikelets pedicellate, distant.
 7. Spikelets obliquely spreading; lemmas broadest about the middle *E. falcata* 12.
 7. Spikelets nearly divaricately spreading; lemmas broadest distinctly below the middle *E. lacunaria* 16.
 6. Spikelets sessile, clustered *E. dielsii* 9.
 5. Spikelets slightly or strongly flattened, usually more than 1.5 mm broad.
 8. Plant more than 120 cm high, cane-like *E. australasica* 1.
 8. Plant rarely exceeding 1 m, if so then not cane-like.

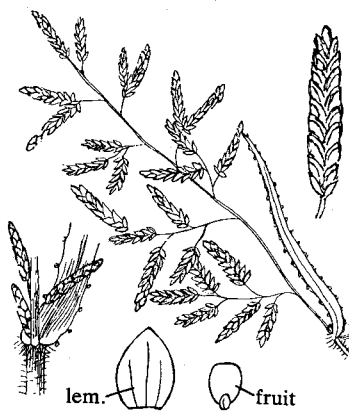
9. Spikelets slightly flattened, without a longitudinal furrow between the two rows of florets.
 10. Palea not more than half as long as the lemma *E. speciosa* 21.
 10. Palea distinctly more than half as long as the lemma.
 11. Annuals; palea 1.5-2 mm long.
 12. Spikelets 3-6 mm long; lemmas scabrous *E. leptocarpa* 18.
 12. Spikelets 6-10 mm long; lemmas glabrous *E. parviflora* 19.
 11. Perennials; palea 2.5-3 mm long.
 13. Panicle narrow, 3-10 cm long, 1-2 cm broad *E. infecunda* 13.
 13. Panicle eventually loose, 10-30 cm long, 10-20 cm broad *E. curvula* 8.
9. Spikelets very flat, with a longitudinal furrow between the two rows of florets.
 14. Base of stems glabrous, not or only slightly swollen.
 15. Spikelets sessile or subsessile.
 16. Annual; lemma 2-3 mm long; spikelet 8-15 mm long *E. basedowii* 3.
 16. Perennial; lemma c. 1.5 mm long; spikelet 3-6 mm long *E. elongata* 10.
 15. Spikelets distinctly pedicellate.
 17. Leaf-blades mostly involute, without marginal tubercles; panicles all terminal, narrow or loose; spikelets 6-18-flowered; perennial *E. brownii* 4.
 17. Leaf-blades flat, with depressed tubercles or glands along the margins; panicles loose; the lower small, axillary and half concealed; spikelets 8-30-flowered; annuals.
 18. Spikelets 3 mm broad; all panicles terminal *E. cilianensis* 5.
 18. Spikelets 2 mm broad; lower panicles small, axillary, half concealed *E. barrelieri* 2.
 14. Base of stems bulbous-woolly, rarely only slightly hairy.
 19. Leaf-blades setaceous; panicle narrow, loose or dense.
 20. Spikelets linear or lanceolate, many-flowered, 5-20 mm long.
 21. Spikelets woolly *E. laniflora* 17.
 21. Spikelets glabrous.
 22. Panicle-branches (often very few) spreading; spikelets 2-3 mm broad *E. eriopoda* 11.
 22. Panicle-branches erect; spikelets c. 1.5 mm broad *E. setifolia* 20.
 20. Spikelets broad at base, tapering upwards, few-flowered, 3-5 mm long *E. clelandii* 6.
 19. Leaf-blades flat, short; panicle spike-like *E. xerophila* 22.

1. *E. australasica* (Steud.), C. E. Hubbard, *Kew Bull.* 1941:26 (1941). **Cane-grass, bamboo-grass.** (Ill. C. A. Gardner (1952) *Flora of Western Australia* 1, pl. 33b). Stems very stout, rigid, to 3 m high, the upper branches usually clustered, with brown sheaths at base; leaves distant on stem, the blades subulate or narrow and flat, 3-20 cm long; panicle loose, 10-20 cm long, 6-12 cm broad, the spreading branches distant, mostly solitary; spikelets 5-12 mm long, 6-12-flowered, linear, flat but not furrowed; glumes unequal, obtuse, the 1st 1.5-2 mm long, the 2nd 3 mm long; lemmas hyaline, becoming rather loose, obtuse, torn, c. 2.5 mm long, with 3 faint nerves not reaching the summit, glabrous; palea glabrous, splitting readily into 2 parts; grain ovoid-oblong, c. 1 mm long.—*Glyceria australasica* Steud., *Synops. Pl. glumac.* 1:286 (1854); *Poa ramigera* F. Muell., *J. Trans. Vict. Inst.* 1:45 (1855); *G. ramigera* (F. Muell.) Benth., *Fl. Aust.* 7:659 (1878).

Fig. 151—*Eragrostis australasica*.

Occurs in all Australian mainland States. Recorded in S.Aust. in the Lake Eyre, Gairdner-Torrens, Flinders Ranges, Eastern, Northern and Southern Lofly and Murray regions.

Flowers Sept.-May.

Fig. 152—*Eragrostis barrelieri*.

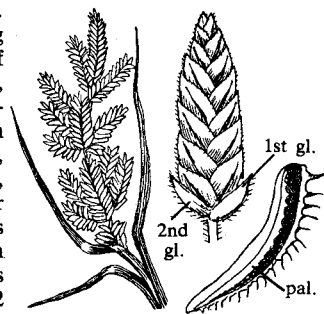
*2. *E. barrelieri* Daveau in Morot, *J.Bot.*, Paris 8:289 (1894). **Pitted lovegrass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 36a). Annual, 15-50 cm high; leaves almost glabrous except the long-bearded orifice of the sheath and minute tubercles on the edges of the flat or involute blades; panicle loose, 5-15 cm long, 3-6 cm broad, the branches finally spreading, with small axillary panicles partly concealed by the swollen sheaths; spikelets dark or pale, linear, flat, furrowed, 6-15 mm long, 1.5-2 mm broad, 8-26-flowered, on short capillary pedicels; glumes subacute, the 1st 1 mm long, the 2nd 1.25 mm long; lemma 2-2.5 mm long; grain oblong, 1 mm long.

Native to the Mediterranean, naturalised in many countries and recorded in N.T., N.S.W. and S.Aust. (throughout the N.W., Lake Eyre, Flinders Ranges and Eastern regions). There are also a few records from Adelaide (Southern Lofly region).

Flowers Sept.-May.

In N.T. recorded from disturbed or well-watered habitats; readily grazed.

3. *E. basedowii* Jedwabnick, *Bot.Archiv.* 4:328 (1923). Annual, 7-25 cm high; leaves glabrous or rarely with long scattered hairs seated on tubercles and always with a ring of long hairs at orifice of sheath; blades flat, c. 3 mm broad, tapering upwards, 3-9 cm long; panicle contracted, interrupted, 4-10 cm long, 2-3 cm broad, the spikelets usually in dense clusters of 2-12 along the short panicle-branches, sessile, linear-lanceolate or linear, 8-20 mm long, 3-4 mm broad, furrowed down the middle, very flat, 10-40-flowered, pale or purplish; rhachilla finally disarticulating from summit; glumes subequal, shorter than the lemmas; lemma 3 mm long, with prominent nerves and scabrous on keel; palea three-quarters as long, with long conspicuous bristly spreading cilia on the 2 nerves; grain ovoid, 0.75 mm long.—*E. concinna* non Steud., sense Benth., *Fl.Aust.* 7:647 (1878), partly.

Fig. 153—*Eragrostis basedowii*.

Occurs in W.Aust., N.T., Qld, N.S.W. and S.Aust. (Lake Eyre region). Its further distribution is obscure as a result of confusion between *E. basedowii* and *E. concinna*, but probably also in the N.W. and Gairdner-Torrens regions

Flowers Jan.-July.

4. *E. brownii* (Kunth) Nees ex Steud., *Nom.Bot.* 1:562 (1841). **Common love-grass.** (Ill. N. T. Burbidge (1966) *Australian grasses* 1, pl. 8). Perennial, 4-40 cm high, glabrous except hairs at mouth of sheath; blades setaceous or flat and narrow; panicle usually loose, 2-15 cm long, 2-8 cm

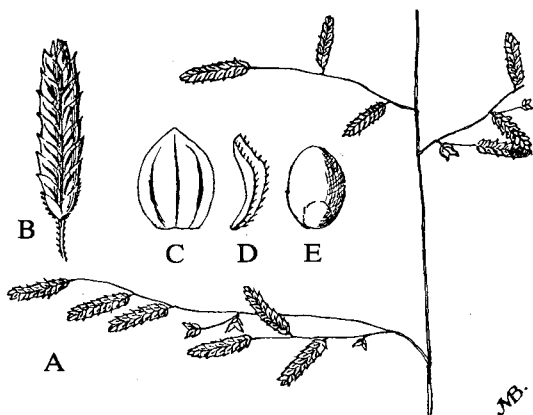


Fig. 154—*Eragrostis brownii*. A, inflorescence, natural size; B, spikelet, x 3; C, lemma, x 7; D, palea, x 7; E, fruit.

broad (when the solitary lower branches are long and spreading); spikelets 5-9 mm long, 2 mm broad, flat, furrowed down centre, linear-lanceolate, 6-18-flowered, shortly pedicellate, distant or clustered; rhachilla tardily distintegrating; glumes almost equal, shorter than the lemmas, acute or acuminate, keeled; lemmas lead-coloured with conspicuous lateral nerves, 2 mm long, scabrous on keel, the lateral nerves prominent, palea nearly as long; stamens 2-3; grain ovoid, almost globular, 0.5 mm long.—*Poa brownii* Kunth, *Rev. Gram.* 112 (1829).

Occurs in all Australian mainland States. Recorded in S.Aust. from the Flinders Ranges, Northern and Southern Lofty and S.E. regions.

Flowers Aug.-April.

Not regarded as economically significant.

Hj. Eichler (1965) recommended the use of Kunth's original spelling, *brownei*, but later authors have corrected it to *brownii*.

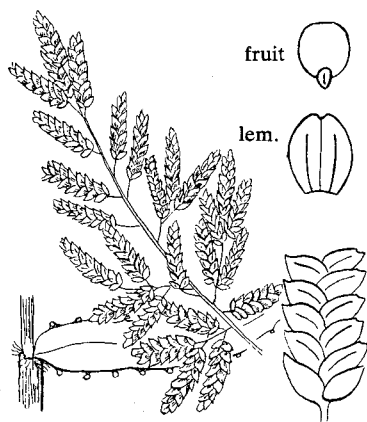


Fig. 155—*Eragrostis cilianensis*.

*5. *E. cilianensis* (All.) Link ex Vign.-Lut., *Malpighia* 18:386 (1904). **Stink grass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 36b). Annual, to 40 cm high; leaves glabrous, except for long hairs at orifice of sheath, the blades flat or involute, with small tuberculate teeth along the edges; panicle narrow but rather loose, 5-12 cm long, 2-3 cm broad, with short, spreading or erect branches; spikelets becoming lead-coloured, 5-15 mm long, 3 mm broad, flat, furrowed, oblong, 10-30-flowered, shortly pedicellate; rhachilla not disarticulating; glumes 2-25 mm long, the 1st 1-nerved, the 2nd 3-nerved; lemma obtuse, almost notched, 2.5-3 mm long, with very prominent nerves; palea broad, nearly as long; grain ovoid, 0.75 mm long.—*Poa cilianensis* All., *Fl.Ped.* 2:246 (1785); *E. major* Host, *Icon.Descr.Gram.Aust.* 4:14 (1809); *Poa megastachya* Koel., *Descr.Gram.* 181 (1802); *E. megastachya* (Koel.) Link, *Hort.bot.Berol.* 1:187 (1827).

Native to Europe, Africa and Asia, naturalised in all Australian States. Recorded in S.Aust. from the Lake Eyre, Flinders Ranges, Eastern, Eyre Pen., Yorke Pen., Southern Lofty, Murray and S.E. regions.

Flowers Dec.-May.

Not considered to have any grazing value.

6. *E. clelandii* S. T. Blake, *Trans.R.Soc.S.Aust.* 67:49 (1943). Perennial, with stiff, slender, erect stems 20-30 cm high and a woolly bulbous base; leaves chiefly on the stem, glabrous, very shortly bearded at mouth of sheath; blades setaceous, 3-10 cm long, the uppermost the longest; panicle narrow but loose, 3-7 cm long, from under 1 to 2 cm broad, the lower branches short, distant, spreading, solitary; spikelets sessile, purple, flat, furrowed, 7-12-flowered, 3-5 mm long, 2-3 mm broad at base and tapering to the obtuse summit, sometimes resembling those of a small *Briza*; lemmas broad, obtuse, divergent, mucronate, villous-ciliate on the lower margins, 2 mm long; palea with rather long silky hairs on the nerves.

Occurs in ?W.Aust., N.T. and S.Aust. (N.W. and Nullarbor regions).

Flowers Aug.-Oct.

This species appears to have been confused with *E. lanipes* C. E. Hubbard and the differences between these species require examination.

7. *E. confertiflora* (J. M. Black) J. M. Black, *Trans.R.Soc.S.Aust.* 55:136 (1931). **Spike lovegrass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 36c). Slender erect annual, 10-40 cm high; leaf-blades flat; panicle erect, spike-like, 6-10 cm long, 1 cm or less broad, interrupted towards base, the branches 5-20 mm long, appressed in dense clusters along the main rhachis and clothed with spikelets to their bases; spikelets subsessile, 2-3 mm long, 4-5-flowered; rachilla fragile; lemmas 1 mm long, almost hyaline; palea glabrous; grain shining, ovoid, 0.5 mm long.—*E. interrupta* var. *densiflora* J. M. Black, *Trans.R.Soc.S.Aust.* 48:253 (1924), not *E. densiflora* Rendle, *Cat.Welw.Afr.Pl.* 2:244 (1899).

Occurs in N.T., Old and S.Aust. (Lake Eyre region).

Flowers May (one record).

Of no grazing value.

*8. *E. curvula* (Schrud.) Nees, *Fl.Afr.Austr.* 1:397 (1841). **African lovegrass, weeping lovegrass.** (Ill. Meredith (1955) *The grasses and pastures of South Africa*, fig. 110). Almost glabrous perennial, with numerous young shoots; stems rigid, erect, with 2-3 prominent nodes; leaf-blades narrow; ligule a conspicuous ring of hairs; panicle loose, 20-30 cm long, 10-20 cm broad, the branches and branchlets somewhat undulate, 2 or 3 lowest branches usually villous at base; spikelets pedicellate, 6-8 mm long, 6-8-flowered, not furrowed down the centre; the rachilla fragile, breaking up from the summit downwards; glumes subequal, 1-nerved; lemmas obtuse, 2.5 mm long; palea as long.—*Poa curvula* Schrad., *Gott.Anz.Ges.Wiss.* 3:2073 (1821).

Native to southern Africa, naturalised in all Australian mainland States. Recorded in S.Aust. from the Murray and S.E. regions.

Flowers Jan.-April.

A valuable pasture grass.

9. *E. dielsii* Pilger, *Bot.Jb.* 35:76 (1905). **Mulka grass, mallee lovegrass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 38a). Perennial, with prostrate, geniculate or erect, stiff, slender stems, 5-40 cm long; leaves scabrous, the blades stiff, setaceous or flat and very narrow, 1-8 cm long; panicle 2-10 cm long; branches solitary, 2-3 cm long

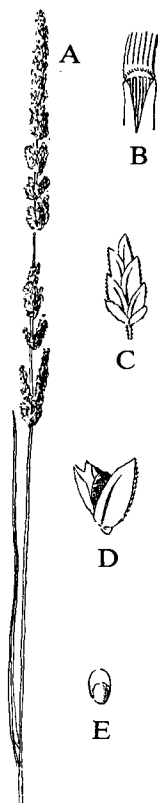


Fig. 156—*Eragrostis confertiflora*. A, inflorescence, x $\frac{1}{2}$; B, ligule, x 5; C, spikelet, x 5; D, lemma and palea, x 10; E, fruit, x 10.

and clothed with clusters of spikes to the base, or the whole panicle short and reduced to a spike; spikelets sessile, pale or dark, often curved, terete, 10-25 mm long, c. 1.5 mm broad, not furrowed, 12-45-flowered; glumes ovate; lemmas broad, very obtuse, under 2 mm long, the lateral nerves prominent; palea ciliate on nerves; grain ovoid, scarcely 1 mm long.—*E. falcata* non Gaud., sensu Benth., *Fl.Aust.* 7:649 (1878).

Occurs in all Australian mainland States. Recorded in S.Aust. from throughout the arid areas, but present also in the Eyre Pen., Yorke Pen., Flinders Ranges, Eastern and Murray regions.

Flowers throughout the year.

Often grows in areas of high salinity. Palatable to stock.

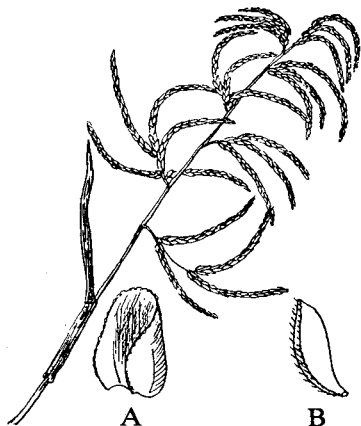


Fig. 157—*Eragrostis dielsii*. A, lemma; B, palea.

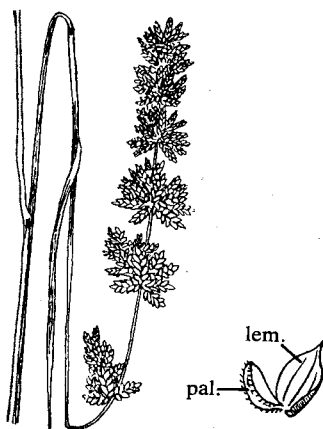


Fig. 158—*Eragrostis elongata*.

10. *E. elongata* (Willd.) Jacq. f., *Eclog. Gram. rar.* 2:3 (1813). **Clustered lovegrass, close-headed lovegrass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 37b). Almost glabrous perennial, 30-60 cm high; leaf-blades setaceous or narrow and flat; panicle narrow, continuous or interrupted towards the base, 3-15 cm long, from less than 1 to 1.5 cm broad; spikelets lanceolate, 3-6 mm long, 2 mm broad, 6-14-flowered, sessile in dense sessile clusters, often forming short distant branches towards the base of the panicle; rhachilla not articulate; glumes as long as or slightly shorter than the 1st lemma, narrow, with scabrous prominent keels; lemmas white or purplish, with conspicuous green lateral nerves, 1.5 mm long, minutely scabrous; palea nearly as long, shortly ciliate on nerves; stamens 2, small, purple (3 in most species); grain ovoid or almost globular, 0.5-0.75 mm long.—*Poa elongata* Willd., *Enum. Hort. Berol.* 108 (1809); *P. diandra* R. Br., *Prod. Fl. Nov. Holl.* 180 (1810); *E. diandra* (R. Br.) Steud., *Synops. P. glumac.* 1:279 (1854).

Occurs in all Australian mainland States. Recorded in S.Aust. from the Lake Eyre, Murray and S.E. regions.

Flowers Dec.-March.

11. *E. eriopoda* Benth., *Fl.Aust.* 7:648 (1878). **Naked woollybutt.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 39). Slender but stiff perennial, 30-50 cm high, the stems rising from a bulbous densely woolly base; leaves glabrous, except the lowest sheaths, the blades mostly setaceous, rather short; panicle narrow, almost like a loose spike, c. 10 cm long by 2 cm broad; spikelets subsessile, spreading, purplish, linear, furrowed, 5-12 mm long, 2-3 mm broad, 6-20-flowered, glabrous, obtuse; glumes subequal, 1.75-2 mm long, 3-nerved; lemma 2-3 mm long; palea broad, scabrous on nerves; grain ovoid, barely 1 mm long.

Occurs in all Australian mainland States except Vic. and Qld. Recorded in S.Aust. from the N.W., Lake Eyre and Flinders Ranges regions.

Flowers recorded in S.Aust. in Aug. and April.

Moderately palatable.

12. *E. falcata* (Gaud.) Benth., *Fl. Aust.* 7:649 (1878). **Sickle lovegrass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 38b). Perennial, with slender stems, 15-40 cm high; leaves almost glabrous or beset with rather long scattered spreading hairs, the blades setaceous, 2-8 cm long; panicle 6-12 cm long, 2-8 cm broad, the capillary branches finally spreading; spikelets rather distant, shortly pedicellate, purple or brown, obliquely spreading, linear and terete (1 mm broad), straight or somewhat curved, 10-40-flowered, 5-16 mm long; glumes oblong-lanceolate, somewhat unequal, 1.2-1.5 mm long; lemmas subtruncate, broadest about the middle, closely appressed but rather distant from each other, 1.5 mm long, the lateral nerves faint, nerves equally distributed; palea almost glabrous; grain dorso-ventrally compressed, ovoid-oblong, under 1 mm long.—*E. trichophylla* Benth., *Fl. Aust.* 7:644 (1878).

Occurs in W.Aust., N.T., N.S.W. and S.Aust. (N.W., Lake Eyre, Nullarbor, Gairdner-Torrens, Eastern and Eyre Pen. regions).

Flowers recorded Aug., Sept. and Feb.

Palatable.

13. *E. infecunda* J. M. Black, *Trans. R. Soc. S. Aust.* 55:137 (1931). Glabrous perennial, with stolons rooting at the nodes; stem long, slender but stiff, almost bulbous at base; leaf-blades subulate or the lower ones flat, 3-8 cm long; panicle narrow but loose, 3-10 cm long, 1-2 cm broad; spikelet subsessile or shortly pedicellate, few on each panicle-branch, linear, 3-8-flowered, 7-12 mm long, 1.5 mm broad, the florets becoming divergent and distant along the rhachilla, but the spikelet showing no regular furrow; lemma glabrous, c. 3 mm long; palea as long, glabrous on nerves; grain not known.

Occurs only in the Mintaro-Riverton area (Northern Lofty region).

Flowers Dec.-March.

*14. *E. japonica* (Thunb.) Trin., *Mem. Acad. Sci. St Petersburg*, ser. 6. Sci. math. phys. & nat. 1:405 (1831). **Delicate lovegrass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 40a). Erect annual, 12-40 cm high; leaves flat; panicle 8-25 cm long, 2-6 cm broad, occupying the greater part of the plant, with long or short spreading branches; spikelets 4-8-flowered, 1-4 mm long, 1 mm broad, shortly pedicellate, often purplish; rhachilla breaking up from the top downwards; lemmas obtuse, c. 1 mm long, loosely imbricate, the nerves prominent; palea glabrous on the nerves; grain ovate-oblong, 0.5 mm long—*Poa japonica* Thunb., *Fl. Jap.* 51 (1784); *E. tenella* non (L.) Beauv. ex Roem. & Schult., sensu Benth., *Fl. Aust.* 7:643 (1878); *E. interrupta* var. *tenuissima* Stapf ex Hook. f., *Fl. Brit. Ind.* 7:316 (1896).

Occurs in Africa, Asia and all Australian mainland States except N.S.W. Recorded in S.Aust. in the Lake Eyre and Eastern regions.

Flowers April and Aug.

Not of significance as grazing.

S. T. Blake, in an unpublished manuscript, suggested that the species should be identified as *E. tenellula* (Kunth) Steud.

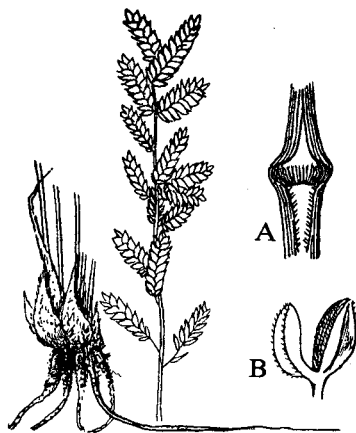


Fig. 159—*Eragrostis eriopoda*. A, ligule; B, palea and lemma.

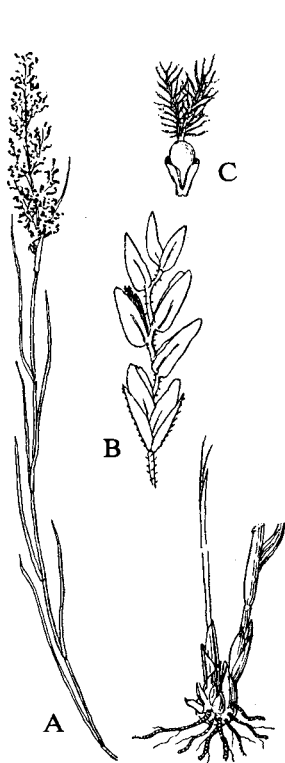


Fig. 160—*Eragrostis infecunda*. A, habit, x $\frac{1}{2}$; B, spikelet, x 3; C, lodicules and gynoecium.

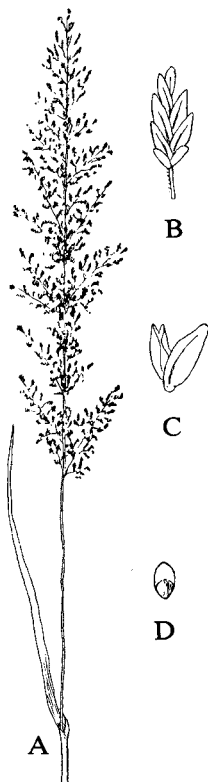


Fig. 161—*Eragrostis japonica*. A, inflorescence, x $\frac{1}{2}$; B, spikelet, x 5; C, palea and lemma, x 10; D, fruit, x 10.



Fig. 162—*Eragrostis kennedyae*. A, inflorescence, x $\frac{1}{2}$; B, spikelet, x 5; C, lemma and palea, x 10; D, fruit, x 10.

15. *E. kennedyae* Turner, *Proc.Linn.Soc.N.S.W.*, ser.2, 8:535 (1894). **Small-flowered lovegrass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 40b). Slender perennial, 15-40 cm high; leaves glabrous except sheaths sometimes bearded at orifice, the blades setaceous or flattish; panicle 8-15 cm long, at first spike-like but later c. 3 cm broad near base, when the lower branches spread; spikelets 3-5-flowered, purplish, 1-1.5 mm long; pedicels of lateral spikelets 0.25-0.5 mm long; rachilla fragile; glumes with a prominent minutely scabrous keel, under 1 mm long; lemmas almost globular, under 1 mm long, the lateral nerves very faint or obsolete; grain obovoid, under 0.5 mm long.

Occurs in all Australian mainland states except Vic. Recorded twice in S.Aust. in the Lake Eyre and Gairdner-Torrens regions.

Flowers April-May.

Not palatable.

16. *E. lacunaria* F. Muell. ex Benth., *Fl.Aust.* 7:649 (1878). **Purple lovegrass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl.38c). Annual or perennial, with slender stems, 20-40

cm high; leaves glabrous or with long tubercle-based hairs, the blades narrowly involute, 2-7 cm long; panicle 11-16 cm long, 6-10 cm broad, the capillary branches spreading or divaricate; spikelets rather distant, distinctly pedicellate, nearly divaricately spreading, linear, scarcely flattened, to 1 mm broad, 11-33-flowered, 6-18 mm long; glumes unequal, the 1st 0.5 mm long, the 2nd 0.75-1 mm long; lemmas obtuse, broadest distinctly below the middle, distinctly narrowed upwards, 1.5 mm long, with the lateral nerves approaching the margins; palea on the keel; grain laterally compressed, under 0.5 mm long.—*E. rankingii* F. M. Bail., *Dept. Agric. Brisbane Bot. Bull.* 2:22 (1891).

Occurs in all Australian mainland States. Recorded in S.Aust. from the Murray region. Flowers Dec.-March.

17. *E. laniflora* Benth., *Fl. Aust.* 7:648 (1878). **Hairy flowered woollybutt.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 41a). Slender but stiff perennial, 30-60 cm high, the stems rising from a bulbous densely woolly base; leaves glabrous except the lowest sheaths, the blades mostly setaceous, rather short; panicle narrow, almost like a loose spike, c. 10 cm long by 2 cm broad, the panicle-branches sometimes spreading horizontally and 2-4 cm long; spikelets subsessile, spreading, purplish, linear, furrowed, 6-15 mm long, 2-3.5 mm broad, 12-40-flowered, with tufts of long silky hairs at the base of lemmas and paleas giving a more or less woolly aspect to the spikelet; lemmas broad, obtuse, 2.5 mm long; palea very broad, scabrous on the upper part of nerves and silky at their base; grain almost globular, truncate at base, under 1 mm long.

Occurs in W.Aust., N.T., Qld, N.S.W. and S.Aust. (N.W., Lake Eyre, Nullarbor, Eastern and Murray regions).

Flowers Feb.-June.

Moderately palatable.

18. *E. leptocarpa* Benth., *Fl. Aust.* 7:644 (1878). **Drooping lovegrass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 40c). Slender annual, 10-50 cm high; leaves flat or setaceous; panicle 6-18 cm long, at first contracted, afterwards loose and broad, with spreading capillary branches 3-6 cm long and naked in lower part; spikelets pale or lead-coloured, narrow-linear, 3-6 mm long, 0.75 mm broad; 4-10-flowered, light or purplish, pedicellate, distant; rhachilla not disarticulating; glumes unequal, the 1st under 0.5 mm long, the 2nd 1-1.25 mm long; lemmas 1.5-2 mm long, minutely scabrous on nerves and back; palea ciliate on the nerves or almost glabrous, usually deciduous; grain oblong-linear or ovoid-oblong, 0.75-1.25 mm long.

Occurs in all Australian mainland States, except Vic. Recorded in S.Aust. from the N.W., Lake Eyre, Gairdner-Torrens, Flinders Ranges, Eastern and Murray regions.

Flowers throughout the year.

Not grazed.

19. *E. parviflora* (R. Br.) Trin., *Mem. Acad. Sci. St Petersburg* ser. 6, Sci. math. phys. & nat. 1:411 (1831). **Weeping lovegrass.** Almost glabrous annual, 20-60 cm high; leaves narrow; panicle finally fairly large and loose, 8-23 cm long and 10-20 cm broad when the long often whorled capillary branches spread out horizontally; spikelets linear, 6-18-flowered, 6-10 mm long, 1 mm broad, usually lead-coloured; pedicels 2-4 mm long, only slightly diverging so that the spikelets lie almost parallel to the panicle-branches; rhachilla not disarticulating; glumes subequal, c. 1.25 mm long; lemmas subacute, 1.5 mm long, lateral nerves faint; paleas ciliate,



Fig. 163—*Eragrostis leptocarpa*.

persistent; grain ovoid, 0.75 mm long.—*Poa pellucida* R. Br., *Prod. Fl. Nov. Holl.* 180 (1810); *E. pellucida* (R. Br.) Steud., *Synops. Pl. glumac.* 1:279 (1854); *E. pilosa* non (L.) Beauv., sensu Benth., *Fl. Aust.* 7:645 (1878).

Occurs in all Australian mainland States. Recorded in S.Aust. from the N.W., Lake Eyre, Gairdner-Torrens, Flinders Ranges, Murray and Southern Lofty regions.

Flowers throughout the year.

Not grazed.

20. *E. setifolia* Nees, *Hook. Lond. J. Bot.* 2:419 (1843). **Narrow-leaf neverfail, Bristly lovegrass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 41b). Perennial, with stiff, slender, erect stems 15-50 cm high and a bulbous slightly woolly base; leaves glabrous, the sheaths with a very short ring of hairs at orifice, the blades mostly setaceous, erect, very narrow, 5-10 cm long; panicle narrow, rather dense, 4-12 cm long, 1.5-3 cm broad, pale or purplish, the branches mostly erect, c. 3 cm long or less; spikelets subsessile or shortly pedicellate, linear, flat, furrowed, crowded, 8-20 mm long, c. 1.5 mm broad, 10-50-flowered; lemmas c. 2 mm long, soon diverging; paleas persistent on rachilla; grain ovoid-oblong, under 1 mm long.—*E. chaetophylla* Steud., *Synops. Pl. Glumac.* 1:279 (1854).

Occurs in all Australian mainland States. Recorded in S.Aust. from the N.W., Lake Eyre, Nullarbor, Gairdner-Torrens, Flinders Ranges and Eastern regions.

Flowers throughout the year.

Moderately palatable.

21. *E. speciosa* (Roem. & Schult.) Steud., *Synops. Pl. glumac.* 1:279 (1854). **Handsome lovegrass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 37c). Perennial, 30 cm to 1 m high; leaf-blades setaceous, glabrous, to 20 cm long; sheaths bearded at orifice; panicle contracted, sometimes drooping, 6-30 cm long, 1-2 cm broad, the branches erect, densely clothed with clustered or solitary spikelets and the lowest branches rather distant; spikelets erect, subsessile, usually lead-coloured, flat but the furrow not conspicuous, linear, 6-20 mm long, under 2 mm broad, 12-40-flowered; lemmas subacute, scarcely 2 mm long, falling from the persistent rachilla from its base upwards; palea persistent on the rachilla for a time, only half as long as the lemma or even less (under 1 mm long); stamens 2; grain ovoid, 0.5 mm long.—*Poa speciosa* Roem. & Schult., *Syst. Veg.* 2:573 (1817).

Occurs in all Australian mainland States except Vic. Recorded in S.Aust. from the Lake Eyre and Flinders Ranges regions.

Flowers recorded only in Jan. & Aug.

Not economically significant.

22. *E. xerophila* Domin, *J. Linn. Soc. (Bot.)* 41:281 (1912). **Knotty-butt neverfail.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 41c). Perennial, with slightly woolly bulbous and closely packed bases, the stems stiff, slender, erect, 15-50 cm high; leaves many on the stems, distichous, ciliate on the edges of sheaths, the blades stiff, usually flat and 2-3 mm broad in lower part, scabrous on upper face, 2-6 cm long; panicle spike-like, 4-12 cm long, 1 cm or less broad; spikelets sessile or subsessile, linear, flat, furrowed, 6-14 mm long, 1.5-2 mm broad, 10-30-flowered; lemmas c. 2 mm long, the lateral nerves faint; grain ovoid-oblong, 0.75-1.25 mm long.

Occurs in all Australian mainland States except N.S.W. and Vic. Recorded in S.Aust. from the Lake Eyre and Flinders Ranges regions.

Flowers Jan.-April.

Moderately palatable.

77. *LEPTOCHLOA* Beauv.

Agrost. 71 (1812).

(Greek *leptos*, slender; *chloë*, grass.)

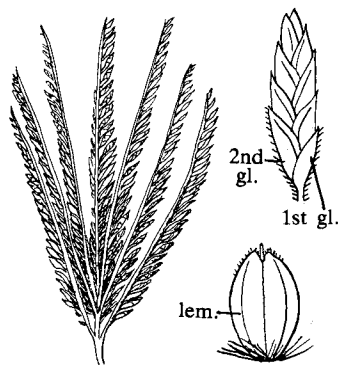
Erect perennials; leaf-blade flat; ligule ciliate; inflorescence of spikes or spike-like racemes arranged in a raceme or umbel; spikelets 2-several-flowered, compressed laterally, sessile in 2 rows along one side of the slender rhachis of the branches of the inflorescences; rhachilla disarticulating; glumes 2, 1-nerved, shorter than the lemmas, persistent; lemmas 3-nerved, awnless. 27 species from tropical and subtropical areas.

1. *L. digitata* (R.Br.) Domin, *Bibliotheca bot.* 85:379 (1915). **Umbrella cane-grass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 50b). Glabrous perennial, with stout erect stems over 1 m high and prominent glabrous nodes; lower leaf-sheaths broad, loose, shining; the blades mostly narrow, channelled; spikes or panicle-branches 6-20, slender, spreading or erect, 5-10 cm long, at first appearing digitate, but really arranged in whorls or rising separately from near the top of the stem; spikelets oblong-lanceolate, 5-7-flowered, 3-4 mm long; glumes acute, the 1st 1.25 mm long, the 2nd 2 mm long; lemma ovate-oblong, 2 mm long, obtuse or with a minute mucro at summit, the 2 lateral nerves near the margin; callus short, bearded.—*Poa digitata* R.Br., *Prod. Fl. Nov. Holl.* 182 (1810); *L. subdigitata* Trin. in Steud., *Synops. Pl. glumac.* 1:210 (1854).

Occurs in all Australian mainland States except Vic. In S. Aust. recorded most frequently from the Lake Eyre region, but also, rarely, from the Yorke Pen. and Southern Lofly regions.

Flowers May (one record).

Not of grazing importance.

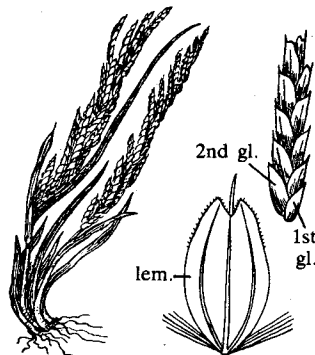
Fig. 164—*Leptochloa digitata*.78. *TRIOGON* Roem. & Schult.

Syst. Veg. 2:34 (1817).

(Greek *treis*, three; *pōgōn*, beard.)

Tufted annuals or perennials; leaf-blade flat or convolute; ligule hyaline and fimbriate; inflorescence a spike; spikelets dorsally compressed, cylindrical, several-flowered, the uppermost florets male or empty, sessile, appressed in 2 rows along one side of the narrow flat rhachis of the spike; rhachilla disarticulating; glumes persistent, subequal; lemma rounded on back, 3-nerved, the midnerve protruding as a short awn or mucro between the lobes of the terminal notch. About 20 species from Africa, Asia and Australia.

1. *T. loliformis* (F. Muell.) C. E. Hubbard, *Kew Bull.* 1934:448 (1934). **Five-minute grass, rye beetle-grass, eight-day grass.** (Ill. N. T. Burbidge (1968) *Australian grasses* 2, pl. 53; Lazarides (1970) *The grasses of Central Australia*, pl. 70b). Small erect annual, mostly 6-15 cm high; leaves mostly basal, the sheaths white, the blades short, narrow, usually hairy; spike terminal, simple, 2-10 cm long; spikelets linear, erect, 5-10 mm long, 6-14-flowered; glumes obtuse, the

Fig. 165—*Triogon loliformis*.

1st c. 2 mm long, 1-nerved, the 2nd nearly 3 mm long, 3-nerved; lemma 3 mm long, with a short bearded callus at base, the awn slightly exceeding the lateral lobes. *Festuca loliiformis* F. Muell., *Fragm. Phyt. Aust.* 8:128 (1873); *Diplachne loliiformis* (F. Muell.) F. Muell. ex Benth., *Fl. Aust.* 7:618 (1878).

Occurs in all Australian mainland States except Vic. Recorded in S. Aust. from the N.W., Lake Eyre and Eastern regions.

Flowers July-Sept.

Said by Lazarides (1970) to be highly valued for stock-fattening in some areas.

79. TRIRAPHIS R.Br.

Prod. Fl. Nov. Holl. 185 (1810).

(Greek *treis*, three; *rhaphis*, a needle; the lemmas are 3-awned.)

Annuals or perennials; leaf-blade narrow; ligule ciliate; inflorescence a panicle, sometimes spike-like; spikelets compressed laterally, several-flowered, the uppermost florets barren; glumes persistent, subequal, hyaline, 1-nerved (keeled); lemma membranous, 3-nerved, narrowly 3-lobed, the nerves running into 3 erect capillary awns, the central lobe deeply bifid into 2 lanceolate teeth and the central awn rising between the teeth. 10 species from Australia and South Africa.

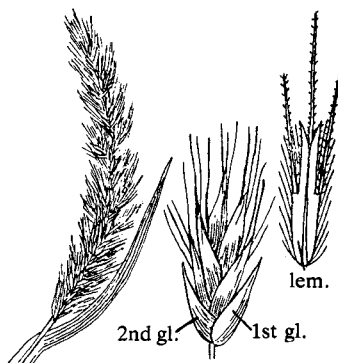


Fig. 166—*Triraphis mollis*.

1. *T. mollis* R.Br., *Prod. Fl. Nov. Holl.* 185 (1810). **Purple heads, purple-plume grass, needle grass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 70c). Erect glabrous perennial, 10-50 cm high; leaves filiform-involute, channelled or flattish; ligule a ring of hairs; panicle soft, dense, cylindrical, often purplish, 4-20 cm long, 1-2 cm broad; spikelets 6-9-flowered, the florets exceeding the glumes, which are glabrous, mucronate, 4-6 mm long; lemma narrow, c. 6 mm long (including the very short acute callus), ciliate on the 2 lateral nerves, the awns c. 6 mm long, the 2 lateral ones rising from a lower level than the central one.

Occurs in all Australian mainland States. Recorded in S. Aust. from throughout the arid areas south to the Yorke Pen., Flinders Ranges and Murray regions.

Flowers throughout the year.

Not considered to be an important grazing species.

TRIBE 17.—CHLORIDEAE

80. BRACHYACHNE (Benth.) Stapf

Fl. Trop. Afr. 9:20 (1917).

= *Cynodon* sect. *Brachyachne* Benth. in Benth. & Hook.f., *Gen. Pl.* 3:164 (1883).

(Greek *brachys*, short; *achnē*, a glume; the lemma is shorter than the glumes.)

Usually creeping perennials or annuals; leaf-blade flat; ligule ciliate; inflorescence an umbel of very slender spikes; spikelets 1-flowered, small, sessile in 2 rows along 1 side of the flattened

rhachis of each spike; rachilla disarticulating above the glumes and sometimes produced as a rather long bristle; glumes narrow, acute or obtuse, subequal, 1-nerved, longer than the lemma; lemma awnless, folded and keeled, 3-nerved, long-haired on the nerves; palea 2-keeled, long-haired on the nerves. About 10 species in Australia and tropical Africa.

1. ***B. ciliaris* (Kuntze) C. E. Hubbard**, *Kew Bull.* 1934:448 (1934). **Hairy native couch**. Small perennial, with geniculate stems; leaves with tubercle-based spreading hairs; spikes 2, digitate, 3-4 cm long; glumes nearly 4 mm long; lemma 2.5 mm long, concave, villous on the 3 nerves and with a transverse ring of long spreading hairs at the base of the short conical glabrous summit, so that the floret appears top-shaped with a hairy pappus-like crown; palea also villous on nerves for three-quarters of its length.—*Cynodon ciliaris* Benth., *Fl. Aust.* 7:610(1878), nom. illegit.; *Capriola ciliaris* Kuntze, *Rev. Gen. Pl.* 2:764 (1891).

Occurs in N.T., Qld, N.S.W. and S.Aust. (N.W. and Lake Eyre regions).

Flowers only recorded in May.

Not of grazing significance.

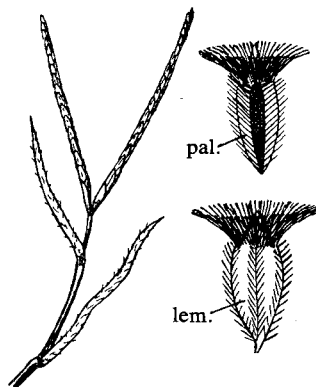


Fig. 167—*Brachyachne ciliaris*.

81. CHLORIS Sw.

Prod. 1:25 (1788).

(Greek *chlōros*, green; alluding to the leaves.)

Perennials or annuals, usually glabrous; leaf-blade flat or folded; ligule membranous; inflorescence of spikes in an umbel or less often a raceme; spikelets with 1 bisexual floret, sessile or shortly pedicellate, arranged alternately in 2 rows on 1 side of the slender rhachis of the spikes, straw-coloured or verging to purple; glumes 2, narrow, 1-nerved, keeled, persistent; fertile lemma laterally compressed, 3-nerved, the lateral nerves close to the margins, with a straight terminal or subterminal slender awn; above the bisexual floret are 1 or more stalked male or empty terminal lemmas, the stalk or stipes consisting of the rachilla produced upwards behind the palea of the perfect floret; callus short, bearded. About 40 species from warm and temperate areas. (Key adapted from Lazarides (1972) *Aust. J. Bot.*, suppl. ser. 5).

- | | |
|---|------------------------|
| 1. Callus 2.5 mm long, pungent; imperfect florets usually 4-5; lemmas scarious, conspicuously expanded with wing-like margins, 5-7-nerved | <i>C. scariosa</i> 3. |
| 1. Callus minute, obtuse; imperfect florets usually 1-3; lemmas membranous or cartilaginous, not expanded, usually 3-nerved. | |
| 2. Spikelets blunt at the apex; imperfect floret(s) obtuse or truncate, notched or obscurely lobed, usually inflated. | |
| 3. Lemma or fertile (lowest) floret ciliate or sparsely pubescent on the lower part of the margins | |
| 4. Lemma of lowest floret ciliate on the upper part of the margins with hairs to 1 mm long; florets 3 or 4 | <i>C. gayana</i> 1. |
| 4. Lemma of lower floret bearded on the upper part of the margins with hairs 2-3 mm long; florets 2 | <i>C. virgata</i> 5. |
| 3. Lemma of fertile (lowest) floret glabrous on the lower part of the margins | <i>C. truncata</i> 4. |
| 2. Spikelets narrowed at apex; imperfect floret(s) acute or acuminate, deeply divided into 2 lobes, not inflated | <i>C. pectinata</i> 2. |

*1. *C. gayana* Kunth., *Rev.Gram.* 1(18):293 (1830). **Rhodes grass.** Erect, largely glabrous perennial, often stoloniferous, 45-120 cm high; leaf-blades flat, to 6 mm broad; culms simple or branched; spikes subdigitate, 8-17, suberect, 7-10 cm long; spikelets crowded; glumes membranous or hyaline, the 1st c. 1 mm long, the 2nd 2.5-3.3 mm long; usually the lowest floret bisexual, the 2nd male and 1 or 2 sterile; lemmas cartilaginous, the 1st (fertile) obscurely lobed, c. 3 mm long, pubescent on the submarginal nerves in the lower part and ciliate above with stiff white hairs to 1 mm long, awn c. 3 mm long, 2nd lemma awned, obtuse or truncate, upper lemmas awnless, obtuse or truncate.

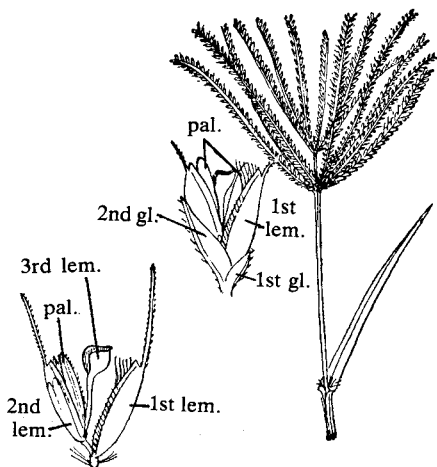


Fig. 168—*Chloris gayana*.

Native to Africa, naturalised in all Australian mainland States. Recorded in S.Aust. from the Yorke Pen., Southern Lofty and S.E. regions.

Flowers March-July.

Introduced as a pasture grass and believed by Black to be of value in sand-binding.

2. *C. pectinata* Benth., *Fl.Aust.* 7:612 (1878). **Comb chloris.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 25a). Annual, with erect or ascending stems, usually 10-40 cm high, largely glabrous; leaf-blade flat, 2-3 mm broad; culms simple or branched; spikes erect to

slightly reflexed, usually 4-7, usually 4-6 cm long, turning purplish; spikelets closely packed; glumes hyaline or membranous, the 1st 1.5-2 mm long, the 2nd 3-4 mm long; lemmas cartilaginous, the 1st (fertile) 2-lobed, 3.5-5 mm long, smooth or shortly hairy, awn 8-20 mm long, 2nd (sterile) lemma awned, deeply 2-lobed, the lobes acute.—*C. divaricata* var. *minor* J. M. Black, *Trans.R.Soc.S.Aust.* 37:124 (1913).

Occurs in all Australian mainland States except Vic. Recorded in S.Aust. from the N.W., Lake Eyre, Flinders Ranges and Yorke Pen. regions.

Flowers recorded in April, Aug. and Oct.

Grows in temporarily wet places in dry regions. Moderately palatable.

3. *C. scariosa* F. Muell., *Fragm.Phyt.Aust.* 6:85 (1867). **Winged chloris.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 246). Often glaucous, glabrous, stiff, usually annual, 18-47 cm high, with erect stems; culms simple or branched; spikes 3-5, more or less erect, usually 2.5-3.5 cm long; spikelets usually whitish; glumes usually hyaline, the 1st 3-5 mm long, the 2nd 5-8 mm long; florets 5-6, with the 1st bisexual; 1st lemmas with broad scarious wings, cartilaginous or indurate, notched, 3.3-5 mm long, bearded on the lateral nerves near the apex with white hairs to 1.5 mm long, usually pubescent near the midrib, awn 7-8 mm long, other lemmas scarious, glabrous, awned.

Occurs in all Australian mainland States except Vic., but concentrated in the northern half of the country. Recorded in S.Aust. from the Lake Eyre and Flinders Ranges regions.

Flowers May-Aug.

Often found in areas of high salinity and watercourses.

Not of significance for grazing.

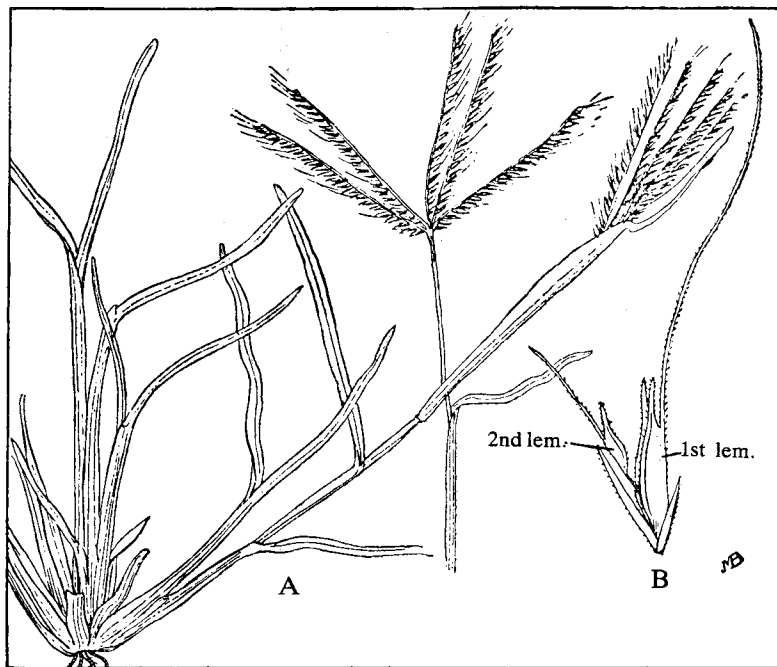


Fig. 169—*Chloris pectinata*. A, habit, $\times \frac{1}{2}$; B, spikelet, $\times 4$.

4. *C. truncata* R.Br., *Prod.Fl.Nov.Holl.* 186 (1810). **Windmill grass.** (Ill. N. T. Burbidge (1968) *Australian grasses* 2, pl. 57). Erect glabrous perennial, sometimes stoloniferous, 16-45 cm high; culms usually simple; spikes usually 6-9, spreading horizontally when in flower, usually 9-13 cm long; glumes hyaline or membranous, acuminate, with or without a short point, the 1st 1-2 mm long, the 2nd 3-4 mm long; florets usually 2, often black; lemmas cartilaginous, the 1st (fertile) with 2 minute apical lobes, smooth or scabrous, pubescent on the upper margins, 3-4 mm long, awn 11-14.5 mm long, 2nd lemma awned, truncate,

Occurs in all Australian mainland States except N.T. Recorded in S.Aust. from the Lake Eyre, Eastern, Yorke Pen., Southern Lofty, Murray and S.E. regions.

Flowers Nov.-June.

5. *C. virgata* Sw., *Fl.Ind.Occid.* 1:203 (1797). **Feathertop Rhodes.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 25b). Glabrous, usually erect annual, (15-) 23-45 (-95) cm high; culms usually

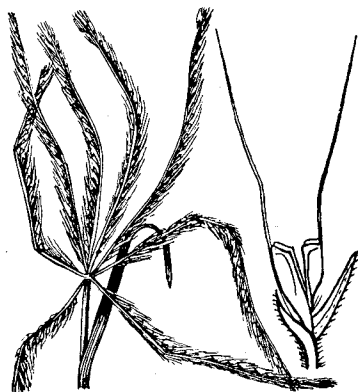


Fig. 170—*Chloris truncata*.

branched; spikes 7-19, erect, usually 4-6 cm long; glumes usually hyaline, the 1st c. 2 mm long, the 2nd 3.5-4.5 mm long; 1 fertile and 1 reduced floret; lemmas cartilaginous, the 1st (fertile) entire or notched, 3-3.5 mm long, pubescent on the lower margins, bearded on the upper margins with stiff white hairs 2-3 mm long, awn 6-10 mm long, 2nd lemma awned, truncate.—*C. decora* Nees ex Steud., *Synops.Pl.glumac.* 1:205 (1854), *C. barbata* var. *decora* (Nees ex Steud.) Benth., *Fl.Aust.* 7:613 (1878).

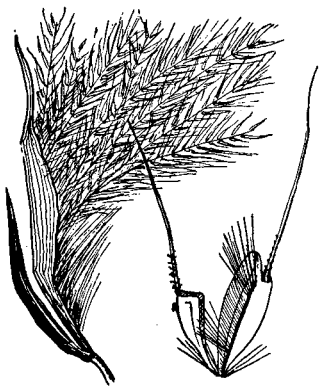


Fig. 171—*Chloris virgata*.

Widespread in tropical and subtropical parts of the world including all Australian mainland States. Recorded in S.Aust. from the Lake Eyre, Eyre Pen., Yorke Pen. and Southern Lofty regions.

Flowers Feb.-Aug.

Of slight grazing value.

82. CYNODON L.C. Rich. in Pers., *Syn.Pl.* 1:85 (1805).

(Greek *kynodon*, dog's tooth; a translation of *chident*, the French name of this grass.)

Stoloniferous perennials; leaf-blades flat or folded; ligule membranous; inflorescence of spikes arranged digitately; spikelets 1-flowered, small, almost sessile, in 2 rows along one side of the narrow continuous (non-articulate) rhachis of the spikes, the rhachilla disarticulating and ending in a slender bristle; glumes narrow, acute, 1-nerved, shorter than the floret; lemma awnless, folded, keeled, 3-nerved. About 10 species, cosmopolitan but especially in Africa. (Lazarides (1972) *Aust.J.Bot.*, suppl.ser.5).

*1. *C. dactylon* (L.) Pers., *Syn.Pl.* 1:85 (1805). **Couch-grass.** (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 75). Perennial, with creeping stems and distichous usually short, flat, sometimes stiff leaves, bearded at the orifice; spikes linear, 2-5 cm long, turning purplish or reddish-brown, 2-6, digitate at the top of the culm; lemma boat-shaped, ciliate on keel, c. 2.5 mm long and nearly twice as long as the 2 glumes.—*Panicum dactylon* L., *Sp.Pl.* 58 (1753).



Fig. 172—*Cynodon dactylon*.

Cosmopolitan and widespread in Australia. Recorded in S.Aust. from the Lake Eyre, Flinders Ranges, Yorke Pen., Southern Lofty, Murray and S.E. regions, but probably present in all regions.

Flowers throughout the year.

A very common lawn-grass.

83. ENTEROPOGON Nees in Lindl. *Nat.Syst.Bot.*, ed. 2:448 (1836).

(Greek *enteron*, intestine; *pōgōn*, a beard; perhaps alluding to the beards on the callus or in the axils of the spikes.)

Tufted perennials, with usually branched culms; leaf-blades flat or folded, ligule a ciliate membrane; inflorescence of spikes arranged digitately; spikelets of 1 bisexual floret and 1 or 2 reduced florets, sessile,

arranged in 2 rows on 1 side of the rachis of the spikes; glumes 2, unequal, 1-nerved, keeled; fertile lemma dorsally compressed, 3-nerved, glabrous, with a straight terminal, awn; upper florets smaller, lacking paleas, awned; callus bearded. 10 species from Africa, Europe, Asia and Australia. (Lazarides (1972) *Aust.J.Bot.* suppl.ser.5).

1. *E. acicularis* (Lindl.) Lazar., *Aust.J.Bot.*, suppl.ser. 5:31 (1972). **Umbrella grass, spider grass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 24a). Glabrous grass, 25-60 cm high; leaf-blades narrow, flat, minutely scabrous; spikes 3-12 in number, 8-17 cm long, finally spreading horizontally; spikelets about 3 mm apart; 1st glumes 3-5 mm long, the 2nd 7-9 mm long; lemma (fertile) very narrow, 3-nerved, 5-7 mm long (without the callus), bifid, almost glabrous; awn 10-15 mm long; stalked empty lemma shorter, also bifid, but with an awn often nearly as long as that of the fertile lemma.—*Chloris acicularis* Lindl. in T. L. Mitchell, *J.Trop.Austral.* 33 (1848).

Occurs in all Australian mainland States. Recorded in S.Aust. from throughout the arid areas, south to the Flinders Ranges, Eyre Pen., Yorke Pen., Southern Lofty and Murray regions.

Flowers throughout the year, especially in early summer.

Grazed mainly when young.

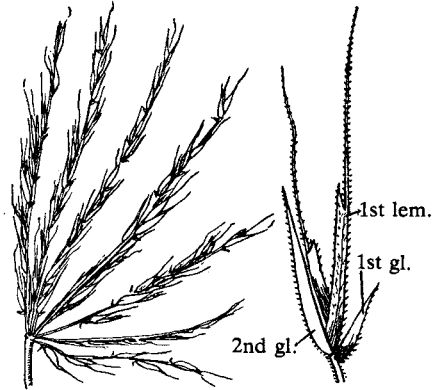


Fig. 173—*Enteropogon acicularis*.

TRIBE 18.—SPARTINEAE

84. SPARTINA Schreb.

Gen.Pl. 1:43 (1789).

(Greek *spartinē*, rope; referring to the fibrous leaves.)

Stout erect glabrous perennials, with rhizomes; inflorescence of erect spikes in a raceme, yellowish; spikelets 1-flowered, large, distichous, appressed to rachis; glumes membranous, unequal, keeled, 3-nerved; lemma similar to 2nd glume, 3-5-nerved. 16 species from America, Europe and Africa, usually on tidal mud flats. (Clapham, Tutin & Warburg (1962) *Flora of the British Isles*.)

*1. *S. townsendii* H. & J. Groves, *Rep.Bot.Exch.Cl.Manchr* 1880:37 (1881). **Cord grass.** 50-130 cm high; leaves to 8 mm broad, very stiff, spreading, tapering to a long slender point; inflorescence 10-25 cm long, usually with 4 or 5 spikes; spikelets 15-20 mm long; rachis extended beyond spikelets as a flexuous bristle.

Native to Europe, naturalised in Vic. and recorded from mangroves north of Adelaide (Southern Lofty region).

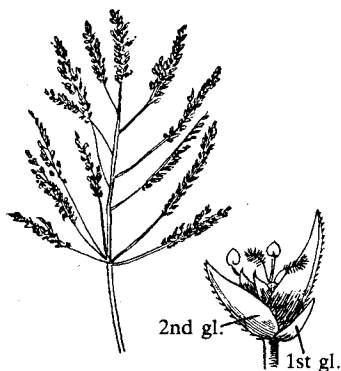
This species originated in Britain by hybridisation.

TRIBE 19.—**SPOROBOLAEAE**85. **SPOROBOLUS** R.Br.*Prod.Fl.Nov.Holl.* 169 (1810).(Greek *sporos*, seed; *bolos*, throwing; the seed is shed easily from the lemma and palea.)

Annuals or more often perennials; leaf-blade flat or inrolled, narrow; inflorescence an open or contracted panicle; spikelets 1-flowered, awnless; glumes 2, persistent, not exceeding the floret, 1-nerved; lemma usually 1-nerved, membranous; palea readily splitting between the 2 nerves. About 150 species from warm areas.

1. Panicle dense, spike-like.
 2. 2nd glume equal to lemma.
 3. Panicle usually lead-coloured; rootstock thick, creeping *S. virginicus* 7.
 3. Panicle pale; creeping rootstock absent *S. mitchellii* 6.
 2. 2nd glume shorter than lemma .
 4. Spikelets 2.5 mm long *S. africanus* 2.
 4. Spikelets under 2 mm long *S. elongatus* 5.
1. Panicle loose, broadly pyramidal.
 5. Spikelets all pedicellate, distant.
 6. Leaves spiny-ciliate, subcordate at base, grain globular *S. australasicus* 3.
 6. Leaves not spiny-ciliate or cordate; grain angular *S. caroli* 4.
 5. Spikelets sessile, crowded on upper part of panicle-branches *S. actinocladius* 1.

1. ***S. actinocladius*** (F. Muell.) F. Muell., *Fragm.Phyt.Aust.* 8:140 (1874). **Ray grass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 68a). Stems slender, 15-30 cm high; leaf-

Fig. 174—*Sporobolus actinocladius*.

blades flat, linear-lanceolate, 3-6 cm long, scabrous-ciliate on margins; panicle pyramidal, 5-12 cm long, 3-6 cm broad at base, the branches finally spreading, the lower ones in rather distant whorls, the uppermost scattered, all naked towards the base; spikelets sessile or almost so, crowded in dense unilateral spike-like partial panicles on upper part of panicle-branches; glumes unequal, the 1st c. 1 mm long, the 2nd 1.5 mm; lemma nearly 2 mm long.—*Vilfa actinoclada* F. Muell., *Fragm.Phyt.Aust.* 6:84 (1867).

Occurs in all mainland Australian States except Vic. Recorded in S.Aust. from the Lake Eyre, Flinders Ranges and Eastern regions.

Flowers July-Dec. and April.

“Highly palatable and nutritious” (Lazarides, 1970).

*2. ***S. africanus*** (Poir.) Robyns & Tournay, *Bull.Jard. Bot.Brux.* 25:242 (1955). **Parramatta grass, rat-tail grass.** (Ill. N. T. Burbidge (1970) *Australian Grasses* 3, pl. 59). Stems erect, slender, 15-50 cm high; leaves mostly basal, the blades subulate, 6-18 cm long; panicle spike-like, dark-green, sometimes slightly interrupted near base, 6-20 cm long, 4-7 mm thick; glumes unequal, the 1st c. 0.5 mm long, obtuse, the 2nd 1.5 mm long, acute; lemma a little over 2 mm long, 1-nerved.—*Agrostis africana* Poir., *Encyc.Suppl.* 1(1):254 (1810); *A. capensis* Willd., *Sp.Pl.* 1:372 (1797), nom.illegit.; *S. capensis* (Willd.) Kunth, *Enum Pl.* 1:212 (1833); *S. indicus* non (L.) R.Br., sensu R.Br., *Prod.Fl.Nov.Holl.* 170 (1810).

Native to Southern Africa; naturalised in all Australian mainland States except N.T. Recorded in S.Aust. from the Southern Lofty, Murray and S.E. regions.

Flowers Nov.-June.

Especially common in the coastal belt and also occurs in built-up areas.

3. *S. australasicus* Domin, *Reprum nov.Spec.Regni veg.* 9:553 (1911). **Australian dropseed.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 68b). Slender annual, 20-35 cm high; leaf-blades stiff, flat, lanceolate, 3-6 cm long, 4-8 mm broad, spiny-ciliate, subcordate at base and broader than the sheaths; panicle loose, compound, exserted, 7-12 cm long, 4-6 cm broad near base, almost all the spreading capillary branches in rather distant whorls; spikelets purple, ovoid or globular, c. 1 mm long; glumes and lemmas similar.

Occurs in all Australian mainland States except N.S.W. and Vic. Recorded twice in S.Aust in the Flinders Ranges region, although in N.T. it occurs only north of the Tropic of Capricorn.

Flowers recorded in S.Aust. in April and Sept.

4. *S. caroli* Mez, *Reprum nov.Spec.Regni veg.* 17:299 (1921). **Fairy grass, yakka grass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 68c). Slender perennials, 20-40 cm high; leaf-blades linear-lanceolate, minutely scabrous, flat, 3-10 cm long; panicle loose, compound, pyramidal, 8-12 cm long and equally broad at the base, the capillary branches spreading and twice divided, only the lowest branches whorled, the upper ones more or less scattered; spikelets dark; pedicels longer than the spikelets; glumes acute, unequal, the 1st under 1 mm long, the 2nd under 2 mm long and equalling the lemma; palea splitting very early.—*S. lindleyi* non (Steud.) Benth., sensu Benth., *Fl.Aust.* 7:623 (1878).

Occurs in all Australian mainland States. Recorded in S.Aust. from the Lake Eyre, Flinders Ranges and Southern Lofty regions.

Flowers recorded in Dec. and March.

5. *S. elongatus* R.Br., *Prod.Fl.Nov.Holl.* 170 (1810). **Rat's-tail grass.** (Ill. N. T. Burbidge (1968) *Australian grasses* 2, pl. 34). Slender perennial, to 60 cm high; leaf-blades setaceous or narrow and flat, rather short; panicle narrow, more or less interrupted, 15-30 cm long, 3-10 mm broad, the branches erect-spreading, to 2 cm long, but clothed with spikelets to the base; glumes subequal, hyaline, c. 1 mm long, the 1st obtuse, the 2nd acute; lemma nearly 2 mm long, acute.

Occurs in N.T., Qld and N.S.W. (De Nardi, *Contr. N.S.W. nat.Herb.* 4:406 (1973). Specimens identified as *S. elongatus* by S. T. Blake were collected in the N.W., Lake Eyre and S.E. regions.

6. *S. mitchellii* (Trin.) C. E. Hubbard ex S. T. Blake, *Pap.Dep.Biol.Univ.Qld* 1(18):22 (1941). **Rat's-tail couch, short rat-tail grass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 68d). Perennial, with erect of flexuous stems, 30-50 cm high; leaf-blades subulate or flattened, sometimes spreading-erect and rigid; panicle spike-like, pale, 3-12 cm long, 3-5 mm thick; glumes sub-equal, the 1st slightly shorter, the 2nd c. 2.5 mm long and equalling the lemma which is faintly 3-nerved.—*Vilfa mitchellii* Trin., *Mem.Acad.Sci.St Petersburg*, ser.6, sci.math.phys. & nat. 6(2):Bot. 53 (1840); *S. virginicus* var. *pallida* Benth., *Fl.Aust.* 7:621 (1878); *S. benthamii* F. M. Bail., *Bot.Bull.Dept Agric.Qld* 13:16 (1896).

Occurs in all mainland Australian States. Recorded in S.Aust. from the Lake Eyre and Murray regions.

Flowers Nov.-April.

Regarded as a good grazing species.

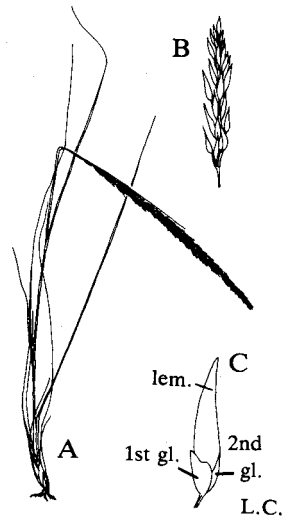


Fig. 175—*Sporobolus africanus*. A, habit; B, portion of inflorescence, x 2; C, spikelet, x 7.

7. *S. virginicus* (L.) Kunth; *Rev. Gram.* 67 (1829). **Salt couch.** (Ill. Gardner (1952) *Flora of Western Australia* 1, pl. 48a). Stems leafy, ascending from a thick, creeping, perennial, scaly rhizome; leaves more or less spreading, rigid, inrolled-subulate, almost distichous (appearing opposite owing to the alternate long and short nodes); ligule very short, ciliate; panicle spike-like, lead-coloured, rarely pale, 1-6 cm long, 4-6 mm broad; glumes unequal, keeled, the 1st 2 mm long, the 2nd 3mm long; lemma similar to and about as long as the 2nd; the 2 nerves of the palea very close together.—*Agrostis virginica* L., *Sp.Pl.* 63 (1753).

Occurs in all temperate continents and all Australian mainland States. Recorded in S.Aust. from Nuyts Archipelago and the Lake Eyre, Flinders Ranges, Eyre Pen., Yorke Pen., Southern Lofly and S.E. regions.

Flowers throughout the year.

Usually grows in salt marshes and on sand hills near the coasts, but also in areas of high salinity inland.

TRIBE 20.—ZOYSIEAE

86. PEROTIS Ait.

Hort.Kew. ed.1, 1:85 (1789).

(Greek *pēros*, deficient; alluding probably to the minute palea.)

Annual or perennial, largely glabrous, tufted herbs; leaf-blades expanded, the margins often fringed with bristle-like hairs; ligule membranous, ciliate; inflorescence a simple raceme or spike; spikelets 1-flowered; glumes 2, linear, rigid, 1-nerved, tapering into long straight terminal awns; lemmas smaller, hyaline; palea minute; styles united at base. 10 species, mainly tropical from Africa, Asia and Australia.

1. *P. rara* R.Br., *Prod.Fl.Nov.Holl.* 172 (1810). **Comet grass.** (Ill. Lazarides (1970) *The grasses of Central Australia*. pl.55b). Slender perennial, almost glabrous grass, 15-30 cm high; leaves flat, lanceolate; ligule very short, ciliolate; spikelets subulate, finally reflexed, 15-20 mm long (with awns), forming a spike 8-20 cm long; glumes 2, linear, scabrous on keel and awns, the 2nd one shorter than the 1st; lemma c. 5 mm long; anthers very small.

Black (1943) included this species although it had not been found in S.Aust. It occurs in W.Aust., N.T., Qld and N.S.W. and has once been found near Everard Park (N.W. region).

Palatable when young; the ripe fruits can be harmful to stock.



Fig. 176—*Perotis rara*.

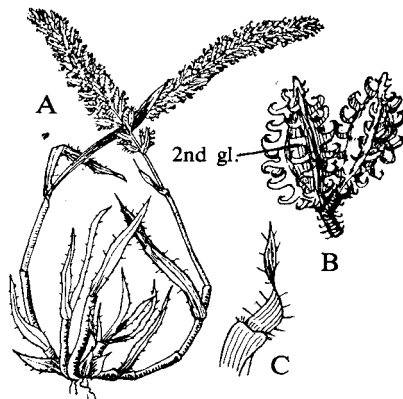


Fig. 177—*Tragus australianus*. A, habit, $\times \frac{1}{2}$; B, 2 spikelets, $\times 5$; C, ligule.

87. *TRAGUS* Scop.*Intr.Hist.Nat.* 73 (1777).

(Greek *tragos*, a he-goat; alluding to the rigid hairs bordering the leaves and to the bristles on the spikelets.)

Annuals or perennials; leaf-blade flat; ligule a row of short hairs; inflorescence a spike-like panicle; spikelets 1-flowered, awnless, 2-5, sessile on very short peduncles or panicle-branches which fall off with them; 1st glume minute or obsolete; 2nd glume large, hard and furnished with 5 rows of hooked spines on the back; lemma and palea membranous and smaller. About 6 species, mainly African.

1. *T. australianus* S. T. Blake, *Pap.Dep.Biol.Univ.Qld* 1 (18):12 (1941). **Bur grass, small bur-grass.** (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 60). Annual, 10-30 cm high; stems ascending, geniculate at the nodes; leaves flat, bordered by rigid cilia; panicle spike-like, bristly, 5-10 cm long; spikelets always 2 on each peduncle, facing each other, 3-5-4 mm long, the 2nd bristly glume the only conspicuous one.—*T. racemosus* non (L.) All., sensu Benth., *Fl.Aust.* 7:507 (1878).

Occurs in all Australian mainland States. Recorded in S.Aust. from throughout the arid areas and the Yorke Pen., Murray and S.E. regions.

Flowers throughout the year.

The mature spikelets adhere to animals and can cause trouble. Palatable.

88. *ZOYSIA* Willd.*Neue Schr.Ges.Naturf.Freunde Berl.* 3:440 (1801).

(After Karl von Zois, 1756-1800, a landed proprietor and plant-collector of Carniola.)

Small creeping plants; leaf-blades rigid, flat; ligule a minute hairy membrane; inflorescence a dense spike; spikelets 1-flowered, sessile, appressed to the continuous rachis of the spike; glume 1, broad, coriaceous, keeled; lemma much smaller, hyaline. 10 species from the Mascarene Islands, Asia and Australasia.

1. *Z. matrella* (L.) Merr., *Philipp.J.Sci.* 7:230 (1912). **Manila grass.** (Ill. Gilliland (1971) *A revised Flora of Malaya* 3, fig. 19). Rhizome creeping, perennial; stems short, erect, bearing a small terminal spike; leaves distichous, glabrous, crowded, the short blades spreading, subulate, with incurved margins, sometimes almost pungent; ligule shortly hairy; spikes cylindrical, 5-12 mm long, of 5-8 spikelets which are 2-3 mm long, very shortly pedicellate, closely appressed to the flexuose unjointed rachis; glume shining, often mucronate, completely enclosing the shorter hyaline lemma and the palea which is still smaller or sometimes wanting.—*Agrostis matrella* L., *Mant.Pl.* 2:185 (1771); *Z. pungens* Willd., *Neue Schr.Ges.naturf.Freunde Berl.* 3:441 (1801).

Occurs in Asia, Qld, Vic., Tas. and S.Aust. (S.E. and Kangaroo I. regions).

Flowers Nov.-Feb.

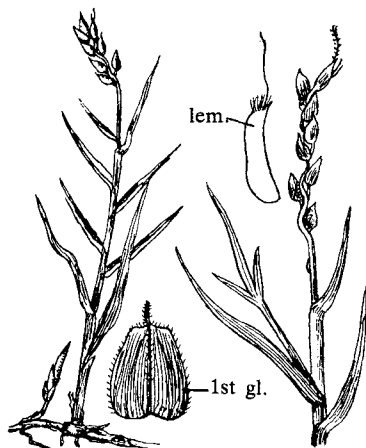


Fig. 178—*Zoysia matrella*.

TRIBE 21.—**PANICEAE**
89. **BRACHIARIA** Griseb. in Ledebour

Fl. Ross. 4:469 (1853).

(From Latin *brachium*, forearm; alluding to the racemes or spikes standing out like arms or branches along the main axis.)

Perennials or annuals; leaf-blade usually flat; ligule minute, ciliate; inflorescence of 2-many spike-like racemes, at first enclosed in the loose leaf-sheaths, afterwards exerted; spikelets 1-flowered, dorsally compressed, plano-convex, adaxial (i.e. backs of the 1st glume and 1st lemma turned towards the rhachis), usually subsessile in 2 rows along the rhachis of the racemes; 1st glume much smaller than the 2nd; 1st (sterile or male) lemma similar to the 2nd glume; 2nd (fertile) lemma and palea nearly as long, rarely much shorter, hardening when ripe. About 50 species from warm areas.

- | | |
|---|---------------------------|
| 1. Spikelets pubescent | <i>B. gilesii</i> 1. |
| 1. Spikelets glabrous or subglabrous. | |
| 2. Fertile lemma without mucro, vertically 3-nerved | <i>B. miliiformis</i> 2. |
| 2. Fertile lemma mucronate, without prominent vertical nerves. | |
| 3. Spikelets in 2 dense regular rows | <i>B. notochithona</i> 3. |
| 3. Spikelets irregularly and loosely arranged along rhachis | <i>B. praetervis</i> 4. |

1. ***B. gilesii*** (Benth.) Chase, *Contr. U.S. natn. Herb.* 22:35 (1920). **Hairy-edged armgrass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 22a). Stems stiff, glabrous; nodes woolly; leaf-sheaths rather loose, with scattered hairs seated on tubercles; blades flat, broadly lanceolate, somewhat dilated at base, almost glabrous except for scattered tubercle-seated hairs near the margins, which are also minutely scabrous-ciliate; ligule of hairs; racemes c. 3 in number,

alternate at the ends of the branches, 1.5-2.5 cm long; spikelets sessile in 2 rows on a trigonous scabrous rhachis barely 1 mm broad, spikelets 5 mm long; 1st glume minute, subtruncate, almost hidden by a ring of hairs at its base, 2nd glume 9-nerved and ciliate on margins; 1st lemma 5-nerved, villous-ciliate on margins and containing a flat hyaline palea, 2nd lemma (fertile) 2.5 mm long, faintly rugulose across, with a short mucro.—*Panicum gilesii* Benth., *Fl. Aust.* 7:477 (1878); *Urochloa gilesii* (Benth.) Hughes, *Kew Bull.* 1923:319 (1923).

Occurs in all Australian mainland States except W.Aust. and Vic. Recorded in S.Aust. from the N.W. region, Mount Davies.

Flowers July (1 record).

2. ***B. miliiformis*** (C. Presl) Chase, *Contr. U.S. natn. Herb.* 22:35 (1920). **Armgrass millet.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 23a). Glabrous perennial, with flat leaves and short ciliate ligule; panicle 6-15 cm long; spikes 2-4, distant, finally deflexed or spreading, 2.5 cm long, bearing the alternate subsessile spikelets in 2 rows along 1 side of the rhachis, which is flat

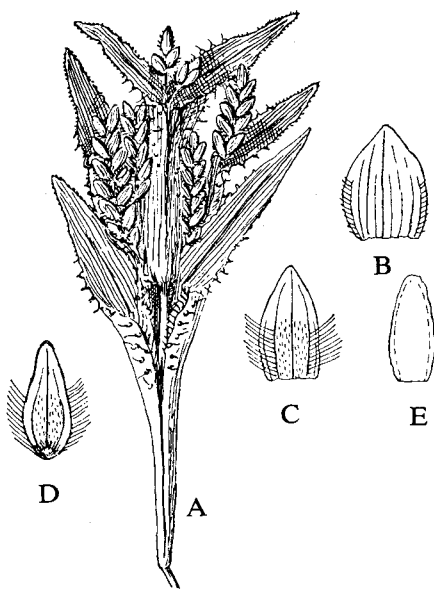


Fig. 179—*Brachiaria gilesii*. A, inflorescence, natural size; B, second glume, x 3; C, first (sterile) lemma, x 3; D, second (fertile) lemma, x 3; E, palea, x 3.

and 2 mm broad; spikelets 5 mm long, acute, glabrous; 1st glume broad, obscurely 3-nerved, not half as long as the spikelet; 2nd glume and 1st lemma equal, 5-nerved; fertile lemma transversely and finely rugose, with 3 prominent vertical nerves.—*Panicum miliiforme* J. S. Presl ex C. Presl, *Rel.Haenk.* 1(4-5):300 (1830); *P. distachyum* non L., sensu Benth., *Fl.Aust.* 7:478 (1878).

Occurs in all Australian mainland States except Vic. Recorded in S.Aust. from the N.W., Lake Eyre, Gairdner-Torrens and Eastern regions.

Flowers Feb.-April.

Palatable.

3. *B. notochthona* (Domin) Stapf., *Fl.Trop.Afr.* 9:597 (1920). **Naked armgrass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 22c). Erect perennial; leaves lanceolate, flat, 4-6 mm broad, hairy, the sheaths loose, beset with long tubercle-seated hairs; ligule of short hairs; racemes 3-5 above the last leaf, spreading-erect, 2-4 cm long; spikelets in 2 rows along the flat rhachis, which is scarcely 1 mm broad, 4-5 mm long, glabrous; 1st glume broad, 3-nerved, third of the length of the spikelet, 2nd glume sub-9-nerved; 1st lemma sub-7-nerved, sometimes enclosing a hyaline palea, the 2nd and 3rd equal; fertile lemma transversely rugulose, terminating in a short mucro c. 1 mm long.—*Panicum notochthonum* Domin, *Reprint nov. Spec.Regni veg.* 10:60 (1911); *Urochloa notochthona* (Domin) Hughes, *Kew Bull.* 1923:319 (1923); *P. helopus* non Trin., sensu Benth., *Fl.Aust.* 7:476 (1878).

Occurs in N.T., Qld, N.S.W. and S.Aust. (Lake Eyre, Yorke Pen. and Murray regions).

Flowers Feb.-May.

Grazed.

4. *B. praetervisa* (Domin) C. E. Hubbard, *Kew Bull.* 1934:446 (1934). **Large armgrass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl.23b). Stems 18-60 cm high; leaf-sheaths pubescent or becoming glabrous, villous at orifice, rather loose, about as long as the blades, which are lanceolate, more or less dilated and cordate at the base, 3-12 cm long, 4-15 mm broad, flat, scabrous-ciliate and often minutely undulate on margin, sparsely pubescent or glabrous on the faces; panicle rather loose, 5-10 cm long, with 3-8 alternate erect racemes, of which the lowest are 2-6 cm long and simple or again shortly branched near the base, scabrous and sometimes with a few long hairs below the spikelets; rhachis triquetrous, c. 0.5 mm broad; spikelets almost always glabrous, 3.5-4 mm long, rather distant and almost appearing in 1 row, the lower ones usually in pairs, 1 subsessile, the other on a pedicel of 2-3 mm, the upper ones solitary; 1st glume subtruncate, 1.25-1.5 mm long, 3-5-nerved, 2nd glume as long as spikelet, 7-nerved; 1st lemma as long as the 2nd glume, 5-nerved and



Fig. 180—*Brachiaria notochthona*. A, inflorescence, natural size; B, spikelet, x 2; C, lemma, x 3.

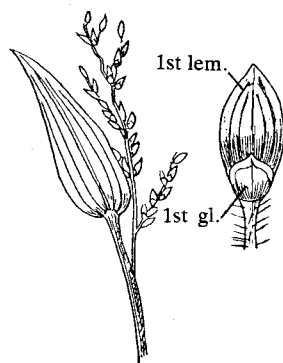


Fig. 181—*Brachiaria praetervisa*.

containing a flat barren oblong hyaline palea nearly as long; fertile lemma 3.5 mm long, faintly rugulose, with a mucro 0.25-0.5 mm long.—*Panicum praetervisum* Domin, *Bibliotheca bot.* 85:309 (1915); *Urochloa praetervis* (Domin) Hughes, *Kew Bull.* 1923:319 (1923); *P. adspersum* non Trin., sensu Benth., *Fl. Aust.* 7:481 (1878).

Occurs in N.T., Qld, N.S.W. and S.Aust. (N.W., Lake Eyre, Gairdner-Torrens, Flinders Ranges and Eastern regions).

Flowers Dec.-July.

Palatable.

90. CENCHRUS L.

Sp. Pl. 1049 (1753).

(*Kenchros*, Greek name for millet.)

Annuals or perennials; leaf-blade flat; ligule membranous or ciliate; inflorescence of simple spikes or racemes; spikelets with 1 fertile floret, sessile in an involucre of coalescing spines which falls off with the spikelets permanently enclosing them; glumes 2, the 1st smaller, 1st lemma barren or enclosing a male floret, 2nd (fertile) lemma and palea hardened, similar to one another. About 25 species cosmopolitan. (Key and descriptions mainly from C. A. Gardner (1952) *Flora of Western Australia* 1 and Weston (1974) *Nuytsia* 1:375-380.)

- | | |
|--|--------------------------|
| 1. Mature inflorescence not spiny | <i>C. ciliaris</i> 1. |
| 1. Mature inflorescence spiny. | |
| 2. Involucre with a ring of slender bristles in the outermost series .. | <i>C. longispinus</i> 3. |
| 2. Involucre with flattened spreading more or less irregular spines, without a ring of slender spines at the base. | |
| 3. Burs glabrous to short pubescent; 2-4 spikelets per bur; florets 3.4-5.8 mm long. | <i>C. incertus</i> 2. |
| 3. Burs densely pubescent; 1 spikelet per bur; florets 6.8-8.7 mm long | <i>C. tribuloides</i> 4. |

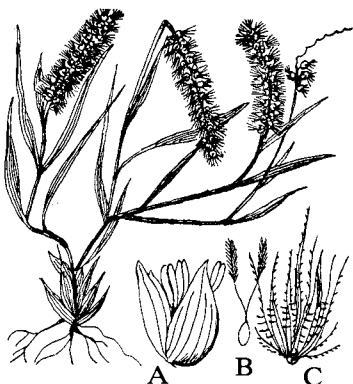


Fig. 182—*Cenchrus ciliaris*. A, palea and lemma; B, gynoeceum; C, involucre of spines.

*1. *C. ciliaris* L., *Mant. Pl.* 2:302 (1771). **Black buffel grass.** (Ill. C. A. Gardner (1952) *Flora of Western Australia* 1, pl. 82A-B). Perennial; culms ascending from a branched geniculate and often decumbent base, 30-40 cm high; leaf-blades linear, tapering to a fine point, usually flat, 3-6 mm broad; ligule a ciliate rim; panicles dense, spike-like, cylindrical, 2-5 cm long, purplish or rarely pallid; bristles not spiny, in 2 series, the outer fine and scabrid (the projections pointing upwards), the inner dilated, thickened and more or less united at the base, plumose-ciliate towards the base; spikelets 1-3 in each involucre, 4-5 mm long.—*Penisetum ciliare* (L.) Link, *Hort. Reg. Bot. Berol.* 1:213 (1827).

Native to the Canary Islands, Africa, Asia and Madagascar, naturalised in all Australian mainland States and recorded in S.Aust. from the Lake Eyre and Flinders Ranges regions.

Flowers Oct.

*2. *C. incertus* M. A. Curtis, *Boston J. Nat. Hist.* 1:135 (1837). **Bur grass.** (Ill. C. A. Gardner (1952) *Flora of Western Australia* 1, pl. 83c and 84c). Perennial, but flowering in the first year; culms erect or ascending from a decumbent base, 25-100 cm high, freely branched; leaf-blades usually folded, sometimes flat, 2-7 mm broad; ligule a ciliate rim; spike 1-10 cm long, more or less dense; involucre 3-7 mm diam. (excluding the spines), glabrous to densely pubescent, the base glabrous; spines spreading or reflexed, broadened at the base, flat, the lower ones sometimes

obsolete and represented by tubercles or callosities, the upper few, rarely more than 5 mm long; spikelets 1-3 in each involucre, 5-7 mm long.—*C. tribuloides* non L., sensu J. M. Black, *Fl.S.Aust.* 76 (1943); *P. pauciflorus* Benth., *Bot.Voy.H.M.S.Sulphur* 56 (1844).

Native to North and South America, naturalised in all Australian mainland States except ?N.T. Recorded in S.Aust. from the Eyre Pen., Southern Lofty and Murray regions.

Flowers Jan.-March.

*3. *C. longispinus* (Hack.) Fern., *Rhodora* 45:388 (1943). **Bur grass.** (Ill. C. A. Gardner (1952) *Flora of Western Australia* 1, pl. 83A-B). Annual; culm ascending from a geniculate or decumbent base, to 80 cm high, branched at the base; leaf-blades flat, linear, tapering to a fine point, 3-8 mm broad; ligule a ciliate rim; spike cylindrical, usually 3-8 cm long, not dense; involucre sessile, 4-7 mm long (excluding spines) and at least as broad, pubescent, straw-coloured or purplish, with a narrow pubescent turbinate base above which is an outer ring of slender bristles about half as long as the bur and frequently an inner whorl of slender bristles; spikelets c. 4 in each involucre.—*C. echinatus* L. forma *longispinus* Hack. in Kneucher, *Allg.Bot. Zeitschr.* 9:169 (1903); *C. echinatus* non L., sensu C. A. Gardner, *Fl.W.Aust.* 1:286 (1952).

Native to North America, naturalised in all Australian mainland States except N.T. and recorded in S.Aust. from the Eyre Pen., Southern Lofty and Murray regions.

Flowers Jan.-April.

*4. *C. tribuloides* L., *Sp.Pl.* 1050 (1753). **Bur grass.** (Ill. C. A. Gardner (1952) *Flora of Western Australia* 1, pl. 84A-B). Annual; culms erect or ascending and rooting at the lower nodes, 15-60 cm long, branched; leaf-blade flat or folded, 4-7 mm broad; ligule a ciliate rim; spike 3-9 cm long, usually half exserted from the uppermost leaf-sheath; involucre 5-6 mm broad (excluding spines), villous (or pubescent?), the turbinate base puberulous with a tuft of dense hairs at the base; spines finally spreading, flat, the lowest short and slender, the upper broadened at the base, more or less deltoid-subulate, to 3 mm broad and 5-8 mm long, villous on the inner face; spikelets usually 2 in each involucre, 7-8 mm long.

Native to North and South America, naturalised in W.Aust., N.T. and ?S.Aust. It is probable that it does not occur in S.Aust and that all former records refer to other species.

There is no specimen in AD.

91. DIGITARIA Heister ex Fabr.

Enum.Meth.Pl. 207 (1759).

(Latin *digitus*, a finger; alluding to the shape of the inflorescence.)

Annuals or perennials; leaf-blade usually flat; ligule membranous; inflorescence of several digitately or sub-digitately arranged spike-like racemes; spikelets usually in pairs along 1 side of the rachis, with 1 bisexual floret, dorsally compressed, abaxial (1st glume away from the axis of the raceme); 1st glume minute; 1st lemma barren, with straight parallel nerves, similar to the 2nd glume or larger; 2nd lemma bisexual, glabrous, thinly cartilaginous, with usually flat margins; palea equal to the fertile lemma and embraced by it, both hardening when ripe. Nearly 400 species from warm areas. (Key adapted from Vickery (1961) *Contr.N.S.W.natn. Herb.*, Flora ser. 19 (1).)

1. Racemes devoid of spikelets at the base for 2-12 cm (very rarely with a few spikelets at the base and then bare for a few cm).
2. Spikelets 2-3.5 mm long, clothed with silky hairs which more or less completely obscure its outline *D. ammophila* 2.
2. Spikelets 3-5.5 mm long, the indumentum not or scarcely concealing the outline of the spikelets.
3. Spikelets linear-elliptical to linear-lanceolate, usually 5 mm long; hairs in axils of the racemes 1-3 mm long; leaves usually greyish velvety pubescent *D. coenicola* 5.

3. Spikelets lanceolate, usually 4-4.5 mm long; hairs in axils of racemes to 0.5 mm long; leaves sub-glabrous to loosely pubescent *D. divaricatissima* 6.
1. Racemes bearing spikelets right to their base, very rarely bare for a few mm (or to 2 cm in *D. brownii*).
4. Spikelets concealed by the long silky hairs on the 2nd glume and sterile lemma *D. brownii* 3.
4. Spikelets glabrous or variously hairy but not concealed by long silky hairs.
5. Spikelets paired, 3-3.5 mm long.
6. 1st glume absent; 2nd glume and sterile lemma equal ... *D. aequiglumis* 1.
6. 1st glume present though sometimes minute, rarely obsolescent; 2nd glume shorter and narrower than the sterile lemma.
7. Sterile lemma scabrous on the lateral nerves at least in the upper part *D. sanguinalis* 8.
7. Sterile lemma not scabrous on the nerves. *D. ciliaris* 4.
5. Spikelets in 3's, 2-2.25 mm long. *D. ischaemum* 7.

*1. *D. aequiglumis* (Hack. & Arech.) Parodi, *Rev. Fac. Agron. Vet.* 4:47 (1922). Annuals, with erect or geniculate culms, sometimes rooting at the lower nodes, 20-40 cm high; leaf-blades linear, acuminate, 4-8 cm long, 2-3 mm broad, glabrous or finely pubescent; ligule truncate or jagged; panicle of 3-5 digitate or approximately 5-8 cm long racemes; spikelets in pairs, 1 on a very short pedicel and the other on a pedicel 4-6 times as long, 3-3.5 mm long, lanceolate, acuminate, light green; 1st glume 0; 2nd glume and 1st (sterile) lemma equal, 5-nerved, pubescent between nerves and on margin; fertile floret a little shorter.—*Panicum aequiglume* Hack. & Arech., *An. Mus. nac. Montevideo* 2:111 (1894).

Native to South America; naturalised in N.S.W. and S.Aust. (only recorded from Adelaide).
Flowers Feb.-April.

2. *D. amorphila* (Benth.) Hughes, *Kew Bull.* 1923:313 (1923). **Spider grass, silky umbrella-grass.** Perennial, with flat, softly villous leaves; ligule obtuse or jagged, c. 2 mm long; racemes 10-12 in number, the lower ones whorled and 8-16 cm long, at first erect, finally spreading and naked for 2-6 cm from base; spikelets 2-2.5 mm long, villous with white silky hairs as long as and concealing the spikelets, which are in pairs on unequal pedicels; 1st glume ovate, minute, the 2nd 3-nerved; the 1st lemma (sterile) 5-nerved, the 2nd glume and 1st lemma both villous and equal; fertile lemma nearly as long, acute, smooth.—*Panicum amorphilum* non Trin., sensu F. Muell., *J. Trans. Vict. Inst.* 1:46 (1855); *P. divaricatissimum* var. *amorphilum* Benth., *Fl. Aust.* 7:468 (1878).

Occurs in all Australian mainland States except W.Aust. and ?Vic. Recorded in S.Aust. from the N.W., Lake Eyre and Murray regions.

Flowers recorded in March and Aug.

Described by Vickery (1961) as "A drought-resistant grass of some value in natural mixed pastures of the drier districts".

3. *D. brownii* (Roem. & Schult.) Hughes, *Kew Bull.* 1923:313 (1923). **Cotton grass, cotton panic grass.** (Ill. N.T. Burbidge (1968) *Australian grasses* 2, pl. 29; Lazarides (1970) *The grasses*

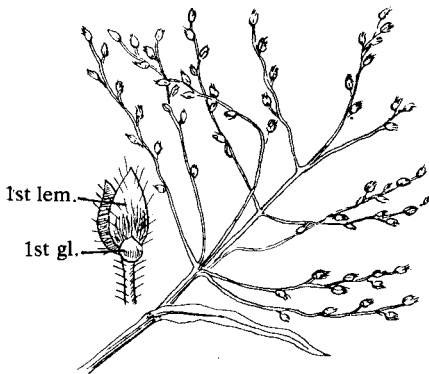


Fig. 183—*Digitaria amorphila*.

of *Central Australia*, pl. 29a). Perennial, with erect stems 12-50 cm high; leaf-blades narrow, flaccid; ligule oblong, glabrous, torn, c. 2 mm long; racemes 1-4, often 2, sessile, erect, at or near the summit of the slender stems, 2-10 cm long; spikelets silky white or purple, 2-3 mm long, on unequal pedicels along the zig-zag rhachis; 1st glume minute; 2nd glume and 1st (sterile) lemma equal, villous on back, the 2nd glume 3-nerved, the 1st lemma 5-nerved; 2nd (fertile) lemma nearly as long, smooth.—*Panicum brownii* Roem.&Schult., *Syst.Veg.* 2:462 (1817); *P. leucophaeum* var. *monostachyum* Benth., *Fl.Aust.* 7:472 (1878); *D. brownii* var. *monostachya* (Benth.) Hughes, *Kew Bull.* 1923:313 (1923).

Occurs in all Australian mainland States except ?Vic. Recorded in S.Aust. from throughout the arid areas and the Flinders Ranges, Eyre Pen. and Southern Lofty regions.

Flowers throughout the year.

A valued pasture species of dry areas.

4. *D. ciliaris* (Retz.) Koel., *Descr.Gram. Gall.&Germ.* 27 (1802). (Ill. Gilliland (1971) *Flora of Malaya* 3, fig. 40). Annual, 15-70 cm high, with flat linear to linear-lanceolate flaccid leaves 5-15 cm long and 4-8 mm broad; ligule truncate or erose, 1-2 mm long; racemes usually 4-9, subdigitate, at first erect but later spreading, 3-30 cm long; spikelets lanceolate, 3-3.25 mm long, acuminate, pale greenish to purplish, glabrous or more often variously hairy; 1st glume usually distinct but short; 2nd glume half to three-quarters of the length of the spikelet, narrow, 3-nerved, usually with fine hairs between the nerves and on the margins; 1st (sterile) lemma equalling the spikelet, 7-nerved, 2nd (fertile) lemma oblong-lanceolate, almost as long as the spikelet.—*Panicum ciliare* Retz., *Obs.Bot.* 4:16 (1786/7); *P. adscendens* Humb., *Bonpl.&Kunth, Nov.Gen.et Sp.Pl.* 1:97 (1815); *D. adscendens* (Humb., *Bonpl.&Kunth*) Henr., *Blumea* 1:92 (1934).

Native throughout the tropics and present in all mainland Australian States. Recorded in S.Aust. from Adelaide.

Flowers April (1 record).

This species is very similar to *D. sanguinalis* and great care is needed in their identification.

5. *D. coenicola* (F. Muell.) Hughes, *Kew Bull.* 1923:313 (1923). **Spider grass, finger panic grass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 29b). Perennial, with erect or geniculate culms 15-60 cm high; leaf-blades flat, linear, densely pubescent on both sides, the margins often somewhat undulate, 5-15 cm long, 3-6 mm broad; ligule obtuse or jagged; racemes stiffly spreading at maturity, the lower in a whorl of 5-10 and to 25 cm long, the upper mostly arising singly, bare at their bases for 5-20 cm; spikelets usually in pairs, 4.5-5 mm long, linear-elliptical to linear-lanceolate, the hairs towards the upper part of the spikelet spreading at maturity and giving the spikelet an obtuse appearance, the shorter pedicel c. 0.5-2 mm long, the other 4-15 mm long; 1st glume one-sixth to one-third as long as the spikelet, obscurely 3-nerved, a little remote from the 2nd glume; 2nd glume and 1st (sterile) lemma more or less equal, 5-7-nerved, pubescent especially above; fertile floret c. 4 mm long.—*Panicum coenicolum* F. Muell., *Trans.Vict.Inst.* 1:45 (1855).

Occurs in all Australian mainland States. Recorded in S.Aust. from throughout the arid areas, Flinders Ranges and Southern Lofty regions.

Flowers throughout the year, especially summer.

Only the var. *coenicola* has been recorded in S.Aust.

Valued as a pasture species in dry areas.

6. *D. divaricatissima* (R.Br.) Hughes, *Kew Bull.* 1923:314 (1923). **Umbrella grass.** Perennial, 15-60 cm high, with erect or geniculate culms; leaf-blades flat, gradually narrowed to the tip, 4-15 cm long, 3-6 mm broad, more or less hairy, sometimes with tubercle-based hairs; ligule often jagged, 2-3 mm long; racemes stiffly spreading at maturity, the lower in a whorl of 4-6 and usually c. 20 cm long, the upper arising singly, usually naked below for 1-9 cm or rarely with a cluster of spikelets at the base; spikelets mostly in pairs, the shorter pedicels 1-4 mm long, the longer

4-10 mm long, greenish, 3-7.5 mm long, lanceolate, more or less hairy; 1st glume one-eighth to one-quarter as long as the spikelet, 2nd glume 3-nerved, slightly shorter than the spikelet, villous on the margins and between the nerves; 1st (sterile) lemma equalling the spikelet, 5-7-nerved, with long soft hairs between the nerves and on the margins, 2nd (fertile) lemma a little shorter than the spikelet.—*Panicum divaricatissimum* R.Br., *Prod. Fl. Nov. Holl.* 192 (1810).

Occurs in all Australian mainland States except W.Aust. and N.T. Recorded in S.Aust. by Vickery (1961), and a few specimens in AD from the N.W. region have been tentatively placed here.

*7. **D. ischaemum** (Schreb.) Schreb. ex Muhl., *Descr. Gram.* 131 (1817). **Smooth summer grass, smooth crab-grass.** Annual, with geniculate-ascending or spreading stems, to 40 cm high; leaves glabrous, the blades flat, 3-15 cm long; ligule obtuse or truncate; racemes digitate or approximate at the summit of the culm, 2-6 in number, 3-5(-10) cm long; spikelets usually ternate but sometimes paired above, on unequal pedicels, 2-2.25 mm long; 1st glume minute or absent; 2nd glume 3-nerved, rather densely and shortly pubescent between the nerves and along the margins, only slightly shorter than the 1st lemma; 1st (sterile) lemma 5-nerved, usually glabrous between the median nerves, pubescent between the outer nerves and along the margins; 2nd (fertile) lemma as long as the 1st lemma, ovate, acute, black with whitish-hyaline margins.—*Panicum ischaemum* Schreb. in Schweigger, *Sp. Pl. Erlang.* 16 (1805).

Native to Europe and Asia; naturalised in North America, New Zealand, N.S.W., Vic. and S.Aust. (Southern Lofty region).

Flowers Feb.-July.

A weed of lawns reported occasionally and first identified by Mr D. Symon in 1977.

8. **D. sanguinalis** (L.) Scop., *Fl. Carniolica*, ed.2, 1:52 (1772). **Summer grass, crab grass.** (Ill. C. A. Gardner (1952) *Flora of Western Australia* 1, pl. 67). Annual, with stems often creeping and rooting, 15-70 cm high; leaves usually sprinkled with hairs, the blades lanceolate, flat, often undulate, 5-15 cm long; ligule truncate or erose, 1-2 mm long; racemes digitate or approximate at the summit of the culm, 3-10, slender, 5-16 cm long; spikelets in pairs on unequal pedicels, 3 mm long; 1st glume minute; 2nd glume 3-nerved, villous-ciliate, acute, half as long as the 1st lemma; 1st (sterile) lemma 5-7-nerved and scabrous or villous-ciliate on the margins, the 4-6 lateral nerves arranged on the margins where they turn inwards and rather distant from the central straight nerves; 2nd (fertile) lemma smooth.—*Panicum sanguinale* L., *Sp. Pl.* 57 (1753).

Widespread in warm and temperate regions of the world, occurring in all Australian mainland States. Recorded in S.Aust. from the Flinders Ranges, Yorke Pen., Southern Lofty, Murray and S.E. regions.

Flowers Dec.-May.

Considered by Black (1943) to have been possibly introduced as it occurs mainly in disturbed places. See note to *D. ciliaris*.

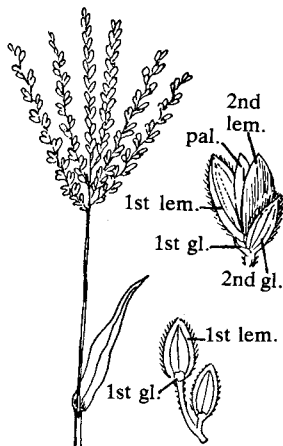


Fig. 184—*Digitaria sanguinalis*.

92. *ECHINOCHLOA* Beauv.

Agrost. 53 (1812).

(From Greek *echinos*, hedge-hog; *chloë*, grass; alluding to the often bristly spikelets.)

Annuals or perennials; leaf-blade flat, narrow; ligule 0 or of hairs; inflorescence a panicle; spikelets 1-flowered, dorsally compressed, plano-convex, abaxial, acuminate or awned,

subsessile in dense alternate spike-like racemes; the 1st glume smaller than the 2nd or 1st (sterile) lemma which are equal and 5-nerved; fertile lemma and palea equal, coriaceous, smooth and shining. About 30 species from warm areas. (Vickery & Michael (1975) *Fl. N.S.W.* 19(2):189-211).

1. Inflorescence lacking bristles *E. colona* 1.
1. Inflorescence with distinct bristles (usually 2-6 mm long) on the rachis of the racemes.
 2. Panicle narrowly pyramidal (widespread).
 3. 2nd glume distinctly longer than the fertile (2nd) lemma *E. crus-galli* 2.
 3. 2nd glume about as long as or shorter than the fertile lemma *E. utilis* 4.
 2. Panicle spike-like (far N.E. of the Lake Eyre region) *E. inundata* 3.

*1. *E. colona* (L.) Link, *Hort. Bot. Berol.* 2:209 (1833). **Awnless barnyard grass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 32a). Annual, to 60 cm high; leaf-blades to 11 cm long, and 5 mm broad; ligule 0; inflorescence contracted, 5-15 cm long, well exerted, with 8-10 racemes; spikelets in 4 rows along the hairy axis, c. 2 mm long; 1st glume 3-nerved, c. 1 mm long, 2nd glume 5-nerved, with a distinct point of 0.4 mm; 1st lemma 5-nerved, slightly longer than the 2nd glume; 2nd (fertile) lemma and palea about as long as the 1st lemma.—*Panicum colonum* L.,

Occurs in Africa, Asia and all Australian mainland States. Only recorded in S.Aust. from Adelaide.

Flowers March (1 record).

Palatable.

*2. *E. crus-galli* (L.) Beauv., *Agrost.* 53 (1812). **Cockspur grass, barnyard grass.** (Ill. N. T. Burbidge (1968) *Australian grasses* 2, pl. 62). Annual, 30-80 cm high; leaf-blades to 40 cm long, 4-12 mm broad; ligule 0; inflorescence contracted, 6-20 cm long, well exerted, with 9-12 racemes; spikelets crowded in about 3 irregular rows on one side of the narrow triquetrous, scabrous, bristly rachis of the erect-spreading racemes, 3-4 mm long (excluding awns); 1st glume 5-nerved, less than half the length of the spikelet, 2nd glume 5-nerved; 1st lemma 5-nerved, often awned, rarely to 2 cm long (including the awn), 2nd (fertile) lemma c. 2.5 mm long, shorter than the 2nd glume.—*Panicum crus-galli* L., *Sp.Pl.* 56 (1753).

Almost cosmopolitan as a native or naturalised. Occurs in all Australian States. Recorded in S.Aust from the Lake Eyre, Eastern, Eyre Pen., Yorke Pen., Northern and Southern Lofty and Murray regions.

Flowers usually Nov.-April, but rarely also in winter.

E. lacunaria (F. Muell.) Michael & Vickery, *Telopea* 1:44 (1975) (= *Panicum lacunarium* F. Muell., *J. Trans. Vict. Inst.* 1854/55: 47; 1855) was described from the Murray region of S.Aust. (cf. Vickery & Michael, 1975). It has not been collected again in S.Aust. and was reduced to synonymy in *E. crus-galli* by Mueller and by Bentham (*Fl. Aust.* 7:479; 1878). Vickery recognised it as distinct and as occurring also in N.S.W. The principle characters she used to distinguish it are the absence of setae, virtual absence of spinules on the glumes and lemmas, glabrous or obscurely scabrid panicle axes and the larger (4.75-6 mm long) spikelets.

3. *E. inundata* Michael & Vickery, *Telopea* 1: 46 (1975). Annual, from less than 1 m to over 2 m high; leaf-blades to 50 cm or more long, 5-12 mm broad; ligule of upper leaves 0, of lower leaves of hairs; inflorescence contracted and more or less spike-like, 8-20 cm long, 1-1.5 cm

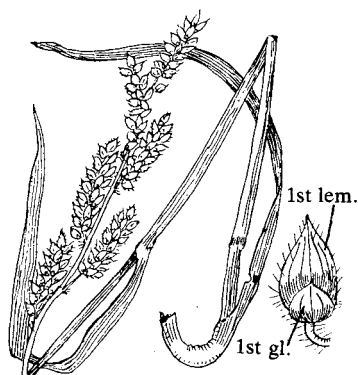


Fig. 185—*Echinochloa crus-galli*.

broad, with several erect branches 1-3 cm long; spikelets crowded in about 3 irregular rows along the narrow, angular, scabrous, more or less bristly rhachis of the racemes, ovoid-acute, c. 5 mm long, 1st glume nearly half as long as the spikelet, 3-nerved, ciliolate; 2nd glume sub-9-nerved; 1st lemma 5- or sub-7-nerved containing a palea nearly as long as itself; 2nd (fertile) lemma shorter than the 2nd glume.

Occurs in Qld, N.S.W. and S.Aust. (Lake Eyre region, south of Cordillo Downs).

Flowers May (1 record).

One specimen in AD from the same area was identified as *E. turnerana* (Domin) J. M. Black, *Fl.S.Aust.* 1:72 (1943) (= *Panicum turnerianum* Domin, *Bibliotheca bot.* 85:307; 1815) by Vickery (1969) and by Michael (1970).

*4. *E. utilis* Ohwi & Habuno in Ohwi, *Acta Phytotax. & Geobot. Kyoto* 20:50 (1962). Annual, 19-50 cm high; leaf-blades to 20 cm long, 8-12 mm broad; ligule 0; inflorescence contracted, 6-7 cm long, 1.5-2 cm broad, not or scarcely fully exerted, with 8-10 racemes; spikelets crowded in about 4 rows on one side of the rhachis of the erect-spreading racemes, c. 3 mm long; 1st glume 5-nerved, less than half the length of the spikelet, 2nd glume 5-nerved; 1st lemma 5-nerved, sometimes awned, 2nd (fertile) lemma longer than the 2nd glume. (Description from 2 specimens in AD).

Native to Asia, cultivated and naturalised in Qld, N.S.W. and S.Aust. (Southern Lofty and S.E. regions).

Flowers Feb.-March.

93. *ERIOCHLOA* Humb., Bonpl. & Kunth

Nov.Gen.&Sp.Pl 1:94 (1816).

(Greek *erion*, wool; *chloë*, grass.)

Annual or perennial; leaf-blade flat; ligule of hairs; inflorescence a panicle of racemes; spikelets 1-flowered, acute, dorsally compressed, erect, adaxial, supported on a hardened disk-like callus which is articulate on the short pedicel, arranged in 1 or 2 rows along one side of the slender racemes; glumes 2, faintly 5-nerved, the 2nd rather shorter than the 1st, the lemma shorter, coriaceous, ovate, mucronate; the palea also hardened, similar but not mucronate. (The callus is supposed to represent a rudimentary glume in which case what is called here the 2nd glume is actually a sterile lemma). About 20 species from warm areas.

1. Spikelets 4.5-6 mm long; sheath not inflated; perennial *E. psuedo-acrotricha* 2.

1. Spikelets 6-12 mm long; sheath more or less inflated; annual *E. australiensis* 1.

1. *E. australiensis* Stapf ex Thell., *Vjishr.naturf.Gesch.Zurich* 64:697 (1919). (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 49a). **Australian cupgrass.** Annual, with several stems, 60 cm high; leaves glabrous, flat, 2-4 mm broad or setaceous-involute in the upper part; sheath more or less inflated; ligule of hairs c. 1 mm long; panicle 5-20 cm long, with several erect scabrous branches 1.5 cm long, the pedicels short, scabrous and with long deciduous hairs at or near the summit; spikelets silky, 6-12 mm long, including the awn-like point into which the glumes taper; lemma 2.5-3 mm long, with a mucro of 1 mm.—*E. longiflora* S. T. Blake, *Pap.Dep.Biol.Univ.Qld* 1(18):18 (1941).

Occurs in all Australian mainland States except Vic. Recorded in S.Aust. from the N.W., Lake Eyre, Gairdner-Torrens, Flinders Ranges and Southern Lofty regions.

Flowers throughout the year.

Highly palatable.

2. *E. psuedo-acrotricha* (Stapf ex Thell.) J. M. Black, *Fl.S.Aust.* 68 (1943). **Perennial cupgrass, early spring grass.** (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 32). Perennial,

with several stems, erect, 12-60 cm high; leaves glabrous, flat and 2-4 mm broad or setaceous-involute in the upper part; sheaths not inflated; ligule of hairs c. 1 mm long; panicle 5-10 cm long, 5-10 mm broad, with several erect, scabrous branches 1-5 cm long, the short pedicels scabrous and with long deciduous hairs at or near the summit; spikelets silky, 4-5-6 mm long, ovate-acute; lemma 2-5 mm long, with a mucro of c. 1 mm.—*E. ramosa* Kuntze var. *pseudo-acrotricha* Stapf ex Thell., *Vjschr.naturf.Gesch.Zurich* 64:679 (1919).

Occurs in all Australian mainland States. Recorded in S.Aust. from Lake Eyre, Gairdner-Torrens, Flinders Ranges, Eastern, Yorke Pen. and Southern Lofty regions.

Flowers Feb.-July.

Highly palatable.



Fig. 186—*Eriochloa pseudo-acrotricha*.

94. PANICUM L.

Sp.Pl. 55 (1753).

(Latin name for millet.)

Perennial or annual; leaf-blades usually flat; ligule of hairs with or without a membrane; inflorescence a panicle; spikelets 1-flowered, dorsally compressed, pedicellate, usually solitary; 1st glume smaller than the 2nd; 1st lemma sometimes enclosing a hyaline palea or male floret; 2nd (fertile) lemma and palea almost equal, becoming hard and smooth. About 500 species in warm parts of the world.

- | | |
|---|---------------------------|
| 1. Inflorescence 2-3-5 cm long; minutely 2-lobed membranous appendage below palea | <i>P. australiense</i> 1. |
| 1. Inflorescence usually more than 10 cm long; lacking appendage below palea. | |
| 2. Spikelets 4-5-5 mm long | <i>P. miliaceum</i> 5. |
| 2. Spikelets to 4 mm long. | |
| 3. 1st glume distinctly more than half the length of the spikelet; nodes not bearded; leaves glabrous | <i>P. prolutum</i> 6. |
| 3. 1st glume less than half the length of the spikelet, if approximately half the length then the leaves hairy (sometimes sparsely so). | |
| 4. 1st glume truncate, one-third the length of the spikelet; nodes not bearded. | |
| 5. Lower panicle-branches clustered; leaves glabrous | <i>P. decompositum</i> 3. |
| 5. Lower panicle-branches solitary; leaves more or less hairy | <i>P. whitei</i> 7. |
| 4. 1st glume acute, more or less half the length of the spikelet; nodes bearded. | |
| 6. Perennial; leaf-blade 2-5 mm broad; panicle soon long-exserted | <i>P. effusum</i> 4. |
| 6. Annual; leaf-blade 5-15 mm broad; panicle enclosed at base until maturity | <i>P. capillare</i> 2. |

1. ***P. australiense*** Domin, *J.Linn.Soc.(Bot.)* 41:271 (1912). **Bunch panic.** (Ill. C. A. Gardner (1952) *Flora of Western Australia* 1, pl. 76; Lazarides (1970) *The grasses of Central Australia*, pl. 52a). A low dense grass with several stems, 10-15 cm high; leaves with scattered hairs often seated on tubercles, the sheaths loose, the blades lanceolate, 3-5-6-5 cm long; ligule of long hairs; panicle 2-3-5 cm long, sometimes unbranched, clustered at the ends of the stems or branches and shorter than the subtending leaves; spikelets glabrous, acute, 3-4 mm long, few (usually 3-6) in

each panicle or raceme; 1st glume broad, acute, 5-nerved, half the length of the spikelet, the 2nd acuminate, 5-nerved; the 1st lemma equal to the 2nd glume, 7-nerved; 2nd (fertile) lemma and palea smooth, brown, glossy, 2 mm long, on a stipes c. 1 mm long which bears at its summit a small white annular membranous open and minutely 2-lobed appendage below the palea.—*Ichnanthus australiensis* (Domin) Hughes, *Kew Bull.* 1923:329 (1923); *P. pauciflorum* var. *fastigiatum* Benth., *Fl. Aust.* 7:483 (1878).

Occurs in W.Aust., N.T., Qld and S.Aust. (recorded by Black (1943) from the far north at Blood's Creek and Dalhousie, but not represented in AD).

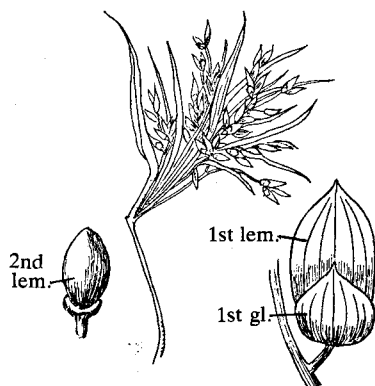


Fig. 187—*Panicum australiense*.

*2. *P. capillare* L., *Sp. Pl.* 58 (1753). **Witch-grass.**

Tufted annual, stems usually erect, 20-80 cm high; leaf-blades 5-15 mm broad, hispid with tubercle-seated hairs on both surfaces; panicle dense and diffuse, often half the length of the entire plant, the base included in the upper leaf-sheaths until maturity, the branches finally divaricately spreading, the whole panicle breaking away; spikelets 2-2.5 mm long; 1st glume ovate, almost half the length of the spikelet, 3-nerved; 2nd glume 5-7-nerved, acute or acuminate; 2nd (fertile) lemma broadly ellipsoidal, smooth and shining (description from C. A. Gardner (1952) *Flora of Western Australia* 1).

Native to North America, naturalised in W.Aust., N.S.W., Vic. and S.Aust. (Southern Lofty region).

Flowers Jan.-March.

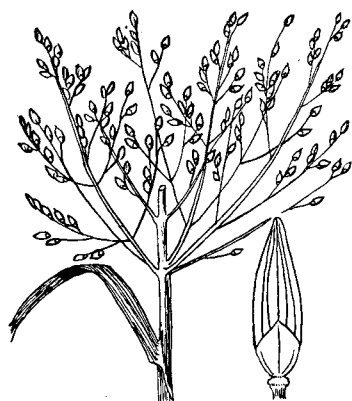


Fig. 188—*Panicum decompositum*.

3. *P. decompositum* R.Br., *Prod. Fl. Nov. Holl.* 191 (1810). **Native millet, windmill grass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 52b). Erect glabrous annual or perennial, 30 cm to over 1 m high, with a thick hollow stem and flat leaves 5-12 mm broad; ligule very short (scarcely 0.5 mm), truncate, ciliate; panicle 15-40 cm long, compound, loose and wide, at first enclosed in the uppermost leaf-sheath, the branches stiff and the lower ones clustered or whorled; spikelets pedicellate, glabrous, acuminate, 2.5-3 mm long; 1st glume hyaline, subtruncate, barely one-third of the length of the spikelet, faintly 1-nerved, 2nd glume 7-9 nerved; 1st lemma equal to the 2nd glume, enclosing a palea, 2nd (fertile) lemma smooth and shining.

Occurs in all Australian mainland States. Recorded in S.Aust from throughout the arid areas and the Flinders Ranges and Southern Lofty regions.

Flowers throughout the year.

Palatable. Grows in both dry and moist situations.

4. *P. effusum* R.Br., *Prod.Fl.Nov.Holl.* 191 (1810).

Hairy panic. (Ill. N. T. Burbidge (1968) *Australian grasses* 2, pl. 9). A perennial tussock grass, 20-50 cm high; leaves more or less hairy, the blades 2-5 mm broad, flat or inrolled, the hairs sometimes seated on tubercles; nodes silky-bearded; ligule silky-ciliate, very short; panicle soon long-exserted, rigid, 10-20 cm long, compound, loose; spikelets distant, pedicellate, usually 2 towards the end of each filiform branchlet, 2-2.5 mm long, acuminate, purplish; 1st glume acute, 3-nerved, one-half the length of the spikelet, the 2nd 5-7-nerved; 1st lemma equal to 2nd glume, enclosing a palea; 2nd (fertile) lemma smooth and shining. —*P. convallium* F. Muell., *J.Trans.Vict.Inst.* 1855:46 (1855).

Occurs in all Australian mainland States. Recorded in S.Aust. from the N.W., Flinders Ranges, Eyre Pen. and Yorke Pen. regions and all regions to the S.E. of this.

Flowers Oct.-May.

Palatable.

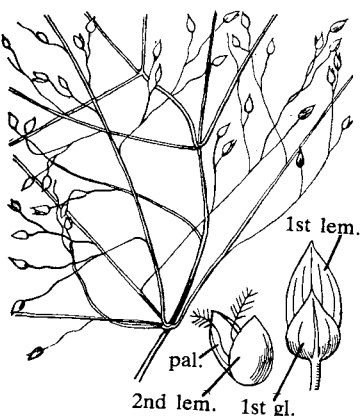


Fig. 189—*Panicum effusum*.

*5. *P. miliaceum* L., *Sp.Pl.* 58 (1753). **Broom millet.** Erect hairy annual, 20-100 cm tall, the stems erect or decumbent at the base; leaf-sheaths broad and loose, with hairs seated on tubercles, the blades to 2 cm broad, usually hairy on both surfaces; ligule a short ciliate membrane; panicle usually partly enclosed in upper leaf-bases, 10-30 cm long, rather compact, but usually drooping, with numerous capillary branches; spikelets 4.5-5 mm long, ovate, acuminate; 1st glume about half the length of the spikelet, 5-nerved, 2nd glume 9-11-nerved, acuminate; 1st lemma equal to 2nd glume, enclosing a palea, 2nd (fertile) lemma 3 mm long, cartilaginous, yellowish to reddish, smooth and shining.

Native to Europe and Asia, naturalised in parts of Australia including W.Aust., Qld, N.S.W., and S.Aust. Recorded in the Southern Lofty and S.E. regions.

Flowers Feb.-April.

Cultivated for the grain and as fodder.

6. *P. prolutum* F. Muell., *J.Trans.Vict.Inst.* 1855:46 (1855). **Coolah grass, rigid panic.** Glabrous perennial, with rigid stems 30-100 cm high; leaves glabrous, flat or inrolled; ligule oblong, glabrous, 3-5 mm long, torn at summit; panicle 15-20 cm long, compound, loose and wide, the lower branches mostly whorled; lateral pedicels capillary, 4-8 mm long; spikelet 3-4 mm long, turning purple, acute, glabrous; 1st glume three-quarters of the length of the spikelet, obtuse, 5-nerved, 2nd glume 7-9-nerved; 1st lemma equal to 2nd glume, not enclosing a palea, 2nd (fertile) lemma smooth and shining.

Occurs in all Australian mainland States except N.T. and ? W.Aust. Recorded in S.Aust from the Flinders Ranges, Eastern, Yorke Pen., Northern and Southern Lofty and S.E. regions.

Flowers Sept.-April.

Usually grows near water.

7. *P. whitei* J. M. Black, *Trans.R.Soc.S.Aust.* 41:632 (1917). **Pepper grass, pigeon grass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 53b). Annual or perennial, 30-70 cm high; leaf-blades flat, the sheaths of the stem-leaves more or less beset with long tubercle-seated hairs, the main rhachis of the panicle often also hairy; ligule short, ciliate; panicle 10-25 cm long, compound, loose, the branches slender and the lowest 1 or 2 branches solitary, the upper ones

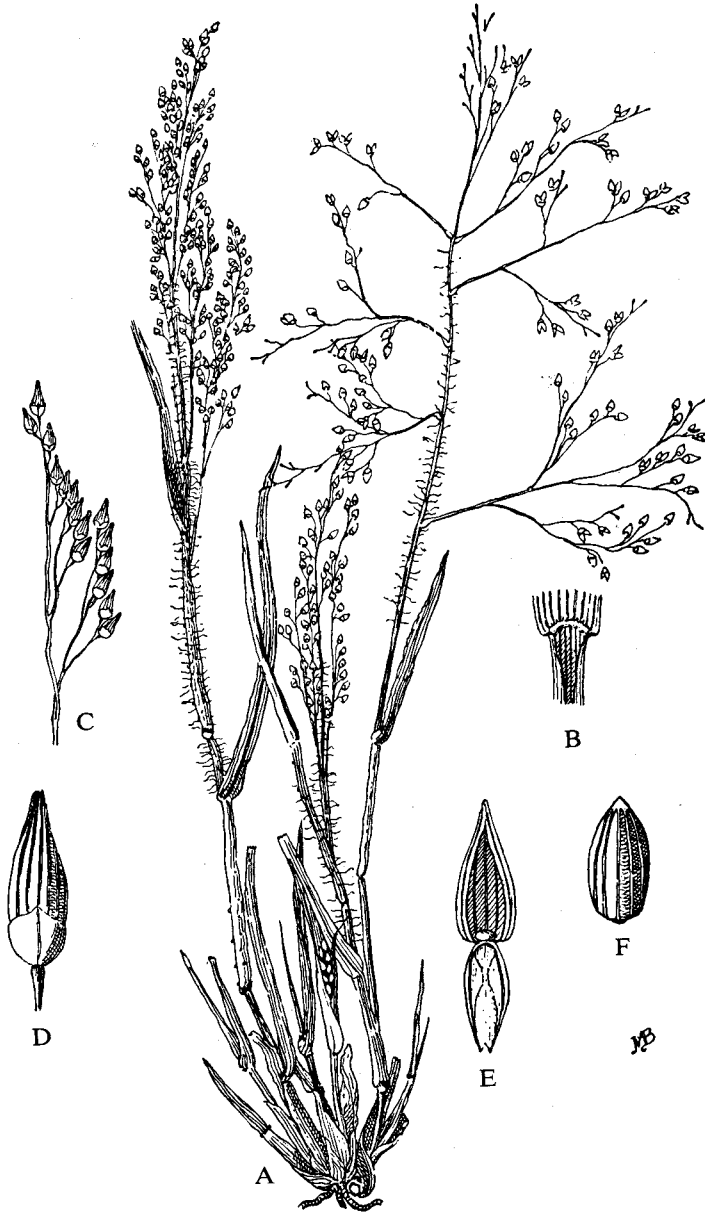


Fig. 190—*Panicum whitei*. A, habit, $\times \frac{1}{2}$; B, ligule, $\times 2$; C, portion of inflorescence, $\times 2$; D, spikelet, $\times 8$; E, first (sterile) lemma and palea, $\times 8$; F, second (fertile) lemma, $\times 8$.

mostly in pairs or threes; spikelets usually in pairs, unequally pedicellate, glabrous, acuminate, 2-2.5 mm long; 1st glume hyaline, subtruncate, less than one third of the length of the spikelet, with a prominent midnerve, 2nd glume as long as the spikelet, 7-9-nerved; 1st lemma equal to 2nd glume, enclosing a palea, 2nd (fertile) lemma with 7 vertical nerves, smooth and shining.

Occurs in all Australian mainland States except Vic. Recorded in S.Aust. from the N.W. and Lake Eyre regions.

Flowers Oct.-April.

Palatable.

95. PARACTAENUM Beauv.

Agrost. 47 (1812).

(Greek *para*, like; *ktenion*, a little comb; probably alluding to the bristly spikes.)

Annual or perennial; leaf-blade flat; ligule ciliate; inflorescence of spikes forming a panicle, the spikes disarticulating from the main axis of the panicle; spikelets 1-flowered, solitary, sessile, abaxial; glumes 2, the 1st 3-5-nerved, the 2nd as long as the spikelet, 9-11-nerved; 1st lemma equal to 2nd glume, lacking a palea, 2nd (fertile) lemma membranous, becoming slightly indurate. Monotypic.

1. *P. novae-hollandiae* Beauv., *Agrost.* 47 (1812). **Reverse grass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 55a). Rather slender glabrous annual or short-lived perennial; leaves 2-5 mm broad; ligule short; spikes distant, erect then deflexed, 3-21 in number, 2-6 cm long, naked towards the base, with rigid bristly bracts sheltering the lowest and terminal spikelets; spikelets few and alternate along one side of the flattened rachis of the spike so as to appear in one row, 4-5 mm long, ovoid-oblong; 1st glume three-quarters as long as the spikelet, obtuse, 3-5-nerved; 2nd (fertile) lemma punctulate.—*Panicum paractaenum* Kunth, *Rev. Gram.* 1:41 (1829); *P. reversum* F. Muell., *Fragm. Phyt.Aust.* 8:152 (1874).

Occurs in all Australian mainland States except Vic. Recorded in S.Aust. from the Lake Eyre, Nullarbor, Gairdner-Torrens and Eastern regions.

Flowers usually May-Aug.

Not grazed.

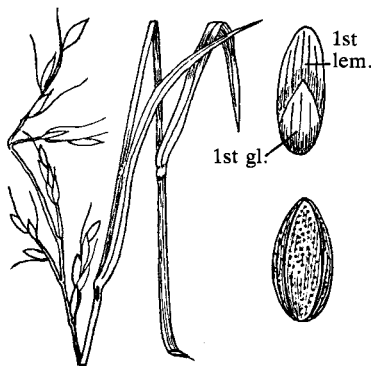


Fig. 191—*Paractaenum novae-hollandiae*.

96. PASPALIDIUM Stapf

Fl.Trop.Afr. 9:582 (1920).

(Formed from the name of the genus *Paspalum*.)

Perennials or annuals; leaf-blades usually flat; ligule hyaline or ciliate; inflorescence of racemes forming a panicle; spikelets 1-flowered, abaxial (1st glume turned away from the rachis of the raceme), closely arranged and sometimes subtended by a bristle; 1st glume smaller than the 2nd; 1st lemma equal to the 2nd glume, 2nd (fertile) lemma acute, but not mucronate. About 20 species from warm areas especially in the old world.

1. Plant practically glabrous.
2. 1st glume obtuse, about half as long as the spikelet *P. jubiflorum* 4.
2. 1st glume acute.
3. 1st glume about two-thirds as long as spikelet *P. basicladum* 1.
3. 1st glume about half as long as spikelet *P. clementii* 2.
1. Plant pubescent; 1st glume about half as long as spikelet, acute *P. constrictum* 3.

1. ***P. basi cladum*** Hughes, *Kew Bull.* 1923:318 (1923). Tufted perennial, usually 20-50 cm high, with erect or ascending stems; leaf-blades glabrous, 3-10 cm long, to 3 mm broad, flat or loosely convolute; panicle often 10-15 cm long, spike-like, basally enclosed in upper leaf-sheath, final branches with 1-3 spikelets; spikelets 2-2.3 mm long, glabrous; 1st glume about two-thirds of the length of the spikelet, acute, 3-nerved; 2nd glume 5-7-nerved, as long as the spikelet. — *P. gracile* non (R.Br.) Hughes, sensu J. M. Black, *Fl.S.Aust.* 71 (1943), partly.

Occurs in W.Aust., N.T., Qld and S.Aust. (N.W., Lake Eyre, Flinders Ranges, Eyre Pen. and Northern Lofty regions).

Flowers Jan.-Sept.

2. ***P. clementii*** (Domin) C. E. Hubbard, *Kew Bull.* 1934:447 (1934). **Clement's paspalidium.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 54a). Tufted annual or short-lived perennial, 15-30 cm high, with erect or ascending stems; leaf-blades almost glabrous, to 15 cm long, flat; panicle to 15 cm long, rather loosely spike-like, shortly exserted; spikelets 2-2.75 mm long, scabrous, sometimes subtended by a bristle; 1st glume about half as long as the spikelet, acute, 3-nerved; 2nd glume 7-nerved; 2nd (fertile) lemma about as long as the spikelet, more or less shiny. — *Panicum clementii* Domin, *J.Linn.Soc.(Bot.)* 41:272 (1912); *Paspalidium gracile* non (R.Br.) Hughes, sensu J. M. Black, *Fl.S.Aust.* 71 (1943), partly.

Occurs in W.Aust., N.T., Qld, N.S.W. and S.Aust. (N.W., Lake Eyre and Flinders Ranges regions).

Flowers May-Sept.

Palatable.

3. ***P. constrictum*** (Domin) C. E. Hubbard, *Kew Bull.* 1934:447 (1934). **Knotty-butt paspalidium.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 54b). Tussock-forming perennial, 20-45 cm high; leaf-blades usually rough with reflexed hairs, to 15 cm long, flat or folded; panicle 6-11 cm long, spike-like and often interrupted in the lower part, shortly exserted, densely scabrous pubescent; spikelets 2.5-2.75 mm long, glabrous; 1st glume about half as long as the spikelet, shortly acuminate, 5-nerved, 2nd glume 7-9-nerved; 2nd (fertile) lemma about as long as the spikelet, rugulose. — *Panicum constrictum* Domin, *Bibliotheca Bot.* 85:302 (1915).

Occurs in all Australian mainland States. Recorded in S.Aust. from the N.W., Lake Eyre, Nullarbor, Gairdner-Torrens, Flinders Ranges, Eastern, Eyre Pen., Northern and Southern Lofty and Murray regions.

Flowers throughout the year, especially Sept.-April.

4. ***P. jubiflorum*** (Trin.) Hughes, *Kew Bull.* 1923:317 (1923). **Warrego summer-grass.** Tufted glabrous perennial, 40-80 cm high, stems usually rather stout; leaf-blades long, flat, glabrous, 3-5 mm broad; ligule short, ciliate; panicle very narrow, 10-25 cm long; racemes several, sessile, erect, the lower ones distant, 1-4 cm long; spikelets subsessile, glabrous, 2.5-3 mm long, in 2 rows along the triquetrous slender rhachis; 1st glume, broad, obtuse, 3-nerved, half as long as spikelet; 2nd glume equal to 1st lemma; 2nd (fertile) lemma acute, 2-5 mm long, finely and transversely



Fig. 192—*Paspalidium clementii*.

densely scabrous pubescent; spikelets 2.5-2.75 mm long, glabrous; 1st glume about half as long as the spikelet, shortly acuminate, 5-nerved, 2nd glume 7-9-nerved; 2nd (fertile) lemma about as long as the spikelet, rugulose. — *Panicum constrictum* Domin, *Bibliotheca Bot.* 85:302 (1915).

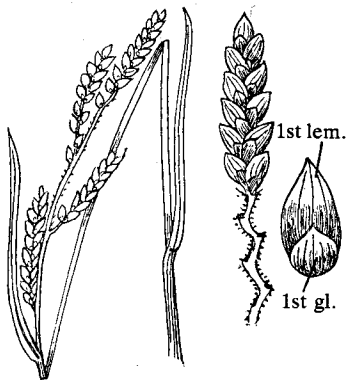


Fig. 193—*Paspalidium jubiflorum*.

rugulose.—*Panicum jubiflorum* Trin., *Gram.Pan.Diss.* 2:150 (1826); *Panicum flavidum* non Retz., sensu Benth., *Fl.Aust.* 7:474 (1878).

Occurs in all Australian mainland States. Recorded in S.Aust. from the Lake Eyre, Gairdner-Torrens, Northern and Southern Lofty and Murray regions.

Flowers recorded Nov.-May and Aug.

97. PASPALUM L.

Syst.Nat., ed. 10:855 (1759).

(Greek *paspalos*, millet.)

Mostly perennials; leaves variable; ligule membranous; inflorescence of spikes or racemes forming an umbel or panicle; spikelets 1-flowered, not awned, plano-convex, with the flat outer face (1st lemma) turned away from the rather broad flat or triquetrous rhachis of the raceme (spikelet abaxial); 1st glume minute or wanting, 2nd glume membranous; 1st lemma equal to 2nd glume, 2nd (fertile) lemma and palea about as long as the 2nd glume, hardened round the grain. About 250 species from warm areas. (Bor in Rechinger (1970) *Fl.Iranica* 70:493-495.)

1. Margins of spikelets villous or long-ciliate *P. dilatatum* 1.
1. Margins of spikelets glabrous.
 2. Upper glume puberulous on the back *P. paspalodes* 3.
 2. Upper glume glabrous on the back *P. distichum* 2.

*1. *P. dilatatum* Poir., *Encycl.* 5:35 (1804). **Paspalum**, (Ill. N. T. Burbidge (1968) *Australian grasses* 2, pl. 61). Perennial, 50 cm to 1 m high, glabrous except on inflorescence; leaves flat, long, with an ovate ligule; racemes 3-10 in number, 4-10 cm long, spreading and distant along upper part of stem; spikelets ovate-acuminate, 3-4 mm long, pedicellate, paired, arranged in 3-4 rows along rhachis of raceme; 1st glume absent, the 2nd 3-5-nerved, against the rhachis, villous-ciliate; 1st lemma 3-5-nerved, 2nd (fertile) lemma almost orbicular; anthers exserted, oblong and purple.

Native to South America, naturalised in all Australian States. Recorded in S.Aust. from the Eyre Pen., Yorke Pen., Northern and Southern Lofty, Murray and S.E. regions.

Flowers Dec.-April.

Grown as a pasture grass, but also a troublesome weed.

2. *P. distichum* L., *Syst.Nat.*, ed. 10, 2:855 (1759). **Salt-water couch-grass**. Perennial, with long creeping rhizomes or stolons and ascending stems, less than 60 cm high, glabrous except at the orifice of the leaf-sheaths; ligule short, obtuse; leaves 1-3 mm broad; spikes terminal, 2 (rarely 3), usually 2-4 cm long, at first erect and appressed to each other; spikelets oblong, 3-4 mm long, solitary, dorsally compressed, sessile in 2 rows along one side of the flattened rhachis of the spikes; 1st glume wanting, the 2nd 4-5-nerved, glabrous; 1st lemma equal to 2nd glume, glabrous; anthers exserted, oblong and purple.—*P. vaginatum* Sw., *Prod.* 21 (1788).

Widespread in most warm areas of the world; especially in salty areas along coasts. Occurs in all Australian mainland States except in Vic. Recorded in S.Aust. from the coasts of the Eyre Pen., Southern Lofty and S.E. regions and from the Murray region.

Flowers throughout the year.

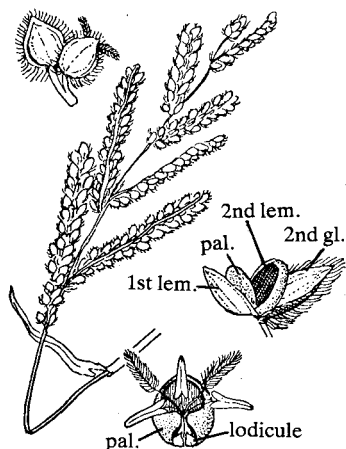


Fig. 194—*Paspalum dilatatum*.

3. *P. paspalodes* (Michx.) Scribn., *Torrey Bot. Club Mem.* 5:29 (1894). **Water couch-grass.** Perennial, with creeping rhizome or stolons and ascending stems, usually less than 45 cm high, glabrous except at the orifice of the leaf-sheaths; ligule short, obtuse; leaves 2.5 mm broad; spikes terminal, 2, usually 4-6 cm long, at first erect and appressed to each other; spikelets ovate-oblong, c. 3 mm long, solitary, dorsally compressed, sessile in 2 rows along one side of the flattened rachis of the spikes; 1st glume minute or wanting, the 2nd 3-nerved, pubescent on the back; 1st lemma equal to 2nd glume, pubescent on the back; anthers exserted, oblong and purple.—*Digitaria paspalodes* Michx., *Fl. Bor. Am.* 1:46 (1803); *P. distichum* non L., sensu J. M. Black, *Fl. S. Aust.* 1:67 (1943).

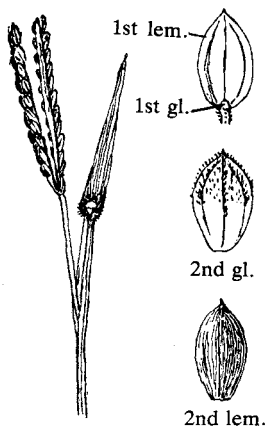


Fig. 195—*Paspalum paspalodes*.

Native to most warm areas of the world; occurs (possibly through naturalisation) in all Australian States. Recorded in S. Aust. from the Southern Lofty and Murray regions.

Flowers Feb.-May.

Weed of cultivated land, especially in wet localities.

98. *PENNISETUM* Rich. ex Pers.

Syn. Pl. 1:72 (1805).

(Latin *penna*, a feather; *seta*, a bristle; alluding to the plumose bristles.)

Mostly perennials; leaf-blades flat or convolute; ligule usually of hairs; inflorescence usually a narrow panicle, rarely a cluster of 1-4 spikelets enclosed in the upper leaf-sheaths; spikelets 1-flowered, solitary or 2-5 together, surrounded by a very shortly stalked involucre of slender hair-like bristles which are united at the very base, the involucre falling off with the spikelet; 1st glume small or minute; 1st lemma sterile, 2nd (fertile) lemma and palea of firmer texture than the glumes and 1st lemma. About 130 species from warm areas. (Key adapted from Beadle, Evans & Carolin (1972) *Flora of the Sydney Region*).

1. Plants with long stolons; spikelets 1-4 together, enclosed in the upper leaf-sheaths. *P. clandestinum* 2.
1. Plants tufted; inflorescence a narrow panicle.
 2. Bristles rarely exceeding 1 cm; panicle 10-30 cm long, sometimes purplish *P. macrourum* 3.
 2. Bristles up to 3-4 cm long.
 3. Bristles mostly equal, about 3-4 cm long; panicles 4-8 cm long, pale coloured. *P. villosum* 4.
 3. Bristles unequal, the longest 3-4 cm long, the rest mostly 1-2 cm long; panicles 8-15 cm long, usually purplish *P. alopecuroides* 1.
1. *P. alopecuroides* (L.) Spreng., *Syst. Veg.* 1:303 (1825). **Swamp foxtail.** (Ill. N. T. Burbidge (1968) *Australian grasses* 2, pl. 45). Tufted perennial, to 1 m high; leaf-blades long and narrow, scabrid; panicle cylindrical, 8-15 cm long, purplish; spikelets shortly pedicellate, 7-8 mm long, subtended by softly scabrid hair-like bristles mostly 1-2 cm long but up to 3-4 cm; 1st glume narrow, shorter than spikelet, 2nd glume lanceolate; 1st lemma equal to 2nd glume; 2nd (fertile) lemma thin and membranous.—*Panicum alopecuroides* L., *Sp. Pl.* 55 (1753); *Pennisetum compressum* R.Br., *Prod. Fl. Nov. Holl.* 195 (1810).

Occurs in Asia and Australia (all mainland States except N.T.). Recorded in S. Aust. from the Yorke Pen. and Southern Lofty regions.

Flowers Jan. and April-June.

Not palatable. Grows mainly as a weed in S. Aust. and may be introduced here. Commonest in the eastern States where it usually grows in damp places.

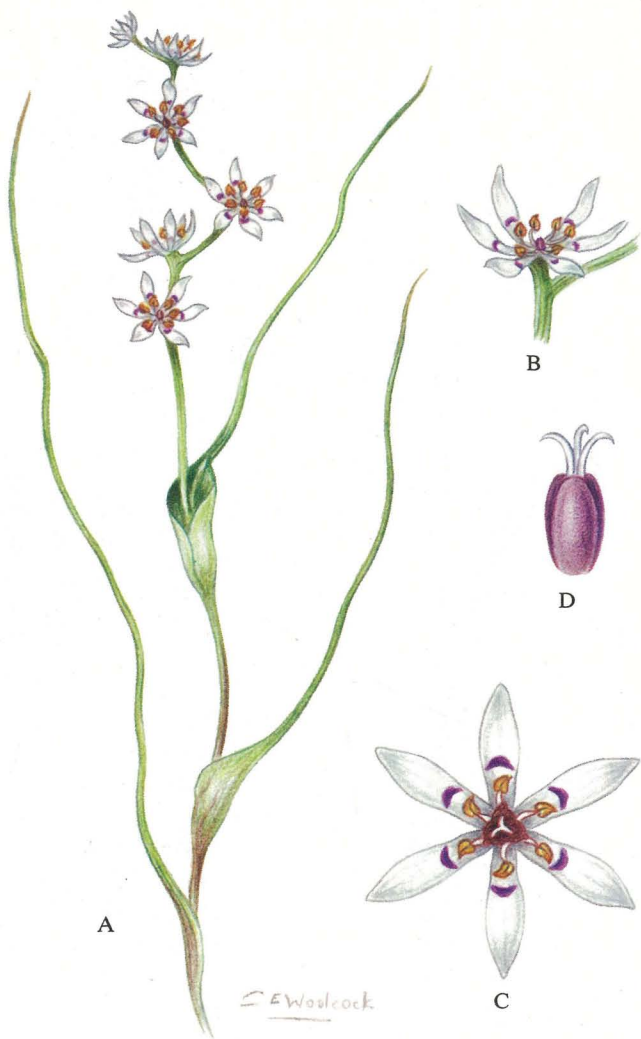


Plate 1—*Anguillaria dioica* (Liliaceae). A, habit, nat. size; B, flower, x 2; C, flower, x 3; D, ovary, x 4.

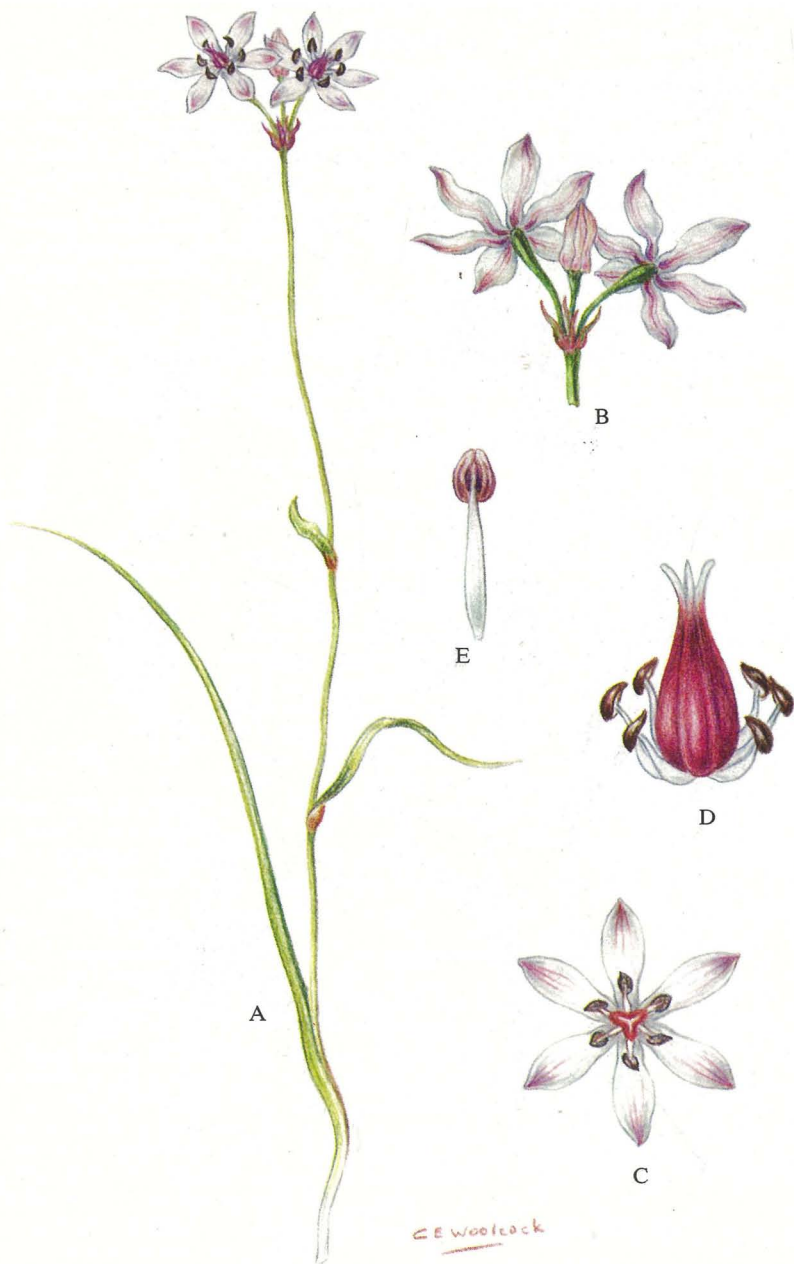


Plate 2—*Burchardia umbellata* (Liliaceae). A, habit, $\times \frac{3}{4}$; B, inflorescence, slightly enlarged; C, flower, $\times 1\frac{1}{2}$; D, gynoecium and stamens, $\times 4$; E, stamen.

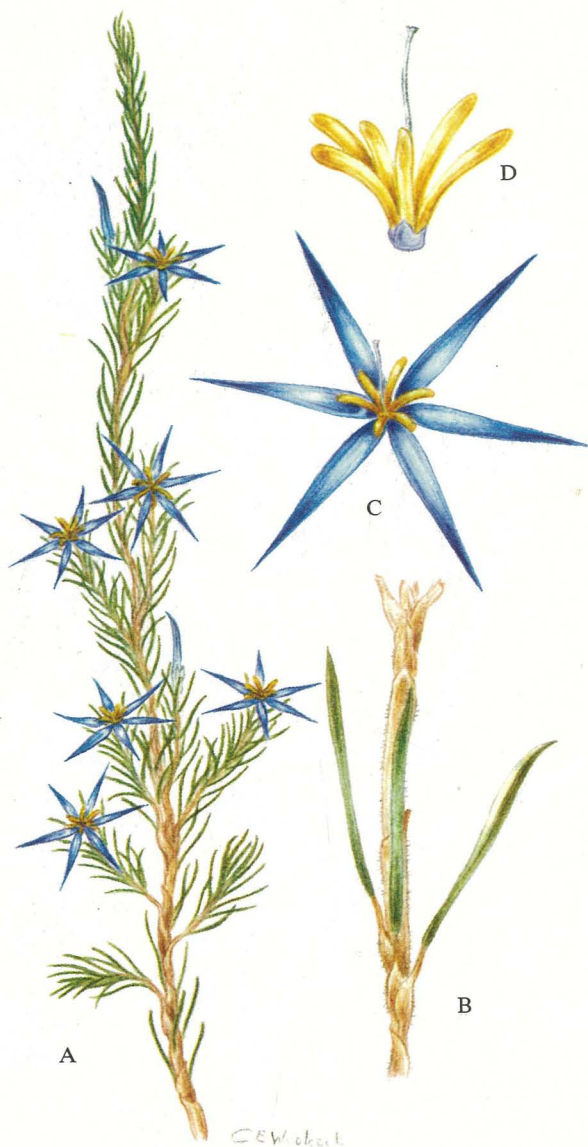


Plate 3—*Calcectasia cyanea* var. *intermedia* (Liliaceae). A, branch, $\times \frac{3}{4}$; B, portion of stem with leaves, $\times 3$; C, flower, $\times 2$; D, anthers and style, $\times 4$.

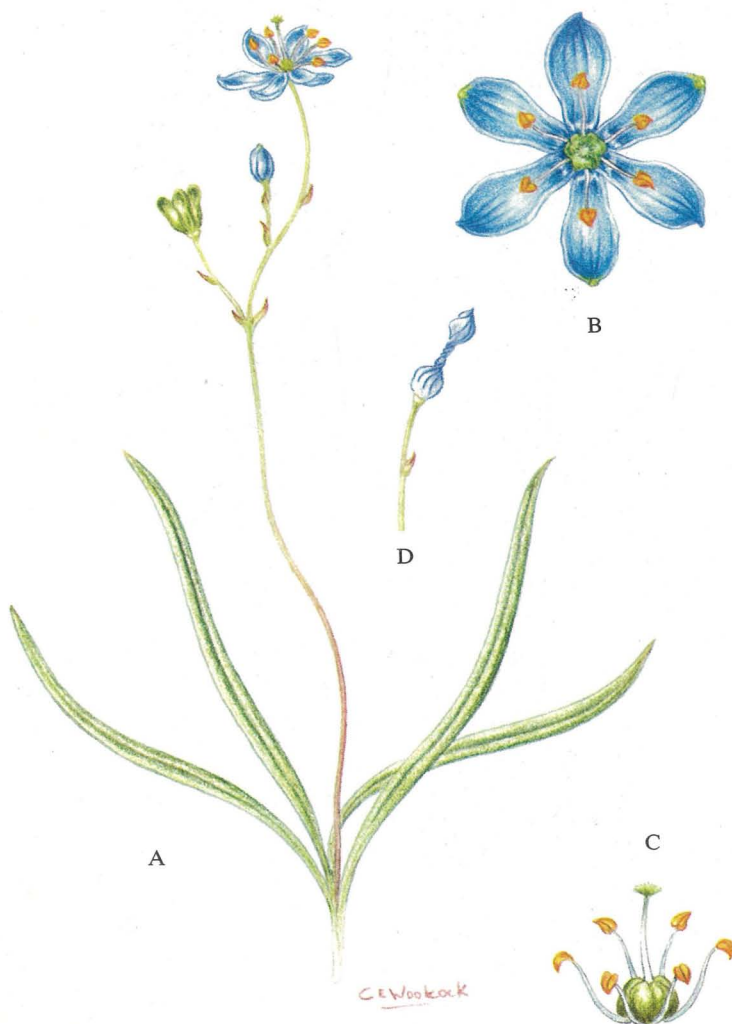


Plate 4—*Chamaescilla corymbosa* (Liliaceae). A, habit, nat. size;
B, flower, x 2; C, gynoecium and stamens; D, wilted flower, x 4.



Plate 5—*Thysanotus tuberosus* (Liliaceae). A, habit, slightly reduced; B, portion of leaf, x 4; C, leaf section, x 5; D, gynoecium and stamens, x 4.

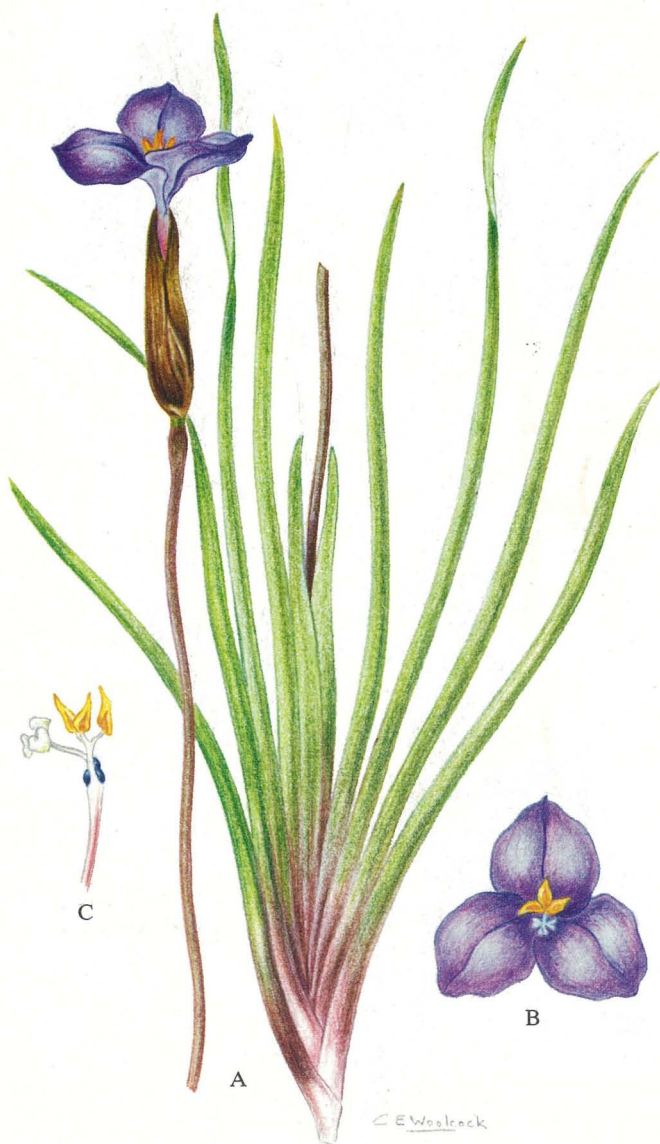


Plate 6—*Patersonia occidentalis* (Iridaceae). A, habit, x $\frac{1}{2}$; B, flower, x $\frac{1}{2}$;
C, stamens and style.

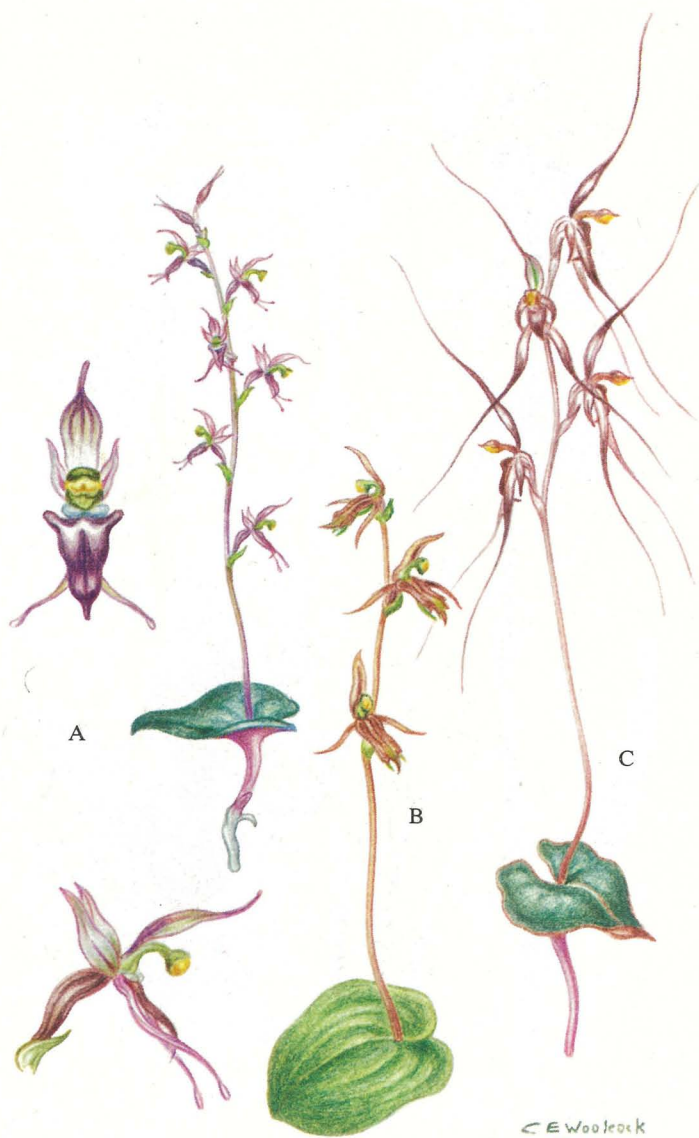


Plate 7—*Acianthus* (Orchidaceae). A, *A. exsertus*, habit, nat. size; two views of flower, x 4; B, *A. reniformis*, nat. size; C, *A. caudatus*, nat. size.

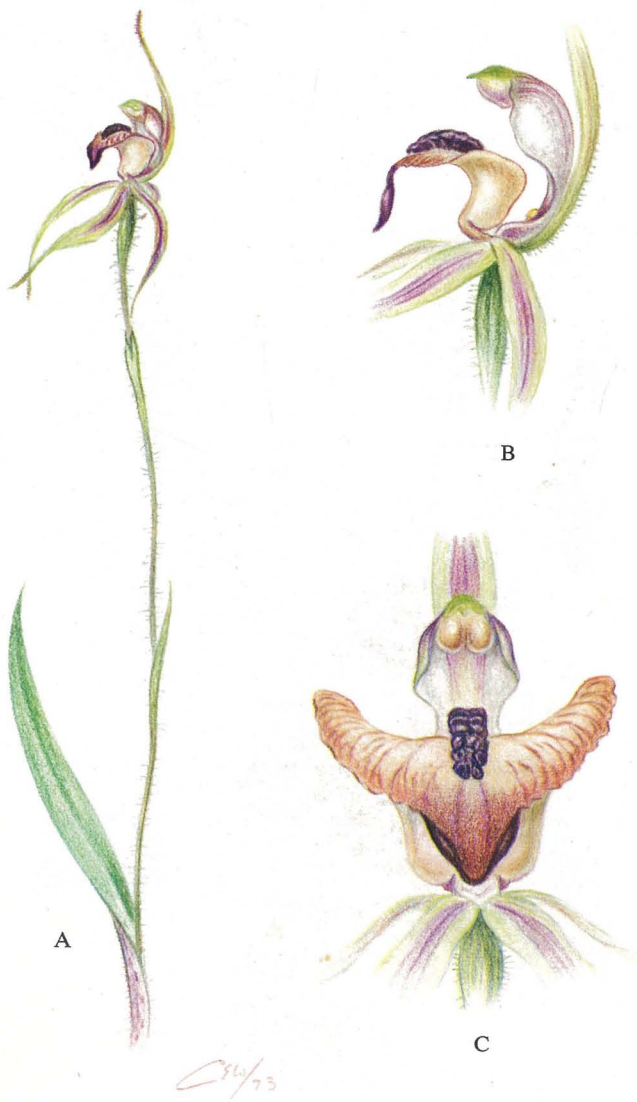


Plate 8—*Caladenia tessellata* (Orchidaceae). A, habit, nat. size; B, details of flower, side view, x 3; C, details of flower, front view, x 4.



Plate 9—A, *Caleana major* (Orchidaceae), habit, nat. size; B, *Paracaleana minor* (Orchidaceae), habit, nat. size.



Plate 10—*Calochilus* (Orchidaceae). A, *C. robertsonii*, habit, nat. size; leaf section, nat. size; B, *C. paludosus*, flower, nat. size; C, *C. campestris*, flower, nat. size.

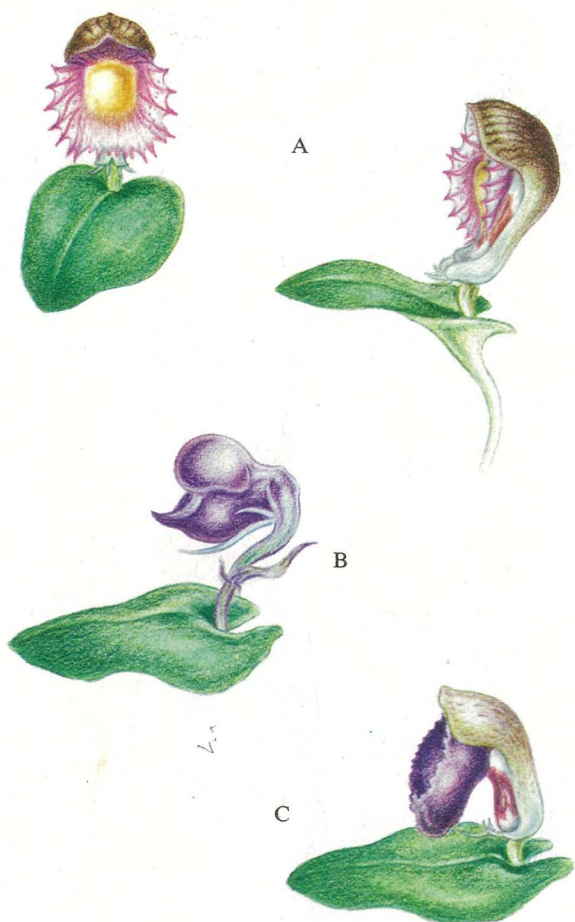


Plate 11—*Corybas* (Orchidaceae). A, *C. dilatatus*, two views of habit, x 1½;
 B, *C. unguiculatus*, habit, x 1½; C, *C. diemenicus*, habit, x 1½.



Plate 12—*Dipodium punctatum* (Orchidaceae), inflorescence, nat. size.

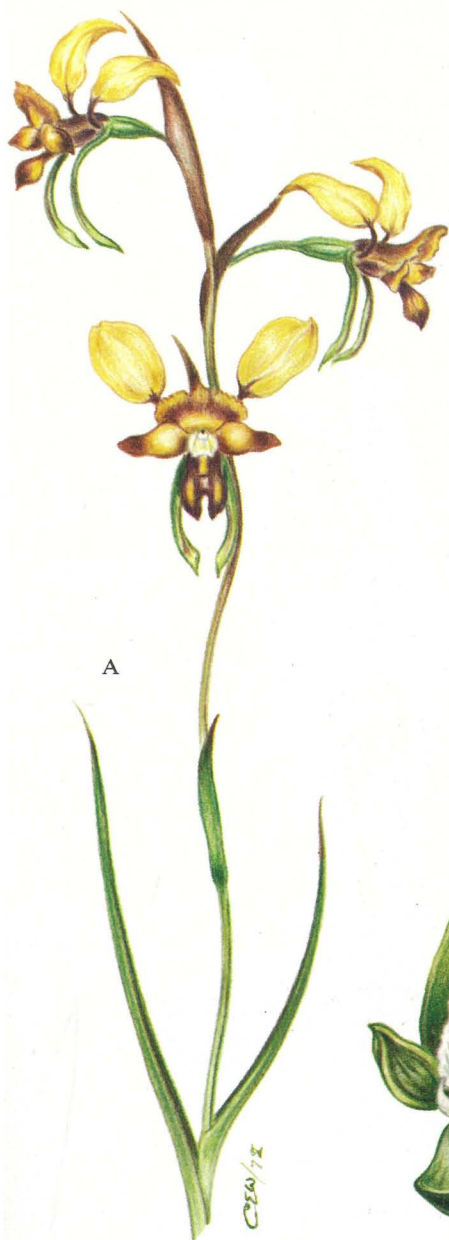


Plate 13—A, *Diuris longifolia* (Orchidaceae), habit, nat. size;
 B, *Prasophyllum elatum* (Orchidaceae), habit, nat. size; flower, x 2.



Plate 14—*Lyperanthus nigricans* (Orchidaceae), habit, x 2.



Plate 15—*Pierostylis curta* (Orchidaceae), habit, x 1½.

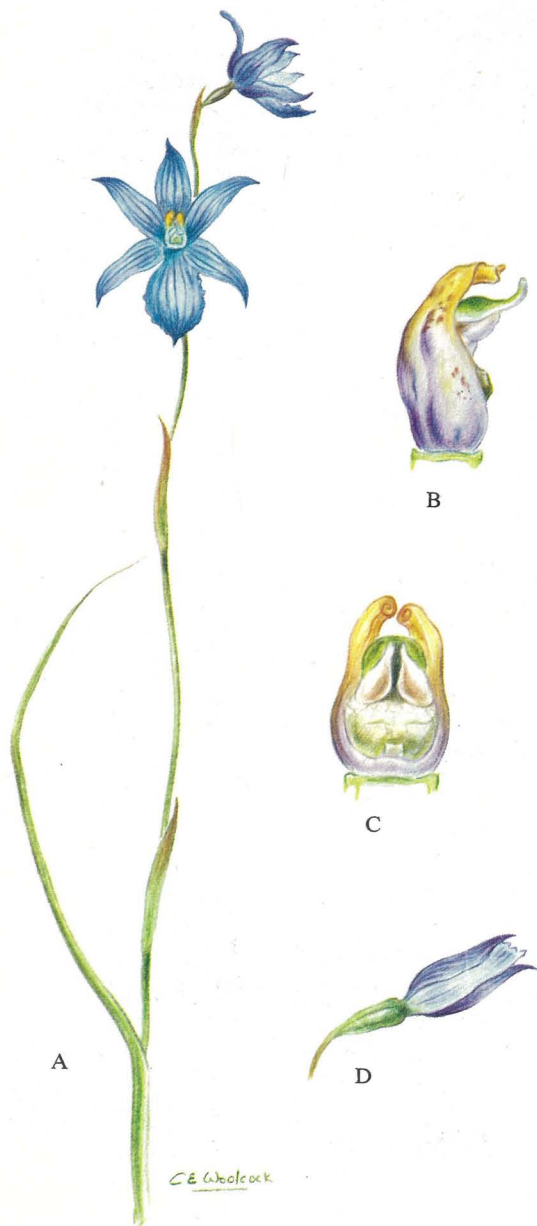


Plate 16—*Thelymitra venosa* (Orchidaceae). A, habit, nat. size; B & C, side and front views of column, x 5; D, wilted flower, nat. size.

*2. ***P. clandestinum*** Hochst. ex Chiov., *Ann.Bot., Roma* 8:41 (1903). **Kikuyu.** (Ill. Meredith (1955) *The grasses and pastures of South Africa*, fig. 369). Perennial, with creeping rhizomes and stolons (lawn grass); leaf-blades linear, 3-4 mm broad, glabrous or slightly hairy; inflorescence a cluster of 1-4 (usually 3) spikelets, included in the upper leaf-sheaths; spikelets sessile or shortly pedicellate, subtended by up to 15 delicate bristles which are up to three-quarters of the length of the spikelet, linear-lanceolate, 1-2 cm long, glabrous; 1st glume 0 or minute, 2nd to 2 mm long, broad, hyaline, obscurely nerved; 1st lemma lanceolate, acuminate, thinly membranous, as long as the spikelet, 9-11-nerved, 2nd (fertile) lemma bisexual or less often female.

Native to east Africa, naturalised in all Australian States. Grown as a lawn-grass and occurring as an escape in all inhabited areas.

Flowers in summer.

*3. ***P. macrourum*** Trin., *Mem.Acad.Sci. St.Petersb.*, ser.6 Sci. Math.Phys.—Nat. 3(2):178 (1834). **African feather-grass.** Stout perennial, to c. 1 m high with long mostly basal setaceous hard scabrous leaves; panicle spike-like, cylindrical, dense, shortly bristly, 10-30 cm long by c. 1 cm broad, purplish or straw-coloured; spikelets acute, 4-5 mm long, subtended by many scabrous bristles scarcely exceeding the spikelets, except 1 which is stouter, awn-like and 10-15 mm long; 1st glume very small, hyaline, 1-nerved, 2nd glumes similar; 1st lemma as long as spikelet, membranous, 5-nerved, without a palea and very similar to the fertile lemma (all glumes and lemmas acute or mucronate).

Native to South Africa, naturalised in W.Aust., N.S.W., Vic. and S.Aust. (Southern Lofty region).

Flowers Oct.-April.

Cultivated as an ornamental, but becomes a weed.

*4. ***P. villosum*** R.Br., *Mus.Senckenb.Abh.* 2:134 (1837). **Feather-top, feather grass.** (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 65). Stems ascending, silky below panicle, 40-50 cm high; sheaths and blades keeled, the sheaths villous at orifice, the blades narrow, channelled; ligule of short hairs; panicle pale, spike-like but rather loose, 4-8 cm long, 1.5-3 cm broad (excluding the long bristles); spikelets in groups of 1-5 on very short pedicels, subtended by an involucre of many unequal bristles to 3-4 cm long and plumose in the lower half, with a few short outer simple bristles, conical, green, 10-12 mm long, acute, glabrous; 1st glume minute, obtuse, the 2nd glume not half as long as spikelet, also hyaline, 1-3-nerved; 1st lemma c. 8 mm long, membranous, 7-9-nerved, containing a palea and stamens, 2nd (fertile) lemma rather longer, membranous (2nd glume and lemmas terminating in a scabrous mucro); anthers orange, 4-5 mm long.

Native to Africa, naturalised in all Australian mainland States except N.T. Recorded in S.Aust. from the Yorke Pen., Southern Lofty, Murray and S.E. regions.

Flowers Feb.-June.

Cultivated as an ornamental, but becomes a weed.

99. *PLAGIOSETUM* Benth.

Hook.Ic. 13:33 (1877).

(Greek *plagios*, oblique; Latin *seta*, a bristle; alluding to the somewhat unilateral bristles.)

Perennial; leaf-blades flat or convolute; ligule of hairs; inflorescence a panicle, the articulate panicle-branches (or

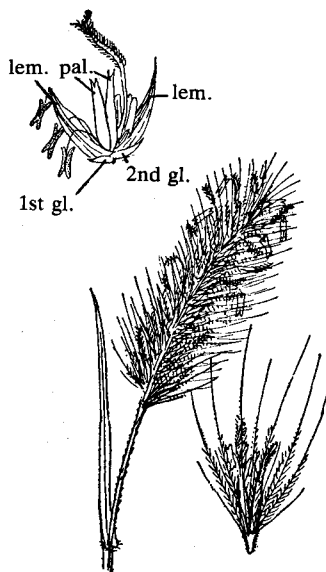


Fig. 196—*Pennisetum villosum*.

peduncles) finally deflexed and falling off with the spikelets and persistent bristles; spikelets 1-flowered, compressed dorsally; the upper spikelets solitary, with flat pedicels articulate at the base, the lower ones (numbering 1-4) arranged at the summit of the flat peduncle-branches along with about 3 flattish linear extensions, clothed for almost all their length with slender bristles much longer than the spikelets; 1 or 2 of the central spikelets on very short pedicels, the lateral ones on longer pedicels; bristles arising from panicle-branches; glumes 2, the 1st 5-7-nerved, less than two-thirds of the length of the spikelets, the 2nd many-nerved, as long as the spikelet; 1st lemma equal to 2nd glume, 2nd (fertile) lemma more or less nerveless and polished. Monotypic.

1. *P. refractum* (F. Muell.) Benth., *Hook. Ic.* 13:33 (1877). **Bristle-brush grass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 55c). Glabrous, with stiff geniculate stems 15-40 cm

high; leaf-blades at first flat, 2-5 mm broad; ligule of silky hairs; panicle narrow, interrupted, 10-25 cm long (including the bristles); the flattened peduncle 7-10 mm long; spikelets ovate-oblong, obtuse, 7 mm long; bristles 10-15 mm long, with erect teeth.—*Setaria refracta* F. Muell., *Fragm. Phyt. Aust.* 3:147 (1863); *Penisetum refractum* (F. Muell.) F. Muell., *Fragm. Phyt. Aust.* 8:109 (1873).

Occurs in all Australian mainland States except N.S.W. and Vic. Recorded in S.Aust from the N.W., Lake Eyre and Gairdner-Torrens regions.

Flowers March-Sept.

Not grazed.

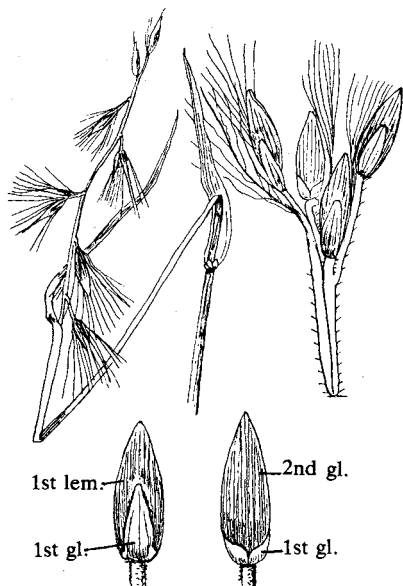


Fig. 197—*Plagiosetum refractum*.

panicle, with an erect bristle below the terminal spikelet; 1st glume minute, the 2nd many-nerved; 1st lemma subequal to 2nd glume; 2nd (female) lemma and palea shorter. 7 species from Asia and Australia.

1. *P. spinescens* (R.Br.) Vickery, *Proc. R. Soc. Qld* 62:69 (1952). (Ill. N.T. Burbidge (1968) *Australian grasses* 2, pl. 24). Stems creeping; upper leaves flat; ligule 1-5 mm deep, entire or cut; panicle 5-10 cm long, with slender flexuose branches which terminate in a stiff bristle or awn as long as or longer than the terminal spikelet; spikelets narrow, acuminate, c. 6 mm long; 1st glume truncate, the 2nd tapering into a long point; the 1st lemma shorter and containing a male floret, the 2nd (female) lemma hyaline, nerveless, 1-4 mm long.—*Panicum spinescens* R.Br., *Prod. Fl. Nov. Holl.* 193 (1810); *Panicum asperum* Koenig, *Naturforscher* 23:209 (1788), non Lam; *Pseudoraphis aspera* Pilger, *Notizbl. Bot. Gart. Berlin* 10:210 (1928).

Occurs in Asia, Indonesia, New Guinea and all Australian mainland States. Recorded in S.Aust from the Murray region.

Flowers April (1 record).

Palatable. Semi-aquatic, growing on mud or with the stems floating in water.

100. *PSEUDORAPHIS* Griff.

Notulae 3:29 (1851).

(Greek *pseudēs*, false; *rhaphis*, a needle; alluding to the solitary bristle.)

Aquatic or marsh perennials; leaf-blade flat; ligule membranous; inflorescence a panicle; spikelets acute, with usually a lower male floret and an upper female (or bisexual) floret, solitary and distant along the simple branches of the

101. SETARIA Beauv.

Agrost. 51 (1812).

(Latin *seta*, a bristle; the spikelets are subtended by stiff bristles.)

Perennials or annuals; leaf-blades flat or rolled, often minutely scabrid; ligule usually of cilia; inflorescence a usually cylindrical and spike-like panicle; spikelets subtended by 1 or more scabrous persistent bristles, plano-convex, with 1 fertile floret, subsessile, crowded; 1st glume small, usually one half of spikelet or less, 1-3-nerved, the 2nd 5-7-nerved; 1st lemma 5-7-nerved, sometimes containing a hyaline palea, 2nd (fertile) lemma and palea tough, shining, more or less wrinkled or pitted. About 140 species from warm and tropical areas. (Key taken mainly from Burbidge & Gray (1970) *Flora of the Australian Capital Territory*).

1. Bristles of inflorescence with teeth directed forwards.
 2. 2nd glume shorter than the strongly rugulose fertile lemma.
 3. Panicle narrowly cylindrical, 4-5 mm diameter (including bristles); bristles less than twice as long as spikelets *S. geniculata* 2.
 3. Panicle cylindrical-oblong, 6-12 mm diameter; bristles 2-3 times as long as the spikelets *S. glauca* 3.
 2. 2nd glumes approximately as long as the smooth or slightly rugulose fertile lemma.
 4. Bristles 1 or less often 2 below each spikelet *S. dielsii* 1.
 4. Bristles usually 3 or more below each spikelet.
 5. Panicle 5-20 cm long; glumes and 1st lemma remaining on inflorescence after fruit is shed *S. italica* 4.
 5. Panicle to 5 cm long; glumes and lemmas shed with fruit *S. viridis* 6.
1. Bristles of inflorescence with teeth directed backwards *S. verticillata* 5.

1. *S. dielsii* Herrm., *Beitr. Biol. Pflanzen*. 10:52 (1910). **Diel's pigeon grass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 66b). Glabrous annual, 15-50 cm tall, the stems rigid and geniculate near base; leaf-sheaths loose, the blades flat, 5-15 cm long, 3-8 mm broad, scabrous, sometimes spirally twisted; ligule ciliate, c. 1 mm long; panicle spike-like, 3-12 cm long, 4-7 mm broad (without the bristles) 8-20 mm broad (including the usually conspicuous bristles), contracted towards the summit, becoming somewhat interrupted towards the base, the rhachis scabrous, the short branches more or less whorled; spikelets glabrous, ovate-acute, 2-25-2.5 mm long; bristle usually 1 at base of the very short pedicel of each spikelet, 6-10 mm long, with erect teeth; 1st glume ovate-acute, 3-nerved; 2nd glume and 1st lemma about equal, the 1st lemma with a small palea, 2nd (fertile) lemma as long as the others, minutely punctulate. —*S. macrostachya* non Humb., Bonpl. & Kunth, sensu J. M. Black, *Fl. S. Aust.* 61 (1922).

Occurs in W. Aust., N.T., Qld and S. Aust. (N.W., Lake Eyre, Flinders Ranges and Northern Lofty regions).

Flowers throughout the year but less frequently in summer.

*2. *S. geniculata* (Lam.) Beauv., *Agrost.* 51 (1812) var. **pauciseta** Desv. in C. Gay, *Fl. chilena* 6:248 (1854). **Slender pigeon grass.** (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 63). Perennial, to 60 cm tall, the stems geniculate near the base; leaf-sheaths loose, the blades flat, more or less glabrous, 5-8 mm broad; ligule shortly ciliate; panicle spike-like, cylindrical, 2-10 cm long, 4-5 mm diameter (including



Fig. 198—*Setaria dielsii*.

bristles), yellowish or purplish, with short branches; spikelets ovate-ellipsoidal, 2-2.5 mm long; bristles 6-8, up to twice the length of the spikelet; 1st glume little more than half the length of the spikelet, ovate, rather acute, 3-nerved, 2nd glume shorter than the spikelet; 1st lemma as long as the spikelet, with a small palea, 2nd (fertile) lemma about as long as the spikelet, transversely rugulose.—*Panicum geniculatum* Lam., *Encycl.* 4:727 (1798).

Native to tropical and South America, naturalised in all Australian mainland States except N.T. Recorded in S.Aust. from the S.E. region.

Flowers Jan. (2 records).

Introduced as a pasture grass and occurs as a weed. Two varieties are naturalised in Aust.—var. *geniculata* and var. *pauciseta* Desv.

*3. *S. glauca* (L.) Beauv., *Agrost.* 51 (1812). **Pale pigeon grass.** (Ill. N. T. Burbidge (1968) *Australian grasses* 2, pl. 47). Erect, pale-green annual, to 1 m high; leaf-blades flat, 3-7 mm broad, with scabrous edges; ligule of hairs and sometimes also long hairs near base of leaf-sheath; panicle spike-like, dense, 2-8 cm long, 5-8 mm broad (excluding bristles); spikelets ovoid, 2.5-3 mm long; bristles yellow or reddish-yellow, c. 6 mm long, denticulate with erect teeth, 6-8

at the base of each spikelet; 1st glume about half as long as the spikelet, 2nd glume only slightly longer than the 1st and exposing the fertile lemma; 1st lemma and its enclosed palea as long as the spikelet, 2nd (fertile) lemma transversely and coarsely wrinkled.—*Panicum glaucum* L., *Sp.Pl.* 56 (1753).

Native to Europe, Asia and northern Australia, naturalised in all Australian mainland States except N.T. Recorded in S.Aust. from the Yorke Pen., Southern Lofty and Murray regions.

Flowers Feb.-May.

A weed of disturbed ground.

*4. *S. italica* (L.) Beauv., *Agrost.* 51 (1812). **Italian millet, foxtail millet.** Annuals, 60-200 cm high, with geniculate stems; leaf-sheaths somewhat keeled, blade flat, largely glabrous, 6-20 mm broad, ligule ciliate; panicle cylindrical, spike-like, interrupted or lobed, the branches mostly verticillate; spikelets oblong-ellipsoidal to globose, 2-2.5 mm long; bristles several to each spikelet, with erect teeth; 1st glume hyaline, 1-3-nerved, rather less than half the length of the spikelet, 2nd glume elliptical, 5-7-nerved, nearly three-quarters of the

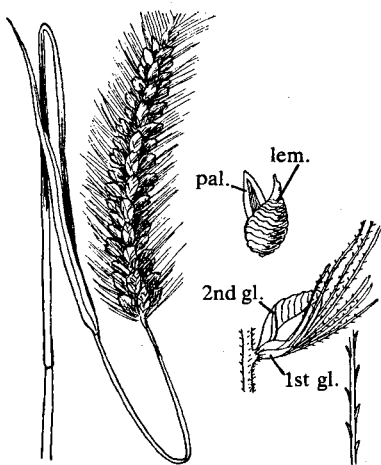


Fig. 199—*Setaria glauca*.

length of the spikelet; 1st lemma similar to the 2nd glume, 2nd (fertile) lemma smooth or very obscurely wrinkled, falling as a false fruit together with the palea and grain leaving the glumes and 1st lemma behind.—*Panicum italicum* L., *Sp.Pl.* 56 (1753).

Native to Europe and Asia; more or less naturalised in all Australian mainland States except N.T.

Flowers usually Feb.-April.

Cultivated in S.Aust. and occurring as a sporadic escape; considered to be derived from *S. viridis*.

*5. *S. verticillata* (L.) Beauv., *Agrost.* 51 (1812). **Whorled pigeon grass.** (Ill. Meredith (1955) *The grasses and pastures of South Africa*, fig. 304). Annual, erect, apple-green, to 1 m high; leaf-blades scabrous, 5-10 mm broad, ligule ciliate; panicle cylindrical, spike-like (not as dense as *S. glauca*), to 12 cm long, 5-12 mm broad (excluding the rather inconspicuous bristles), branches short; spikelets 2 mm long, densely clustered, obtuse; bristles 1 (less often 2) below each spikelet

and with the small teeth pointed downwards along the bristle; 2nd glume as long as the fertile lemma; 1st lemma as long as the 2nd glume, its palea 0 or minute, 2nd (fertile) lemma almost smooth or faintly rugulose under the lens.—*Panicum verticillatum* L., *Sp.Pl.* ed.2, 1:82 (1762).

Native to Europe, Asia, Indonesia and America, naturalised in all Australian mainland States. Recorded in S.Aust. from the Flinders Ranges, Eyre Pen., Yorke Pen., Southern Lofty, Murray and S.E. regions.

Flowers throughout the year.

Weed of disturbed areas.

*6. *S. viridis* (L.) Beauv., *Agrost.* 51 (1812). **Green pigeon-grass.** Annual, to 40 cm high, with stems branching at the base and sometimes geniculate; leaf-blades flat, to 1 cm broad, sheath ciliate near the summit, ligule of hairs 2 mm long; panicle compact, at first green, 2-5 cm long, 4-6 mm broad (excluding bristles); rhachis often villous; spikelets c. 2.5 mm long, 2-6 within a very shortly stalked involucre of 12-18 unequal bristles to 8 mm long and with erect teeth; 2nd glume and lemmas nearly equal in length, 2nd (fertile) lemma smooth or almost so, its palea almost obsolete; entire spikelet shed with fruit.—*Panicum viride* L., *Syst.Nat.* ed.10, 2:870 (1759).

Native to Europe and Asia, naturalised in all Australian mainland States except N.T. Recorded in S. Aust., from the N.W., Murray and S.E. regions.

Flowers Feb.-June.

A weed of disturbed land.

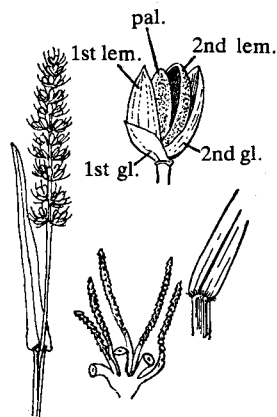


Fig. 200—*Setaria verticillata*.

102. SPINIFEX L.

Mant. 2:163 (1771).

(Latin, "thorn-maker"; alluding to the pungent leaves of the Asiatic species first described.)

Perennials, usually with creeping stems; the plants male or bisexual; leaf-blades concave or convolute, the sheaths broad and loose; ligule of hairs; inflorescence of spikes in a head, subtended by large spath-like bracts; spikelets sessile; the male spikelets with 2 glumes and 2 fertile lemmas, the narrow rhachis of the spike extended upwards as a scabrous awn or bristle 2-4 cm long; bisexual spikelets solitary near the base of a long bristle-like rhachis, a number of which are united at the base to form a large globular umbel or head, glumes 2, 1st lemma with a male or imperfect floret and above it the 2nd (fertile) lemma and palea hardened round the grain. 3 species from Asia and Australia.

1. *S. hirsutus* Labill., *Nov.Holl.Pl.Sp.* 2:81 (1806). **Spiny rolling-grass, hairy spinifex.** (Ill. N.T. Burbidge (1970) *Australian grasses* 3, pl. 51 and 52). A sand-binding grass with stout creeping stem; leaves silvery-silky, the sheaths loose, the blades long, setaceous; ligule of hairs; spathe-like bracts at base of each male and bisexual spike long, hairy, straw-coloured, lanceolate; male spikelets rigid, acute, hairy, 8-12 mm long, c. 20 along the rhachis of each spike, forming a large terminal head; bisexual spikelets much like the males but solitary on the long awn-like villous and scabrous rhachis of the spike, all spikes finally spreading, the fertile heads c. 20 cm diam. and forming a bristly globular head which falls off the peduncle when ripe and is blown around by the wind.

Occurs in all Australian States except N.T. and in New Zealand. Recorded along the entire S.Aust. coast, including Nuyts Archipelago and Kangaroo I.

Flowers usually Sept.-Jan.

Important species of sand-dune ecology.

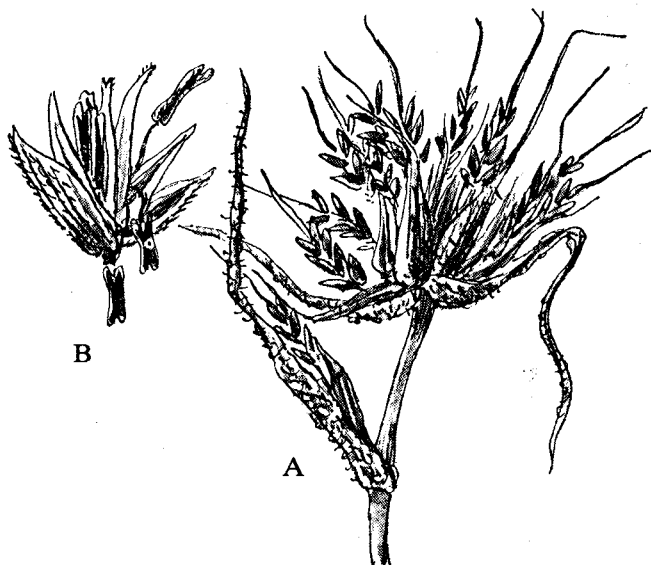


Fig. 201—*Spinifex hirsutus*. A, male inflorescence; B, male spikelet.

103. STENOTAPHRUM Trin.

Fund. Agrost. 175 (1820).

(Greek *stenos*, narrow; *taphros*, a trench; alluding to the narrow rachis of the spike.)

Creeping perennials; leaf-blade flat; ligule of hairs; inflorescence a spike-like raceme or spike-like panicle; spikelets compressed dorsally, with 1 fertile floret, sub-sessile, 2-5 together, embedded in alternate hollows of the flattened corky rachis of the raceme, which finally disarticulates between the notches; 1st glume small; 1st lemma subequal to 2nd glume, containing a hyaline palea with or without stamens, 2nd (fertile) lemma and palea rather stiff. 7 species from warm countries.



Fig. 202—*Stenotaphrum secundatum*.

*1. *S. secundatum* (Walter) Kuntze, *Rev. Gen. Pl.* 2:794 (1891). **Buffalo grass.** (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 81). Glabrous, rooting at nodes, ascending; leaves keeled, the sheaths closely compressed, ciliate near summit, ligule only of hairs, blades channelled, obtuse; racemes 4-8 cm long, the rachis almost flat on back, 4-6 mm broad, the short rigid appressed branches of the raceme bearing 2 (rarely 1 or 3) acute sessile erect spikelets, one close above the other, the branch ending in an erect tooth; spikelets

4-5 mm long, rigid, the 1st glume short, truncate; the 1st lemma usually containing a male floret, 2nd (fertile) lemma 7-nerved.—*Ischaemum secundatum* Walter, *Fl. Carol.* 249 (1788); *S. americanum* Schrank, *Pl. Rar. Hort. Monac.* 2(10):t. 98 (1822).

First described from N. America; naturalised in all Australian States except N.T. Occurs widely in S. Aust. in settled areas, especially near the sea.

Flowers summer.

Extensively grown as a lawn grass.

104. *ZYGOCHLOA* S. T. Blake

Pap. Biol. Univ. Qld 1(19):7 (1941).

(Greek *zygon*, yoke or pair; *chloë*, grass; alluding to the dioecious spikelets.)

Perennials, with a bushy habit; plants dioecious; leaf-blades flat; ligule of hairs; inflorescence of heads of spikelets; male spikelets sessile or subsessile in small dense clusters with 1-3 outer ovate, acuminate bracts scarcely exceeding the spikelets; the 2 glumes much shorter than the 2 lemmas which each have a palea and male floret; female spikelets in a similar head but with outer bracts which become hardened and variously shaped in fruit. 1 Australian species.

1. *Z. paradoxa* (R.Br.) S. T. Blake, *Pap. Biol. Univ. Qld* 1(19):8 (1941). **Sand-hill cane-grass.** Glabrous plant with long, rigid spreading branching stems, creeping at base; leaves short, with ligule of hairs; heads of spikelets small (c. 1.5 cm diam.); male spikelet 6 mm long; glumes much shorter than the lemmas; spikelets of female plant usually enclosed in hardened straw-coloured bracts irregularly winged on the back and sometimes with a short rigid horn; 1st lemma with a palea, 2nd (fertile) lemma ovoid, acute, shining and smooth, pubescent near summit.—*Neurachne paradoxa* R.Br. in Sturt, *Exped. Centr. Aust.* 2, app. 89 (1849); *Spinifex hirsutus* (R.Br.) Benth., *Hook. Ic.* tt. 1243 & 1244 (1877).

Occurs in all Australian mainland States except W. Aust. Recorded in S. Aust. from the Lake Eyre, Flinders Ranges, Eastern and Eyre Pen. regions.

Flowers June-Sept.

A sand-binder. Grazed when young.

TRIBE 22.—**NEURACHNEAE**

105. *NEURACHNE* R.Br.

Prod. Fl. Nov. Holl. 196 (1810).

(Greek *neuron*, nerve; *achnē*, husk, glume; alluding to the many-nerved glumes.)

Densely tufted with short horizontal rhizomes; leaf-blades linear; ligule of hairs; inflorescence a well exserted spike-like raceme; spikelets dorsally compressed, with 1 bisexual floret and a male or sterile floret below, bearded at the base; glumes 2, longer than the florets, diverging upwards, narrowly ovate, more or less acuminate, rigidly membranous but more or less indurated, subequal, several-nerved, 2-keeled, the 2nd with a dense narrow beard of long hairs; 1st lemma resembling or thinner than the glumes or more or less coriaceous below with hyaline margins, 5-7-nerved, 2-keeled, 2nd (fertile) lemma not longer than the 1st, membranous to hyaline, 1-5-nerved, with thinly hyaline ciliate margins. 6 Australian species (S. T. Blake (1972) *Contr. Qld Herb.* 13).

1. 1st glume 5-nerved in the lower half, shortly awned; spikelets 8-13 mm long.
2. Sheaths not woolly outside; upper floret 5-6.4 mm long *N. alopecuroidea* 1.
2. Sheaths densely woolly outside; upper floret 8-8.5 mm long *N. lanigera* 2.
1. 1st glume 3-ribbed in the lower half on the back, awnless; spikelets to 7 mm long *N. munroi* 3.

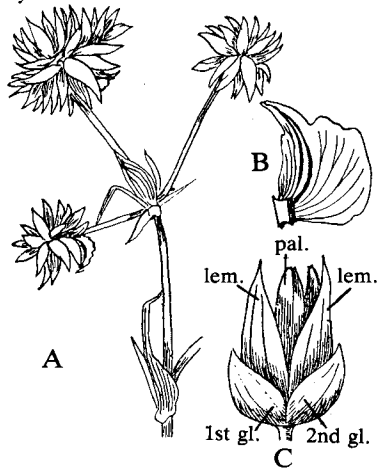


Fig. 203—*Zygochloa paradoxa*. A, inflorescence; B, outer bract; C, spikelet.

1. *N. alopecuroidea* R.Br., *Prod.Fl.Nov.Holl.* 196 (1810). **Fox-tail mulga-grass.** Stems 20-50 cm high, pubescent or almost glabrous at base; nodes pubescent; leaves mostly basal, 1-6.8 cm long, 2-3.2 mm broad, rigid, flat or subulate-channelled, glabrous or the lower ones sparsely hairy; raceme oblong or ovoid-oblong, 2-2.5 cm long, dark; spikelets bearded at base; glumes villous-ciliate on the intramarginal nerves, acuminate with long points, the 1st flat, green, glabrous and prominently 3-5-nerved on back, 7-9 mm long, the 2nd 7-11-nerved, sparsely pubescent on back, 9-11 mm long; 1st lemma also herbaceous, 7 mm long, obtuse, 5-7-nerved, pubescent in upper part, sometimes with a small palea and male floret, 2nd (fertile) lemma 6 mm long, glabrous or silky-ciliate on margin.



Fig. 204—*Neurachne alopecuroidea*.

Occurs in W.Aust., Vic. and S.Aust. (Flinders Ranges, Eyre Pen., Yorke Pen., Northern and Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Aug.-Dec.

2. *N. lanigera* S. T. Blake, *Contr.Qld Herb.* 13:10 (1972). Stems 15-30 cm high, woolly at base; nodes densely pubescent; leaves mostly basal, 8-13 cm long, 0.9-2 mm broad, rigid, flat or involute, pubescent or glabrous; racemes oblong, 3-4 cm long, dirty green; spikelets bearded at base; glumes pubescent or villous, acuminate with long points, the 1st flat, green, 5-nerved, the 2nd 9-nerved, densely ciliate upwards, the hairs increasing in length downwards and also forming a dense beard extending towards the midveins; 1st lemma also herbaceous, 5-nerved, almost hirsute above middle, pubescent towards the base, with a palea 1.5-2 mm long, 2nd (fertile) lemma c. 8mm long, scaberulous above, shortly ciliate on the upper margins.

Occurs in W.Aust. and S.Aust. (only 1 record cited for each state by S. T. Blake) from the N.W. region near Mt Watson.

Flowers July-Aug.

Very similar to *N. alopecuroidea*, differing only in the hairs on the leaf-sheaths and spikelets and in the size and shape of the lemmas and paleas.

3. *N. munroi* (F. Muell.) F. Muell., *Fragm.Phyt.Aust.* 8:200 (1874). **Window mulga-grass.** Stems slender, stiff, 20-30 cm high from a more or less woolly base; leaves chiefly basal, 2-12 cm long, 1.35-3.5 mm broad, mostly channelled-subulate, minutely hispidulous above; ligule of hairs 0.4-0.7 mm long; raceme narrowly oblong, 2.5-5.5 cm long, silky; spikelets bearded at base; 1st glume convex below, flat above, 7-nerved, slightly acuminate but awnless, puberulous or glabrous, the 2nd 7-nerved, shortly awned, reaching to the top of the spikelet, internerves membranous above but hardened below, convex below, pubescent below but often glabrous above; 1st lemma thinner than the glumes, 4-5 mm long, slightly emarginate at the tip, 5-7-nerved, with a palea and male floret, 2nd (fertile) lemma c. 3.5-4 mm long, ciliate at the top but glabrous elsewhere.—*Panicum munroi* F. Muell., *Fragm.Phyt.Aust.* 5:204 (1866).

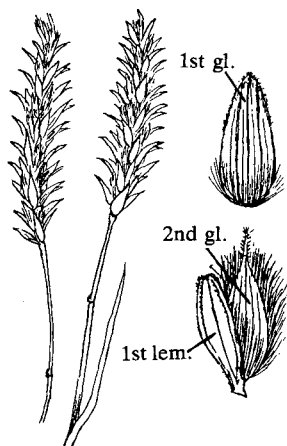


Fig. 205—*Neurachne munroi*.

Occurs in all Australian mainland States except W.Aust. Recorded in S.Aust. from the N.W., Lake Eyre and Nullarbor regions.

Flowers May-Oct.

Grows mainly on stony ground and deeper red sands in mulga scrub. Palatable especially when young.

106. PARANEURACHNE S. T. Blake

Contr.Qld Herb. 13:20 (1972).

(Greek *para*, near; *Neurachne*.)

Perennial, often stoloniferous, tufted; leaf-blades flat; ligule of hairs; inflorescence a spike-like raceme; spikelets dorsally compressed, with 1 bisexual floret and a male or sterile floret below, bearded at the base; glumes 2, longer than the florets, more or less diverging upwards, subulate-acuminate, subequal, the 1st rigidly membranous, 5-7-nerved, the keels above with tubercle-based stiff hairs, the 2nd glume very much indurated, smooth and shining, finely 11-13-nerved on the inside only; 1st lemma similar to the 2nd glume in texture, conspicuously 3-5-nerved, 2-keeled, 2nd (fertile) lemma a little shorter than the 1st, for the most part indurated, cartilaginous, the upper part more or less membranous, 5-7-nerved, with hyaline margins. Monotypic.

1. *P. muelleri* (Hack.) S. T. Blake, *Contr.Qld Herb.* 13:21 (1972). **Northern mulga-grass** (in N.T.). (Ill. C. A. Gardner (1952) *Flora of Western Australia* 1, pl. 78C-D). Tufted perennial, with a hairy base, to 45 cm high, stems erect or stoloniferous; leaf-blades linear or ovate-linear, 1-12 cm long; racemes oblong-cylindrical, dense, hairy, 2.7-3.5 cm long; spikelets pale or tinged with purple, 7.4-12 mm long (including the awns); 1st glume as long as or to 2 mm shorter than the spikelet, 2nd glume reaching the top of the spikelet; 1st lemma 5.5-7.5 mm long, 2nd (fertile) lemma 5.5-7 mm long.—*Neurachne muelleri* Hack., *Oesterr.Bot.Zeitschr.* 45:329 (1895); *N. clementii* Domin, *J.Linn.Soc.(Bot.)* 41:273 (1912).

Occurs in W.Aust., N.T., Qld and S.Aust. (recorded once from the N.W. region, Mount Watson).

Flowers July (1 record).

Usually found on sandy plains or stony slopes. Young plants moderately palatable.

107. THYRIDOLEPIS S. T. Blake

Contr.Qld Herb. 13:25 (1972).

(Greek *thyridos*, a window; *lepis*, scale, glume; alluding to the hyaline depression in the 1st glume.)

Tufted perennials, with scaly woolly bases; leaf-blades flat; ligule of hairs; inflorescence a long-exserted spike-like raceme; spikelets dorsally compressed, with 1 bisexual floret and a male or sterile floret below, bearded at the base; glumes 2, at least as long as the florets, subequal in length, 7-11-nerved, narrowed towards the apex but lacking an awn-like tip; 1st glume with a thickened transverse ridge below the tip bearing a series of bristles on the back, with a hyaline window-like excavation extending from below the ridge to the base; 2nd glume much indurated below the apex with a series of large tubercles near each margin bearing bristles; 1st lemma 5-nerved, 2nd lemma a little longer than the 1st, finely 3-5-nerved, palea resembling the lemma. 3 Australian species. (S. T. Blake (1972) *Contr.Qld Herb.* 13).

- | | |
|--|---------------------------|
| 1. Stems minutely silky-pubescent beneath the inflorescence;
spikelets 1.7-2 mm broad | <i>T. mitchelliana</i> 1. |
| 1. Stems glabrous beneath the inflorescence; spikelets 1.25-1.5 mm
broad | <i>T. xerophila</i> 2. |

1. ***T. mitchelliana*** (Nees) S. T. Blake, *Contr. Qld Herb.* 13:27 (1972). **Window mulga-grass.** Base woolly; stems erect, leafy, 20-30 cm high; all nodes of the culms more or less pubescent; leaves stiff, lanceolate, flat, striate, glabrous or with tubercle-seated hairs beneath, 2.5-6.5 cm long, 2.5-4.5 mm broad; at least the lower sheaths longer than the internodes, raceme narrow-cylindrical, sometimes interrupted towards the base, 20-35 mm long, 7-9 mm broad (excluding bristles), pale, the stem minutely silky-pubescent beneath the inflorescence; spikelets bearded at base, 4.5-6.8 mm long (excluding bristles), 1.6-2.1 mm broad, the middle and upper ones pubescent to villous as well as setose, with bristles the longer of which are 2-3.5 mm long; glumes with nerves in the upper part narrower than the internerves, 1st glume 5-7 mm long, rigid, 3-5-nerved, narrowed but obtuse at summit, with a hyaline cavity in the lower half, pubescent to villous except the window, the 2nd glume of equal length, pubescent on back, villous-ciliate near margins except along the obtuse narrowed upper part; 1st lemma 3-nerved, glabrous, sterile, nearly 4 mm long, 2nd (fertile) lemma and palea scarious, ovate, 3.4-4.5 mm long, multistriate.—*Neurachne mitchelliana* Nees, *London J. Bot.* 2:410 (1843).

Occurs in all Australian mainland States except Vic. Recorded in S. Aust. from the N.W., Lake Eyre and Nullarbor regions.

Flowers recorded in May and Sept.

Moderately palatable especially when young.

2. ***T. xerophila*** (Domin) S. T. Blake, *Contr. Qld Herb.* 13:33 (1972). Base woolly; mostly erect, leafy, most 15-30 cm high; lower nodes of the culms pubescent, the upper ones more or less glabrous; leaves stiff, lanceolate, flat or involute, striate, lower surface pubescent and with tubercle-seated hairs, 1.3-6 cm long, 1.4-4 mm broad, sheaths mostly shorter than the internodes; racemes narrowly oblong, 20-35 mm long, 5-8 mm broad (excluding bristles), the stem glabrous or only slightly pubescent beneath the inflorescence; spikelets bearded at base, 4.5 mm long (excluding bristles), 1.25-1.5 mm broad, setose but otherwise mostly glabrous or the upper spikelets pubescent, with bristles the longer of which are 1.2-3 mm long; glumes with nerves in the upper part narrower than the internerves, 1st glume 3.5-4.5 mm long, rigid, 3-5-nerved, acuminate, with a hyaline cavity in the lower half, scaberulous-ciliate on the margins in the upper part and nerves but elsewhere glabrous, the 2nd glume of equal length, scaberulous; 1st lemma 3-nerved, rough to pubescent, sterile, 2.7-3.2 mm long, 2nd (fertile) lemma 2.7-3.5 mm long, scarious, multistriate, palea similar.—*Neurachne xerophila* Domin, *Bibliotheca Bot.* 85:284 (1915).

Occurs in all Australian mainland States except N.S.W. and Vic. Recorded once in S. Aust., from 47 miles (75 km) S.E. of Emu, N.W. region.

Flowers Aug. (1 record).

Although separated principally on minute characters, Blake recorded that its relatively glabrous spikelets, smaller leaves and habit allow its recognition when growing with *T. mitchelliana*.

TRIBE 23.—ANDROPOGONEAE

108. BOTHRIOCHLOA Kuntze

Rev. Gen. Pl. 2:762 (1891).

(Greek *bothrion*, a little pit; *chloë*, grass.)

Tufted perennials; leaf-blades usually flat, ligule usually membranous; inflorescence of spike-like racemes arranged in a panicle or digitately; spikelets 2-flowered, in pairs, the sessile one fertile, the pedicellate one sterile or male, the terminal spikelets in 3's, pedicels and articles of rhachis silky-villous with a longitudinal translucent furrow visible when illuminated from behind or below, 1 or 2 of the lowest sessile spikelets sterile and awnless although resembling the fertile spikelets and persisting at the summit of the stem for some time after the upper spikelets have fallen; glumes of sessile spikelet obtuse, flat or concave, with 2 prominent marginal minutely

ciliate or scabrous keels and often with a depression or pit in the back, the 2nd glume boat-shaped, about as long, acute, more or less hairy, 3-nerved, with a blunt protuberant keel or midnerve and enclosing the small hyaline 1st lemma and the short narrow 2nd (fertile) lemma with a terminal awn rising from the toothless summit, the column loosely twisted; palea minute or absent. About 20 species from warm parts of the world.

1. Nodes more or less pubescent; pedicellate spikelets sometimes male, with 2 glumes and with or without a sterile lemma; anthers yellow; racemes 6 to many.
2. Racemes at base of panicle shorter than the long common rhachis *B. bladhii* 1.
2. Racemes much longer than the common rhachis *B. ewartiana* 2.
1. Nodes glabrous; pedicellate spikelets sterile, with usually only 1 glume; anthers purple; racemes usually 2-5 *B. macra* 3.

1. *B. bladhii* (Retz.) S. T. Blake, *Proc.R.Soc.Qld* 80:62 (1969). (Mountain) blue-grass. (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 19b). Perennial, stems stiff, glabrous, 100-135 cm high; nodes usually pubescent; leaves glabrous, the blades flat, 6-8 mm broad; ligule short, truncate; panicle 8-15 cm long, the racemes, 2.5-5 cm long, 10 to over 30 in number, with peduncles naked towards the base, arranged along a common rhachis 4-10 cm long, either simple or the lower racemes slightly branched; sessile spikelet 3-4 mm long; 1st glume glabrous except a few hairs near the base, 5-nerved between the 2 keels, sometimes pitted, 2nd glume same length, ciliate on margins and keel; 1st lemma glabrous, narrow, almost as long as the glumes, awn bent, 12-20 mm long; pedicellate spikelet of same length but narrower, male or sterile; anthers linear, yellow, nearly 2 mm long.—*Andropogon bladhii* Retz., *Obs.Bot.* 2:27 (1781); *A. intermedius* R.Br., *Prod.Fl.Nov.Holl.* 202 (1810); *B. intermedia* (R.Br.) A. Camus, *Ann. Soc.Linn.Lyon* n.s. 76:164 (1931); *A. inundatus* F. Muell., *Linnaea* 25:444 (1853); *B. inundata* (F.Muell.) J. M. Black, *Trans.R.Soc.S.Aust.* 60:163 (1936).

Occurs in New Guinea and all Australian mainland States except Vic. Recorded in S.Aust. from the Gairdner-Torrens and Flinders Ranges regions.

Flowers June (1 record).

Rare in S.Aust. Palatable.

2. *B. ewartiana* (Domin) C. E. Hubbard, *Kew Bull.* 1934:444 (1934). (Desert) blue-grass. (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 19a). Perennial; stems stiff, glabrous, 40-80 cm high; nodes usually pubescent; leaves glabrous, the blades flat, 3-5 mm broad; ligule short, truncate; panicle simple, 5-8 cm long; common rhachis 1-2 cm long; racemes 6-14, straw-coloured or purplish, 4-6 cm long, subsessile on the short common rhachis so as to have a digitate appearance; sessile spikelet 3-4 mm long; 1st glume glabrous except a few hairs near base, 5-7-nerved between the 2 keels, rarely pitted, 2nd glume membranous, hairy on back and margins; awn bent, 12-20 mm long; pedicellate spikelet of same length but narrower, male or sterile; anthers linear, yellow, nearly 2 mm long.—*Andropogon ewartianus* Domin, *Bibliotheca Bot.* 85:269 (1915); *Dichanthium ewartianum* (Domin) C. A. Gardner, *Fl.W.Aust.* 1:328 (1952); *A. ischaemum* non L., sensu Benth., *Fl. Aust.* 7:531 (1878).



Fig. 206—*Bothriochloa ewartiana*.

Occurs in all Australian mainland States except Vic. Recorded in S.Aust. from the N.W., Lake Eyre, Gairdner-Torrens and Eyre Pen. regions.

Flowers April-Aug.

Valued for grazing in wetter areas.

3. *B. macra* (Steud) S. T. Blake, *Proc.R.Soc.Qld* 80:64 (1969). **Red-leg grass.** (Ill. N. T. Burbidge (1968) *Australian grasses* 1, pl. 60). Perennial, glabrous except inflorescence; stems slender, usually reddish-purple, 40-80 cm high; nodes glabrous; leaf-blades usually flat, c. 3 mm broad; panicle erect, simple, 4-8 cm long; racemes 2-5, rarely 6-8, 3-6 cm long, subdigitate, shortly pedunculate, white-silky by the long hairs of the joints of the rhachis and the pedicels; primary rhachis 1.5-2 cm long; sessile spikelet lanceolate, 6-7 mm long (including the short bearded callus); 1st glume flattish; more or less channelled, glabrous or with scattered hairs on lower part of back, 5-7-nerved between the 2 keels, with a usually deep pit above the middle, forming a boss on the inner face, or unpitted, or with a shallower inconspicuous pit only near the base, 2nd glume white; 1st lemma flat, hyaline, nerveless, 3-4 mm long, ciliate in upper part, 2nd (fertile) lemma c. 3 mm long, supporting a brown awn 17-20 mm long; anthers narrow, 1.5-2 mm long, purple, pedicellate spikelet narrow-linear, 4-6 mm long, sterile, usually consisting of only 1 glume, which is 7-nerved between the keels, rarely with a second smaller hyaline glume.—*Andropogon macer* Steud., *Syn.Pl.Glum.* 1:371 (1854); *B. ambigua* S. T. Blake, *Pap.Dep. Biol.Univ.Qld* 2(3):29(1944); *B. decipiens* non (Hack.) C. E. Hubbard, sensu J. M. Black, *Fl.S.Aust.* 61 (1943); *A. pertusus* non Willd., sensu Benth., *Fl.Aust.* 7:530 (1878).

Occurs in the eastern States of Australia and in S.Aust (Yorke Pen., Southern Lofty and S.E. regions).

Flowers recorded Dec.-April, Aug. and Sept. Unpalatable.

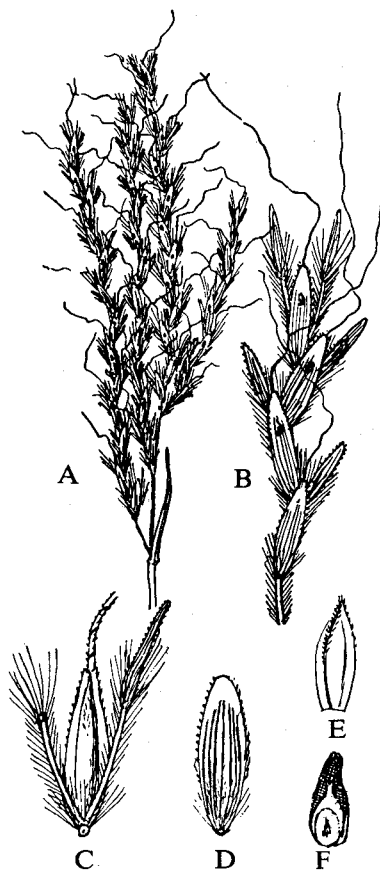


Fig. 207—*Bothriochloa macra*. A, inflorescence, natural size; B, portion of inflorescence, x 2; C, fertile (sessile) and sterile (stalked) spikelets, x 3; D, first glume, x 3; E, second glume, x 3; F, first lemma and fruit, x 3.

109. CHRYSOPOGON Trin.

Fund.Agrost. 187 (1820).

(Greek *chrysos*, gold; *pōgōn*, beard; alluding to the tuft of hairs at base of the short terminal raceme or triplet.)

Usually perennials; leaf-blade narrow; ligule membranous; inflorescence usually a lax panicle; spikelets 1-flowered; usually forming a triplet at the summit of the capillary panicle-branches or peduncles, the triplet consisting of 1 sessile bisexual spikelet and 2 pedicellate male or sterile spikelets, their pedicels flat, rigid and shorter than the fertile spikelet which sits between them at the base of each triplet in a hairy callus which disarticulates from the capillary branch and falls off

with the triplet leaving a scar at the summit of the branch; fertile spikelet compressed laterally; glumes of fertile spikelet equal, stiff, sometimes shortly awned; 1st lemma smaller, hyaline, 2nd (fertile) lemma narrow and hyaline, with a short or long bent and twisted awn rising between the 2 teeth; palea minute or 0; sterile spikelets compressed dorsally. About 25 species from tropical and subtropical parts of the world.

1. *C. fallax* S. T. Blake, *Pap. Dep. Biol. Univ. Qld* 2(3):9 (1944). **Golden-beard grass.** (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 7; Lazarides (1970) *The grasses of Central Australia*, pl. 26a). Erect, almost glabrous perennial, 30 cm to over 1 m high, with long narrow ribbed leaves; ligule short, ciliate; panicle 10-20 cm long, with capillary whorled simple branches, the triplets with a tuft of hairs at their base; fertile spikelets c. 6 mm long, the 2 glumes rounded on back, obtuse, hairy at summit, the 1st 5-nerved, muricate on the marginal nerves, usually with 3 short awns of which the middle one (4 mm) is the longest, the 2nd glume obscurely nerved, terminating in a slender awn c. 10 mm long; the 1st lemma 5 mm long, hyaline, fringed, the 2nd (fertile) lemma 5 mm long, concave, ciliate, ending in an awn 3-4 cm long, the column c. 1 cm long, twisted; the 2 pedicellate spikelets c. 1 cm long, the 1st glume 5-nerved, membranous and ciliate on the outer nerves, the 2nd of the same length, 3-nerved, the 3 lemmas hyaline, ciliate, gradually decreasing in size; the callus at the base of the triplet is 1.5-2 mm long and the scar on the panicle-branch is ovate in outline, obliquely cup-shaped and villous-ciliate on the circular margin.—*C. gryllus* non (L.) Trin., sensu Benth., *Fl. Aust.* 7:537 (1878) partly; *Andropogon gryllus* non L., sensu J. M. Black, *Fl. S. Aust.* 55 (1922).

Occurs in all Australian mainland States except Vic. Recorded in S. Aust. only in the Lake Eyre region.

Flowers recorded May and July.

A valuable pasture species but too restricted to be of importance in S. Aust.

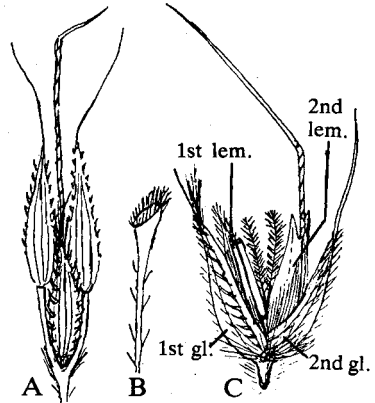


Fig. 208—*Chrysopogon fallax*. A, 1 fertile (sessile) and 2 sterile spikelets; B, pedicel after dropping the spikelets; C, fertile spikelet.

110. CYMBOPOGON Spreng.

Pl. Pugill. 2:14 (1815).

(Greek *cymbos*, hollow; alluding to the spathes, and *pōgōn*, beard.)

Perennials, densely tufted; leaves flat or inrolled; ligule membranous, erect, oblong, truncate; inflorescence of 2 or 3 terminal racemes supported by a spathe-like bract; spikelets in pairs, 1 sessile and bisexual, 1 pedicellate and male or sterile; pedicels and articles opaque; 1st glume of fertile spikelet with 2 prominent marginal keels, the 2nd glume boat-shaped with 1 central keel, all the keels minutely ciliolate; the 1st lemma hyaline, boat-shaped and ciliate on the upper margins; 2nd (fertile) lemma short, linear, with an awn rising between the 2 teeth. About 60 species from tropical and subtropical areas, especially Africa and Asia.

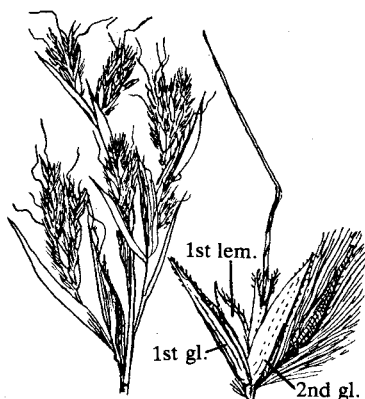
1. Racemes more or less erect; awns conspicuous, c. 15 mm long; leaf-blades inrolled, filiform

C. ambiguus 1.

1. Racemes, or most of them, finally reflexed; awns inconspicuous, 5-8 mm long, rarely absent; leaf-blades usually flat

C. obtectus 2.

1. *C. ambiguus* (Steud.) A. Camus, *Rev. Bot. Appl.* 1:289 (1921). **Scented grass, scented oilgrass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 27a). A handsome scented

Fig. 209—*Cymbopogon ambiguus*.

grass, 30 cm to 2 m high; leaf-blades filiform, with long narrow points; ligule long, glabrous; nodes glabrous; racemes twin or rarely 3 together, emerging from a sheathing bract about as long as they, 2-2.5 cm long, densely silky-villous owing to the long hairs arising from the pedicels and articles of the rhachis, erect or the lower ones sometimes spreading, forming together a narrow panicle; 1st glume of fertile spikelet glabrous, acute, 5 mm long, 3-5-nerved between the keels, 2nd glume also glabrous, prominently 1-keeled; awn slender, c. 1.5 cm long.—*Andropogon ambiguus* Steud., *Syn. Pl. Glum.* 1:385 (1854); *C. exaltatus* non (R.Br.) Domin., sensu J. M. Black, *Fl.S.Aust.* 62 (1943).

Occurs in all Australian mainland States except Vic. Recorded in S.Aust. from the N.W., Lake Eyre, Flinders Ranges, Eastern, Eyre Pen., Northern and Southern Lofty and Murray regions.

Flowers throughout the year.

Not usually grazed.

2. *C. obtectus* S. T. Blake, *Pap. Dep. Biol. Univ. Qld* 2(3):55 (1944). **Silky-heads.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 27b). A handsome scented grass, 30-90 cm high; leaf-blades narrow but usually flat, tapering to a long fine point; ligule 3-5 mm long, glabrous; nodes glabrous; panicle shortly branched; racemes paired, finally bent downwards, emerging from a sheathing bract about as long as they, 2-2.5 cm long, densely silky-villous owing to the long hairs arising from the pedicels and articles of the rhachis and almost completely concealing the spikelets and awns; 1st glume of fertile spikelet 5-nerved between the keels; somewhat obtuse; 2nd glume with a central keel expanded into a narrow wing; awn inconspicuous, very slender, less than 1 cm long.—*C. bombycinus* non (R.Br.) Domin., sensu J. M. Black, *Fl.S.Aust.* 63 (1943).

Occurs in all Australian mainland States. Recorded in S.Aust. from the N.W., Eyre Pen., Southern Lofty and Murray regions. The record from the N.W. requires confirmation.

Flowers March-Sept.

Not usually grazed.

111. *DICANTHIUM* Willem. in Usteri

Neue Ann. der Bot. 18:11 (1796).

(Greek *dicha*, different; *anthos*, flower; alluding to the sterile sessile spikelets at base of raceme.)

Perennial; leaf-blades flat; ligule a ciliate membrane; inflorescence of digitate spike-like racemes which are subsessile at the summit of the stem; spikelets in pairs, 1 sessile and bisexual, 1 pedicellate and male or sterile; pedicels and articles opaque; glumes of fertile spikelets equal, thinly chartaceous, the 1st usually very obtuse, 2-keeled with narrow sharply inflexed margins, the 2nd boat-shaped, acutely keeled, 3-nerved; 1st lemma hyaline, nerveless, 2nd (fertile) lemma reduced to a hyaline stipe passing into the awn; palea minute or 0; pedicellate spikelet unawned; the lowest 1-3 sessile spikelets on each raceme sterile and awnless. About 15 species from the tropics and subtropics of Africa, Asia and Australia (S. T. Blake (1969) *Proc. R. Soc. Qld* 80:65-69).

1. Racemes 1.5-4 cm long, less densely villous; 1st glume without a prominent subapical fringe of hairs *D. affine* 1.
1. Racemes 4-7 cm long, densely villous; 1st glume with a prominent subapical fringe of hairs *D. sericeum* 2.

1. *D. affine* (R.Br.) A. Camus, *Bull.Mus.Hist.Nat.(Paris)* 27:549 (1921). **Dwarf blue-grass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 21a). Stems 10-30 cm high; nodes bearded; leaves glabrous or with scattered tubercle-seated hairs; ligule truncate, ciliate; racemes 2-6, 1.5-4 cm long, less densely silky than in *D. sericeum*; 1st glume of sessile spikelets 4 mm long, 3-5-nerved between the 2 keels, bordered by irregularly placed long hairs; 2nd (fertile) lemma 2 mm long, with an awn 20-22 mm long; 1st glume of pedicellate spikelets 7-9-nerved between the keels; 2nd lemma of pedicellate spikelets 0.—*Andropogon affinis* R.Br., *Prod.Fl.Nov.Holl.* 201 (1810); *A. annulatus* Forsk.var.? *humilis* Benth., *Fl.Aust.* 7:531 (1878); *D. humilius* J. M. Black, *Trans.R.Soc.S.Aust.* 60:164 (1936).

Occurs in all Australian mainland States except Vic. Recorded in S.Aust. from the Lake Eyre, Gairdner-Torrens and Flinders Ranges regions.

Flowers Aug.-Sept.

Not often grazed.

2. *D. sericeum* (R.Br.) A. Camus, *Bull.Mus.Hist.Nat.(Paris)* 27:549 (1921). **(Queensland or silky) blue-grass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 21b). Erect grass 30-70 cm high; nodes bearded; leaves flat; ligule ciliolate, sometimes with long hairs rising from the blade behind it; racemes 2-7, 4-7 cm long, densely clothed with white silky hairs; 1st glume of sessile spikelets 4-5 mm long, 5-7-nerved between the 2 keels, densely bearded near the summit by an arch of long hairs seated on tubercles; awn 25-33 mm long; 1st glume of pedicellate spikelets 7-13-nerved between the keels; 1st lemma of pedicellate spikelets usually present.—*Andropogon sericeus* R.Br., *Prod.Fl.Nov.Holl.* 201 (1810).

Occurs in New Guinea and all Australian mainland States. Recorded in S.Aust. from throughout the arid areas, south to the Flinders Ranges, Eastern and Southern Lofty regions.

Flowers throughout the year.

Said by S. T. Blake (1969) to occur on more clayey soils than *D. affine* and to be commoner in open grassland. Not extensively grazed.

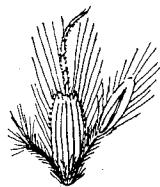


Fig. 210—*Dichanthium affine*. Fertile (sessile) and sterile spikelets, x 3.

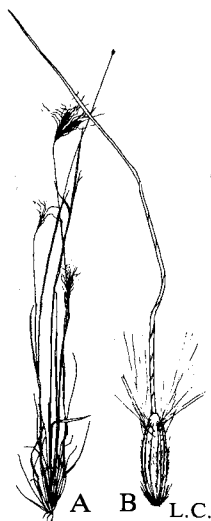


Fig. 211—*Dichanthium sericeum*. A, habit, x 1/4; B, spikelet, x 2.



Fig. 212—*Eulalia fulva*.

112. EULALIA Kunth

Rev. Gram. 1:160 (1829).

(Named after Kunth's artist, Eulalia Delile.)

Tufted perennials; leaf-blades flat; ligule a membrane with or without hairs; inflorescence of digitate or fascicled spike-like racemes; rhachis of racemes articulate; spikelets in pairs, 1 sessile and 1 pedicellate, both similar and fertile, 1-flowered or with a lower sterile floret; glumes equal, membranous to coriaceous, truncate, villous, the 1st 2-keeled, the 2nd 1-3-nerved; 1st lemma small or 0, the 2nd very short, 2-lobed, awned. About 30 species from tropical and subtropical parts of Africa, Asia and Australia.

1. *E. fulva* (R.Br.) Kuntze, *Rev. Pl. Gen.* 2:775 (1891). **Sugar-grass, silky browntop.** (Ill. N.T. Burbidge (1970) *Australian grasses* 3, pl. 86; Lazarides (1970) *The grasses of Central Australia* pl. 50a). A rather tall perennial, growing in tussocks, to 1 m or more high; leaves flat, glabrous or sparsely hairy; ligule ciliate or glabrous; racemes 2-4, sessile in a terminal cluster, 4-8 cm (rarely to 11 cm) long, coloured reddish-brown by the silky hairs of the glumes; spikelets in pairs, both fertile; glumes truncate, 5 mm long, the 1st 2-keeled, the 2nd 1-nerved, both villous on back; 1st lemma minute or 0; 2nd (fertile) lemma hyaline and inconspicuous except for the bent and twisted awn, which is golden and 12-15 mm long.—*Saccharum fulvum* R.Br., *Prod. Fl. Nov. Holl.* 203 (1810); *Pollinia fulva* (R.Br.) Benth., *Fl. Aust.* 7:526 (1878), nom. illegit.

Occurs in all Australian mainland States. Recorded in S.Aust. throughout the northern areas, including the Lake Eyre, Eastern, Flinders Ranges and Murray regions.

Flowers throughout the year.

Grazed when young.

113. HEMARTHRIA R.Br.

Prod. Fl. Nov. Holl. 207 (1810).

(Greek *hēmi*, half; *arthron*, a joint; because the rhachis does not split into articles.)

Perennials; leaf-blades flat; ligule short and membranous, with or without hairs; inflorescence of spike-like racemes each supported by a spathe-like bract; spikelets usually bisexual, in pairs, 1 on a pedicel fused with the rhachis and therefore appearing sessile and 1 sessile similar spikelet sunk in hollows in the rhachis; the rhachis scarcely articulate; glumes (of sessile spikelets) close the hollows in the rhachis; glumes subequal, the 1st 2-keeled; 1st lemma sterile, the 2nd fertile, both lanceolate, acuminate, membranous, white. About 10 species from Africa, Madagascar, Asia and Australia

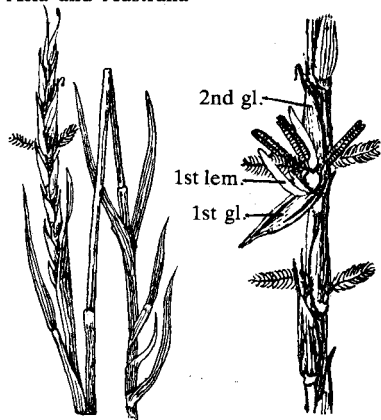


Fig. 213—*Hemarthria uncinata*.

1. *H. uncinata* R.Br., *Prod. Fl. Nov. Holl.* 207 (1810). **Mat grass.** (Ill. N.T. Burbidge (1970) *Australian grasses* 3, pl. 71). Rather rigid ascending perennial, 20-80 cm high; leaf-blades flat, almost glabrous, 2-4 mm broad; ligule of short hairs; racemes terminal, solitary, rigid, 6-14 cm long, 2-3 mm broad; spikelets and corresponding hollows alternate or sometimes almost opposite; glumes coriaceous, rounded on back, faintly 5-7-nerved, opposite, the 1st 10 mm long, covering the cavity, the 2nd rather longer with its back turned to the cavity, both acuminate and sometimes hooked at summit; lemmas and palea hyaline, oblong, obtuse, nerveless and much shorter than the glumes; anthers linear, purple.—*H. compressa* non (L.f.) R.Br., sensu Benth., *Fl. Aust.* 7:510 (1878).

Occurs in all Australian States except N.T. Recorded in S.Aust. from the Southern Lofty and S.E. regions.

Flowers usually Dec.-Feb.

Usually grows in damp places. Not of significance for grazing. Resembles *Monerma cylindrica* in which the spikelets have a single shorter glume.

114. *HYPARRHENIA* Anderss.ex. Fourn.

Mex.Pl.Gram. 51 (1886).

(Greek *hypo*, below; *arrhenos*, male.)

Tufted perennials; leaf-blade flat; ligule membranous; inflorescence of paired racemes terminating the culms and their branches and subtended by spathe-like bracts; spikelets compressed in pairs, 1 sessile with a lower male floret and an upper bisexual floret, 1 pedicellate and sterile; glumes of fertile spikelet equal, the 1st truncate or 2-toothed, 2nd glume boat-shaped, 3-nerved, 1st lemma hyaline, 2nd lemma with a geniculate hairy awn, palea usually 0; pedicellate spikelets usually slightly longer than the sessile, awnless. About 75 species from Europe, Africa, Asia and Australia.

1. *H. hirta* (L.) Stapf, *Fl. Trop. Afr.* 9:315 (1919). **Tambookie grass.** (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 90). Densely tufted perennial, to 1 m high; leaf-blades flat, tapering to a narrow point, 10-30 cm long, 1-3 mm broad; panicle elongated, loose, 15-30 cm long, with 3-8 cm long spathe-like bracts; racemes erect or nodding, 1.5-4 cm long, whitish or greyish villous, with 5-7 pairs of spikelets; sessile spikelets 5-6 mm long, 1st glume 9-11-nerved, loosely villous, 2nd glume thinner; 1st lemma almost as long as the glumes, 2nd (fertile) lemma narrow, c. 4 mm long, with 2 short subacute lobes and a 15-25 mm long awn; pedicellate spikelets male.—*Andropogon hirtus* L., *Sp.Pl.* 1046 (1753).

Native to Africa and the Mediterranean, naturalised in Qld, N.S.W. and S.Aust. (around Adelaide).

Flowers only recorded in May and Dec.

115. *IMPERATA* Cyr.

Pl.Rar.Neap. 2:26 (1792).

(After Ferrante Imperato, a Neapolitan botanist, 1550-1625.)

Perennials; leaf-blades flat, somewhat rigid; ligule short and often ciliate; inflorescence a spike-like panicle; spikelets all alike and generally in pairs, unequally pedicellate, disarticulating from their pedicels; glumes subequal, membranous, 3-9-nerved, enveloped by long silky hairs from their bases and the callus; lemmas 2, usually much shorter than the glumes, hyaline, awnless, the 1st sterile or male, the 2nd bisexual; palea hyaline, nerveless. About 10 species from the tropics and subtropics.

1. *I. cylindrica* (L.) Beauv., *Agrost.* 165 (1812). **Blady grass.** (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 67). A handsome perennial grass, 30-100 cm high; leaves flat, erect; panicle spike-like, silky-white, 5-20 cm long;



Fig. 214—*Hyparrhenia hirta*. A, habit, $\times \frac{1}{4}$; B, portion of inflorescence; C, spikelet, $\times \frac{2}{3}$.

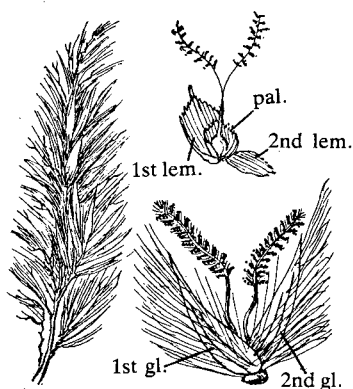


Fig. 215—*Imperata cylindrica*.

spikelets usually in pairs with different pedicel lengths; glumes hyaline, villous on the back; 1st lemma hyaline, smaller, 2nd (fertile) lemma and palea smaller still, the palea truncate and torn at the summit; stamens 1 or 2.—*Lagurus cylindricus* L., *Syst.Nat.* ed. 10, 2:878 (1759); *I. arundinacea* Cyr., *Pl.Rar. Neap.* 2:26 (1792).

Only var. **major** (Nees) C. E. Hubbard ex C. E. Hubbard & Vaughan, *Grass.Maur.* 96 (1940) has been recorded in S.Aust.—*I. koenigii* (Retz.) Beauv. var. *major* Nees, *Fl.Afr.Aust.* 1:90 (1841).

This variety occurs in Africa, Asia and all Australian States. Recorded in S.Aust. from the Southern Lofty and S.E. regions.

Flowers usually Jan.-May.

Not palatable.

116. ISEILEMA Anderss.

Nova Acta Soc.Sci.Upsal. ser. 3, 2:250 (1856).

(Greek *isos*, equal; *eilema*, a covering or involucre; alluding to the 4 involucre spikelets.)

Tufted annuals; leaf-blades flat or folded; ligule membranous; inflorescence leafy, consisting of groups of apparent spikelets (racemes) subtended by a spathe, 1 or more of such groups subtended by a common spathe, the whole forming a leafy panicle; spikelets of 2 kinds, pedicellate and male or sterile, or very shortly pedicellate and bisexual, arranged in groups of 4 sterile with 1 fertile; sterile spikelets dorsally compressed, with 1 or 2 subequal glumes; fertile spikelets often very shortly pedicellate, with no callus, usually dorsally compressed, 1st glume flattened, 2-keeled, 3-5-nerved between the keels, 2-toothed, 2nd glume boat-shaped, as long as the 1st, 3-nerved, 1st lemma smaller, flat, hyaline, the 2nd (fertile) lemma consisting of a short linear hyaline 1-nerved base ending in a slender bent awn; articulation below sterile spikelets, the whole cluster falling together. About 20 species from Indonesia and Australia.

1. Sheaths of floral leaves herbaceous, compressed, the 4 involucre spikelets with 2 well-developed glumes each.

2. Racemes slightly exserted from sheaths; awn 15-18 mm long *I. eremaum* 1.

2. Racemes quite exserted from sheaths; awn 12-13 mm long ... *I. membranaceum* 2.

1. Sheaths of floral leaves coriaceous, hard, the 4 involucre spikelets with 1 large and 1 minute glume each; awn 17-20

mm long *I. vaginiflorum* 3.

1. ***I. eremaum*** S. T. Blake, *Proc.R.Soc.Qld* 49:82 (1938). Leaf-blades flat, 4-5 mm broad; floral leaf-sheaths 12-15 mm long, flattened, keeled, herbaceous; racemes more or less exserted from the sheaths; the 4 involucre spikelets c. 4 mm long, each with 2 glumes of which the 1st is 7-9-nerved and minutely hairy or almost glabrous, all on short stout pedicels which are much exceeded by the tufts of hair at their base; fertile spikelet 5-5.5 mm long, with a beard of long erect hairs at its base and with a very short pedicel scarcely 0.5 mm long, the 1st glume 3-5-nerved between the 2 keels, pubescent near summit, the awn 15-18 mm long.

Occurs in W.Aust., Qld and S.Aust. (Lake Eyre region). May occur also in N.T. and N.S.W. Flowers July-Nov.

2. ***I. membranaceum*** (Lindl.) Domin, *Bibliotheca Bot.* 85:280 (1915). **Small Flinders-grass.** (Ill. Lazarides (1970) *The grasses of Central Australia*, pl. 51c). Leaf-blades flat, c. 3 mm broad; floral sheaths 8-12 mm long, or sometimes rather longer, flattened, keeled, herbaceous; racemes spreading-erect, conspicuous and quite exserted from the floral sheaths; the 4 involucre spikelets 3-5.4 mm long, with 2 glumes each, the 1st 7-9-nerved and minutely scabrous-hairy, all on short pedicels about as long as or rather longer than the tufts of hair at their base; fertile spikelet 5 mm long, bearded by a few long hairs at their base and on a pedicel of c. 1 mm, the 1st glume 3-5-nerved between the keels, ciliate on margins and more or less pubescent on back, base of awn 3 mm long, entire, awn 12-13 mm long.—*Anthistiria membranacea* Lindl. in T. L. Mitchell, J.

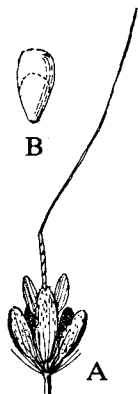


Fig. 216—*Iseilema eremaeum*. A, raceme, x 2; B, fruit, x 4.



Fig. 217—*Iseilema membranaceum*. A, inflorescence, natural size; B, raceme, x 3; C, fruit, x 4.

Trop. Austral. 88 (1848); *I. actinostachys* Domin, *Bibliothca Bot.* 85:282 (1915); *I. mitchellii* Anderss., *Nova Acta Soc.Sci.Upsal.*, ser.3, 2:252 (1856).

Occurs in W.Aust., N.T., Qld, N.S.W., and S.Aust. (throughout the northern areas and the Nullarbor and Flinders Ranges regions).

Flowers March-Sept.

Palatable.

3. *I. vaginiflorum* Domin, *Bibliothca Bot.* 85:281 (1915). **Red Flinders-grass.** (Ill. C. A. Gardner (1952) *Flora of Western Australia* 1, pl. 101). Leaf-blades flat, 3-5 mm broad; floral sheaths 7-10 mm long, coriaceous, hard, rounded on back and scarcely keeled, almost completely concealing the racemes and their spathes, with the exception of the awns; 4 involucrel spikelets consisting of 1 glume each 3-5-4 mm long and 5-11-nerved, glabrous except ciliation near summit, the 2nd glume minute or 0, always without stamens, all on short pedicels about as long as or rather shorter than the tufts of hairs at their base; fertile spikelets 6 mm long, glabrous or with a few hairs at base on a pedicel of c. 1 mm, the 1st glume 3-5-nerved between keels, glabrous except ciliation near margin; base of awn c. 4 mm long, entire or minutely 2-toothed; awn 17-20 mm long.

Occurs in all Australian mainland States except Vic. Recorded in S.Aust. from the Lake Eyre and Gairdner-Torrens regions.

Flowers July-Jan.

Grazed but sometimes too coarse.

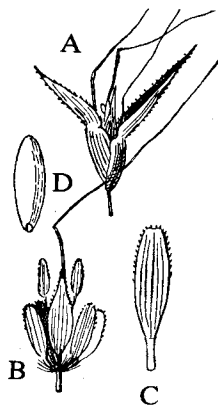


Fig. 218—*Iseilema vaginiflorum*. A, involucrel bracts enclosing spathes and racemes, natural size; B, raceme, x 2; C, solitary glume of involucrel spikelet, x 5; D, fruit, x 4.

117. SORGHUM Moench

Meth. 207 (1794).

(Italian *sorgo*; medieval Latin *surgum*, *suricum*; probably from *frumentum syriacum*, Syrian corn.)

Annual or perennial, often robust; leaf-blades usually flat and large; ligule membranous; inflorescence a panicle; spikelets in pairs along the panicle-branches and in 3's at the summit, 1 spikelet sessile

and bisexual, the other 1 or 2 pedicellate and male or sterile; the 1st glume of the fertile spikelet becoming hard and shining, the 1st lemma thin and empty, the 2nd (fertile) lemma small, ciliate and hyaline with a very short or a twisted and bent awn rising between its 2 teeth; pedicellate spikelets awnless. About 60 species from the tropics and subtropics.

Several species are cultivated in S.Aust. mainly as stock feed. These rarely occur as escapes and only 1 is regarded as naturalised. Identification of the others is difficult.

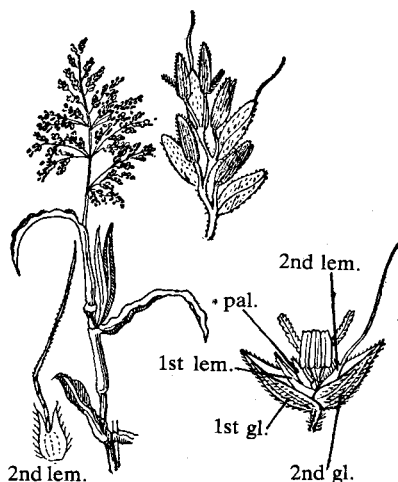


Fig. 219—*Sorghum halepense*.

*1. *S. halepense* (L.) Pers., *Syn.Pl.* 1:101 (1805). **Johnson grass.** (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 28). Tall, glabrous perennial grass, 50-150 cm high, with creeping rhizomes and stout stems downy or glabrous at the nodes; leaves flat; panicle loose, pyramidal; terminal spikelets in 3's, the lower ones usually paired; glumes of fertile spikelets stiff, equal, pubescent, finally smooth and shining; 2nd (fertile) lemma with a bent awn twice as long as the spikelet, rising from the notch, or the awns almost obsolete.—*Holcus halepensis* L., *Sp.Pl.* 1047 (1753); *Andropogon halepensis* (L.) Brot., *Fl.Lusit.* 1:89 (1804).

Native to the Mediterranean, naturalised in New Guinea and all Australian mainland States except N.T. Recorded in S.Aust. from the Eastern, Yorke Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers Nov.-May.

Grown as a fodder grass, but becomes a serious pest in parts, being difficult to eradicate and sometimes causing poisoning of stock.

118. THEMEDA Forssk.

Fl.Aegypt.-Arab. 178 (1775).

(Believed by Forsskal to be an Arabic name for *T. triandra*, but said by Black (1943) to mean "a depression where water lies after rain and dried up in summer".)

Perennials; leaf-blade various; ligule scarious or membranous; inflorescence a panicle, with the spikelets arranged in spikelet-like racemes; spikelets with 1 bisexual floret, male or sterile, clustered on the fragile rhachis of the short racemes, each raceme subtended by a sheathing bract; 4 male or sterile persistent spikelets whorled at the base of, and forming a sort of involucre round 1 bisexual spikelet, sessile between 2 pedicellate male or sterile ones, which occupy the summit of the raceme; glumes of the fertile spikelet rigid, rounded on back, the 1st obscurely 5-7-nerved, the 2nd 3-nerved; the 1st lemma small and hyaline the 2nd (fertile) lemma consisting almost entirely of a stiff awn rising from a very short narrow entire hyaline base; male or sterile spikelets green, acute, awnless; the fertile spikelet with its 2 accompanying pedicellate spikelets has a long hairy acute callus which breaks away from the 4 sessile involucre spikelets below it and which are permanent; the male or sterile spikelets lanceolate, with or without lemmas, the 1st glume flattish on back, green, with a keel near each margin and 9-11-nerved between the 2 keels, the 2nd hyaline and nearly as long. About 10 species from Africa, Asia and Australia.

- | | |
|--|------------------------|
| 1. Fertile spikelets glabrous except at summit; the 4 involucre spikelets all sessile..... | <i>T. australis</i> 1. |
| 1. Fertile spikelets densely pubescent with brown hairs; 2 of the 4 involucre spikelets shortly pedicellate..... | <i>T. avenacea</i> 2. |

1. *T. australis* (R.Br.) Stapf, *Fl. Trop. Afr.* 9:420 (1919). **Kangaroo grass** (Ill. N. T. Burbidge (1970) *Australian grasses* 3, pl. 92). Erect glabrous perennial, to 90 cm high; leaf-blades narrow, with more or less revolute margins and scabrous above; ligule short, truncate, ciliate; nodes glabrous; panicle loose, interrupted, 10-20 cm long; fertile spikelet fusiform, whitish when young, finally glossy-brown, glabrous except for a few short golden hairs near summit, 5-6 mm long; callus 2-3 mm long, villous with long golden-reddish hairs; sessile (involucral) spikelets inserted at apparently the same level, 13-14 mm long, glabrous; the 2 pedicellate ones rather shorter, their pedicels glabrous; awn pubescent, usually twice bent, 5-7 cm long, the column 2.5-3 cm long, pubescent, reddish-brown, rigid, loosely twisted.—*Anthistiria australis* R.Br., *Prod. Fl. Nov. Holl.* 200 (1810); *A. ciliata* non L.f., sensu Benth., *Fl. Aust.* 7:542 (1878).

Occurs in New Guinea and all Australian States. Common in the southern parts of S. Aust. (not recorded from Kangaroo I.) and also present, but rare, in the far N.W. and Lake Eyre regions.

Flowers throughout the year.

Grazed when young and at least in some areas regarded as a valuable pasture species. Formerly considered to be synonymous with *T. triandra* Forssk., and its separation requires further examination.



Fig. 220—*Themeda australis*.

2. *T. avenacea* (F. Muell.) Maiden & Betche, *Census N.S.W. Pl.* 15 (1916). **Tall oat-grass**. (Ill. Lazarides (1970) *The grasses of Central Australia* pl. 69b). Similar to *T. australis*, but has a somewhat woolly or silky base; stems usually over 1 m high; the racemes are often solitary on the filiform panicle-branches and do not spread in a fan-like shape; the involucral spikelets inserted at different levels as 2 alternate pairs separated by an internode of 0.5-0.8 mm, 19-28 mm long, 1 of each pair pedicellate; the fertile spikelets covered all over with brown hairs, 8-10 mm long; callus villous, 5-6 mm long; awn 7-10 cm long; column usually longer than bristle.—*Anthistiria avenacea* F. Muell., *Fragm. Phyt. Aust.* 5:206 (1866).

Occurs in all Australian mainland States. Recorded from the N.W. region of S. Aust.

Flowers July (1 record).

Less palatable than *T. australis*.

FAMILY 33.—CYPERACEAE

Usually perennial grass- or rush-like herbs ("sedges"); leaves often 3-ranked, with closed basal sheaths and usually linear blades, without ligule; stems solid or hollow, often 3-angled. Flowers small, bisexual or unisexual, naked or with a perianth of scales or bristles, in the axil of scale-like bracts (*glumes*) comprising spikelets; stamens usually 1-3, rarely 4 or 6; anthers basifixed, 2-celled; ovary superior, 1-celled, with 1 erect anatropous ovule; style divided into 2-3 stigmatic branches; fruit an indehiscent dry nut (*achene*), flattened when the style is 2-branched, trigonous when it is 3-branched; seed erect, albuminous; inflorescence a panicle, head or spike or spikelet solitary, often with 1-several leafy bracts at the base.

1. All flowers in each spikelet or spike unisexual; glumes spirally imbricate round the rhachilla.
2. Nut enclosed in a utricle; leaves cylindrical CAREX 2.
2. Nut not enclosed in a utricle; leaves grass-like CHORIZANDRA 4.

1. All flowers in each spikelet bisexual or sometimes the uppermost or lowermost male; nut never enclosed in a utricle.
3. Glumes distichous, imbricate in 2 opposite rows.
 4. Style not thickened at base.
 5. Style 2-fid CYPERUS 6.
 5. Style 3-fid.
 6. Spikelets several-flowered; hypogynous bristles absent; rhachilla straight or slightly flexuose CYPERUS 6.
 6. Spikelets usually 1-3-flowered; hypogynous bristles sometimes present; rhachilla prominently zig-zag and more or less curved over the nut SCHOENUS 14.
 4. Style thickened and hispid in the lower part, persistent as a more or less distinct beak on the nut.
 7. Coarse plant with long leaves and a dense head of spikelets surrounded by short broad bracts GYMNOSCHOENUS 10.
 7. Slender almost leafless plant with few racemose or paniculate spikelets and setaceous bracts TETRARIA 16.
3. Glumes spirally imbricate all round the rhachilla.
 8. Spikelets maturing more than 3 fruits.
 9. Style slender, not thickened towards the base.
 10. Hypogynous bristles or scales 3-6, not hyaline, mostly absent SCIRPUS 15.
 10. Hypogynous scales 2, flat and hyaline, enclosing the nut. LIPOCARPHA 12.
 9. Style thickened at the base.
 11. Style articulate on the ovary and deciduous as a whole from the nut FIMBRISTYLIS 8.
 11. Style not articulate, the base remaining attached to the ripe nut.
 12. Plants leafy at the base; spikelets more than one to each stem BULBOSTYLIS 1.
 12. Plants leafless; spikelet one to each stem ELEOCHARIS 7.
 8. Spikelets maturing 1 or rarely 2 fruits each.
 13. Hypogynous scales or bristles present.
 14. Scales becoming broad, thick, and spongy under the nut; style thickened at base; leaf-sheaths all basal LEPIDOSPERMA 11.
 14. Scales or bristles under the nut remaining quite small, but somewhat dilated at base; style not thickened at base; stems usually with 1 leaf-sheath above the base TRICOSTULARIA 17.
 13. Hypogynous scales or bristles absent.
 15. Stems reiterately branched, leafless; spikelets 1 or 2 at the ends of the branches CAUSTIS 3.
 15. Stems simple or with leafy branches usually from the base; spikelets in terminal inflorescences.
 16. Stems hollow; nut drupe-like, borne on a disc not falling off with the nut; leaves horizontally flattened, 3-ranked CLADIUM 5.
 16. Stems solid, pithy or transversely septate; nut not drupe-like, without disk.

17. Upper flower of the spikelets bisexual, lower one when present sterile or male; style-base not swollen; leaves horizontally flattened, spirally arranged GAHNIA 9.
17. Upper flower reduced, lower one bisexual; style base swollen; leaves vertically flattened or terete, 2-ranked MACHAERINA 13.

1. *BULBOSTYLIS* Kunth

Enum.Pl. 2:205 (1837).

(From Latin *bulbus*, bulb; *stylus*, style; alluding to the bulb-like style-base.)

Slender annuals or perennials, with the leaves all at the base of the stem, the sheaths usually bearded at the orifice with fine needle-like hairs, and the blades very slender; involucre bracts under the inflorescence similar to the leaves, sometimes short; spikelets several-flowered, solitary or in heads or in umbel-like inflorescences; glumes imbricate all round the rachilla, the lowest 1-2 empty; flowers bisexual, no hypogynous bristles; styles 2-3-cleft, thickened at the base, not articulate on the ovary and at maturity the upper part deciduous, leaving the base as a small button persistent on the nut or occasionally deciduous when very old. About 100 species in warm regions.

1. Spikelets capitate.

2. Nut acutely triquetrous, with concave sides *B. barbata* 1.
 2. Nut obcordate, smooth and without angles *B. eustachii* 2.

1. Spikelets umbellate; nut obtusely trigonous, with convex sides *B. turbinata* 3.

1. *B. barbata* (Rottb.) C. B. Clarke in Hook.f., *Fl.Brit.India* 6:651 (1893). Annual, with filiform glabrous stems, 2-20 cm high; leaves almost capillary, usually much shorter than the stems, the sheaths prominently bearded; inflorescence capitate or very rarely reduced to a single spikelet, with 1 or 2 bracts longer than it; spikelets usually numerous, erect-spreading, light-brown, oblong-lanceolate, 4-5 mm long; glumes ovate, acute, mucronate, 2 mm long, glabrous or somewhat puberulous, prominently keeled; stamen 1; nut ovate or somewhat cordate, acutely triquetrous with concave sides, smooth or almost so, c. 0.75 mm long, crowned by the minute brown to blackish style-base.—*Scirpus barbatus* Rottb., *Descr. & Icon.* 52 (1773), *Stenophyllus barbatus* (Rottb.)Cooke, *Fl.Bombay* 2:887 (1908), *Fimbristylis barbata* (Rottb.)Benth., *Fl.Aust.* 7:321 (1878).

Widespread in warm countries of the old world, U.S.A. and Australia (all mainland States except Vic.). Recorded in S.Aust. from the N.W. region.

2. *B. eustachii* J. M. Black ex Eardley, *Fl.S.Aust.* 945 (1957). Glabrous annual, with filiform spreading-erect stems 4-7 cm long; leaves 1 or 2, narrow-linear, 2-3 cm long, clasping each stem near its base; flowers in terminal heads or clusters, with 2 filiform divaricate involucre bracts at base, the lower one c. 2 cm long and the upper one about half as long; spikelets 4-5 mm long, about 5 in each cluster, with about 12 glumes; glumes boat-shaped, 2.5-3 mm long, acuminate, with green rounded back and not keeled; glumes 2, with linear anthers; style-branches 3, capillary, divergent, much longer than style; nut obcordate, orange-coloured, 1 mm long, with the small globular permanent style-base in the notch, smooth and without angles, supported on a small globular stipes.

Only known from the type from between the Everard and Musgrave Ranges (N.W. region of S.Aust.), and probably not a distinct species.

Flowers Jan. (1 record).

3. *B. turbinata* S. T. Blake, *Proc.R.Soc.Qld* 52:56 (1941). Very slender annual, to 15 cm high with filiform sometimes scabrous stems and leaves; leaf-blades shorter than the stems, the sheaths usually bearded at the orifice but sparsely so; inflorescence umbellate, with few slender rays longer than the bracts, rarely reduced to a single spikelet; spikelets usually 2-4, lanceolate or

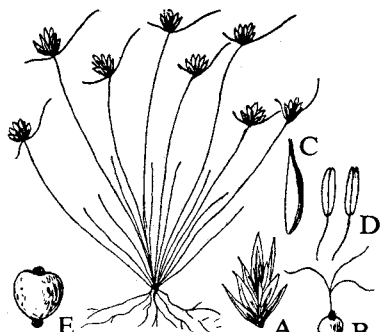


Fig. 221—*Bulbostylis eustachii*. A, spikelet; B, gynoecium; C, glume; D, stamens; E, nut.

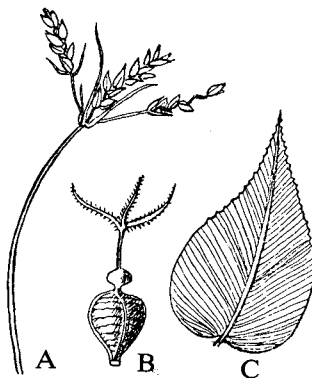


Fig. 222—*Bulbostylis turbinata*. A, inflorescence; B, gynoecium; C, glume.

linear, mostly 6-8 mm long; glumes 3-3.5 mm long, strongly keeled, with the keel running out into a recurved point, glabrous on the margins, minutely ciliate in the upper part; stamens 3; nut white, 1 mm long, shining, turbinate, transversely finely wrinkled, crowned with the minute persistent ovoid or conical style-base.

Occurs in N.T. and Qld. A specimen from the Lake Eyre region of S.Aust. was tentatively identified as *B. turbinata* by Blake. An unidentified specimen of *Bulbostylis* with an umbellate inflorescence has also been collected in the Eyre Pen. region.

2. CAREX L.

Sp.Pl. 972 (1753).

(Latin name of some kind of rush.)

Perennials with grass-like leaves usually at the base of the stem, leaf-like to glume-like bracts and usually a creeping rootstock, inhabiting moist places; flowers unisexual, in unisexual or androgynous usually cylindrical spikes, which are terminal or also distant along the stems; glumes spirally imbricate in several rows; ovary enclosed in a membranous or corky sack or utricle from which the 2-or-3-fid style emerges; stamens usually 3; nut compressed or trigonous, enclosed in the persistent utricle. Over 1500 species from all parts of the world. (Key mainly from Willis (1970) *A handbook to plants in Victoria*).

1. Spikes sessile, short and broad; terminal spike bisexual.
2. Spikes 20 or more in a long narrow panicle.
3. Stems triangular, scabrous; utricle flattened *C. appressa* 1.
3. Stems cylindrical, smooth; utricle turgid on one face *C. tereticaulis* 13.
2. Spikes fewer than 10, usually almost capitate.
4. Bract of lowermost spike leaf-like and usually at least twice the length of the whole inflorescence.
5. Glumes dull, pallid or greenish *C. inversa* 10.
5. Glumes shining, chestnut-brown *C. hebes* 9.
4. Bract or lowermost spikes glume-like and usually shorter than the whole inflorescence.
6. Utricle with serrulate margins; spikes green or pale brown *C. chlorantha* 4.
6. Utricle with smooth margins; spikes bright brown *C. divisa* 5.

1. Spikes stalked, elongate; terminal spike male.
 7. Stigmas 2..... *C. gaudichaudiana* 7.
 7. Stigmas 3.
 8. Spikes in fascicles of 1-5 at each node; upper part of utricle conspicuously setulose *C. iynx* 11.
 8. Spikes solitary at nodes; upper part of utricle smooth on margins.
 9. Leaves septate-nodulose, 5-10 mm broad *C. fascicularis* 6.
 9. Leaves not septate-nodulose, rarely as broad as 6 mm.
 10. Utricle pubescent..... *C. breviculmis* 3.
 10. Utricle glabrous, sometimes scabrous near the tip.
 11. Utricle thin, membranous *C. gunniana* 8.
 11. Utricle thick, corky, obscurely angled.
 12. Spikes 4-7, the male ones 1-4 *C. pumila* 12.
 12. Spikes 9-23, the male ones 6-20 *C. bichenoviana* 2.

1. *C. appressa* R.Br., *Prod.Fl.Nov.Holl.* 242 (1810). **Tall sedge.** Densely tufted; stems tall, to 1 m or so high, acutely triquetrous, scabrous on the edges towards the summit; leaves 3-6 mm broad, with scabrous margins; inflorescence a long narrow spike-like panicle 5-25 cm long, with inconspicuous bracts or the lowest sometimes prominent and filiform; spikelets very numerous, androgynous, ovoid, c. 5 mm long; glumes more or less hyaline, acute or subacute, shortly mucronate, the sides stained chestnut; utricles ovate and tapering into a shortly bifid beak, plano- or somewhat biconvex, compressed, glabrous, serrulate on the margins in the upper part, 3-3.5 mm long and slightly longer than the glumes; style-branches 2.—*C. paniculata* non L., sensu Benth., *Fl.Aust.* 7:440 (1878).

Occurs in all States of Australia except N.T., New Zealand and other adjoining areas. Recorded in S.Aust. from the Flinders Ranges, Southern Lofty, S.E. and Kangaroo I. regions.

Flowers Aug.-Jan.

Grows in damp areas including standing water.

2. *C. bichenoviana* Boott ex Hook.f., *Fl.Tasm.* 2:101 (1858). **Sedge.** Rhizome long-creeping; stems 25-50 cm high, prominently triquetrous; leaves and bracts long and narrow, the latter overtopping the inflorescence and the lowest with a distinct sheath; spikes few to more than 20, 6-20 male, sessile, and close together in a terminal cluster, the others (about 3) female or partly male at the top, sometimes pedunculate and sometimes compound; glumes purple-brown or blackish, acute, mucronate; utricle 4.5-5 mm long and longer than the glumes, scarcely stipitate, ovoid-trigonal, with a short conical prominently bifid beak, thick and corky, smooth, obscurely nerved; style 3-branched.

Occurs in N.S.W., Vic., Tas. and S.Aust. (Southern Lofty region).

Flowers Oct.-Feb.

Grows in moist places.

3. *C. breviculmis* R.Br., *Prod.Fl.Nov.Holl.* 242 (1810) **Sedge.** Densely tufted and leafy; stems 1-15 cm long, triquetrous with scabrous margins; leaves much longer, flat; bracts long, with indistinct sheaths; spikes 2-5, close together or somewhat distant, sessile, cylindrical, the terminal one male and 4-26 mm long, the others female and 10-20 mm long; glumes acuminate, awned; utricles shorter, pubescent,

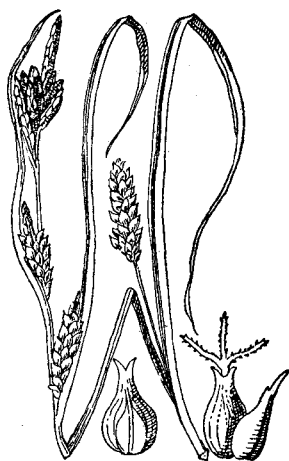


Fig. 223—*Carex bichenoviana*.

nerved, narrow-ellipsoid or obovoid, with a nearly conical almost entire beak, 3-4 mm long; style-branches 3.

Occurs in all Australian States except N.T., N.Z. and adjoining areas. Recorded in S.Aust. from the Northern and Southern Lofty, S.E. and Kangaroo I. regions.

Flowers Aug.-Dec.

Grows in grassland and in moist areas. The only S.Aust. species with a pubescent utricle.

4. *C. chlorantha* R.Br., *Prod.Fl.Nov.Holl.* 242 (1810). **Sedge.** Perennial, with slender, smooth and glabrous culms usually less than 30 cm high, arising at intervals along the long-creeping rhizomes; leaves soft and usually shorter than the culms; bracts glume-like but awned; spikes, sessile, fewer than 10, arranged in a short terminal inflorescence less than 3 cm long, terminal spike bisexual; male flowers at summit of spikelets; utricle compressed, with ciliate edges and a short bifid beak.

Occurs in N.S.W., Vic., Tas. and S.Aust. (Southern Lofty and S.E. regions, but apparently rare).

*5. *C. divisa* Huds., *Fl.Angl.* 348 (1762). **Divided sedge.** Perennial, with long-creeping rhizomes; culms slender and wiry, usually less than 60 cm high, glabrous but rough towards the top, triquetrous; leaves 1.5-3 mm broad, usually shorter than the culms, usually more or less flat; inflorescence 1-2 cm long; the lowest bract glume-like, often long and narrow; spikes sessile, 3-7, the terminal spike bisexual; male flowers at summit of spikelets; female glumes ovate, shortly aristate, 3.5-4 mm long, brownish; utricle broadly ovoid, plano-convex, 3.5-4 mm long, many-veined, with a beak less than 1 mm long; nut suborbicular, 2 mm long.

Native to Europe, Africa and Asia, naturalised in Vic., Tas. and S.Aust. (Southern Lofty region).

Flowers Sept.-Feb.

6. *C. fascicularis* Soland.ex Boott in Hook.f., *Fl.N.Z.* 1:283 (1853). **Tassel sedge.** Stems to over 50 cm high, acutely triquetrous, scabrous on the margins; leaves nearly as long, to 8 mm broad; bracts leafy, much exceeding the inflorescence, with scarcely any or no sheaths; spikes 3-6, pedunculate, drooping, all close together at the top of the stem, cylindrical, 3-6 cm long, the terminal one male, the others female; glumes with scabrid awns; utricles divergent or reflexed, obtusely trigonous, prominently nerved, ovoid-ellipsoid, on a rather long stipes and with a long, narrow-spreading, deeply bifid beak with spreading teeth, in all 4-5 mm long; style-branches 3.—*C. pseudocyperus* non L., sensu R.Br., *Prod.Fl.Nov.Holl.* 243 (1810).

Occurs in all Australian States except N.T., New Zealand and adjoining areas. Recorded in S.Aust. from the Southern Lofty, Murray, S.E. and (by Black; 1943) Kangaroo I. regions.

Flowers Oct.-April.

Grows in wet places.

7. *C. gaudichaudiana* Kunth, *Enum.Pl.* 2:417 (1837). **Sedge.** (Ill. Burbidge and Gray (1970) *Flora of the A.C.T.*, fig. 77). Stems acutely triquetrous with scabrous margins, to at least 60 cm high, but often small; leaves often longer than the stem, flat; spikes 3-8, cylindrical, 1.5-6 cm long, distinct, sessile except the lowest which is sometimes shortly pedunculate, the upper 1 or 2 male, the others female or shortly male at the top; lower bracts long, sometimes as long as the inflorescence; glumes with dark-brown sides, lanceolate, narrowly obtuse and often mucronate; utricles exceeding the glumes, 2-3 mm long, very flat, strongly nerved, ovate-elliptic, indistinctly beaked, somewhat bifid at the tip; style-branches 2.



Fig. 224—*Carex fascicularis*.

Occurs in all Australian States except W.Aust. and N.T. Recorded in S.Aust. from the Flinders Ranges, Southern Lofty, Murray and Kangaroo I. regions

Flowers Sept.-Feb.

Grows in wet places.

8. *C. gunniana* Boott, *Trans.Linn.Soc.* 20:143 (1846). **Sedge.** Tufted; stems triquetrous, smooth below the inflorescence, 20-40 cm long; leaves flat, 3-5-7 mm broad, broader than most other species; bracts with prominent sheaths, long but not always overtopping the inflorescence; spikes 3-6, distant, cylindrical, the lowest one female, usually on a long peduncle and then usually low down, the terminal one male, 1-5-3 cm long, the other spikes female or sometimes with a few male flowers at the top, 1-5-4 cm long; glumes ovate, obtuse or emarginate, prominently mucronate, stained chestnut on the sides; utricles longer than the glumes, several-nerved but not very prominently so, trigonous, scarcely stipitate, smooth, gradually attenuate into a very distinct shortly bifid conical beak, 4-5-5 mm long; style-branches 3.

Occurs in N.S.W., Vic., Tas. and S.Aust. (Flinders Ranges, Southern Lofty and S. E. regions).

Flowers Oct.-March.

Grows in wet places.

9. *C. hebes* Nelm., *Kew Bull.* 1939:310 (1939). **Sedge.** Rhizomes shortly creeping; culms 8-20 cm high, slender, smooth; leaves c. 2 mm broad, longer or shorter than the culms; spikes sessile, clustered, 3-5, ellipsoid, 5-10 mm long, terminal spike bisexual; bract of lowest spike rather leaf-like, not much longer than the inflorescence; glumes ovate, with chestnut-brown sides and hyaline margins; utricle ovate-elliptic, c. 3-5 mm long, plano-convex, membranaceous, weakly nerved; style-branches 2.

Occurs in N.S.W., Vic. and S.Aust. (rare in the Southern Lofty and S.E. regions).

Flowers Sept.-Dec.

10. *C. inversa* R.Br., *Prod.Fl.Nov.Holl.* 242: (1810). (**Knob**) **Sedge.** Stems slender, 10-60 cm high; leaves 1-3 mm broad; bracts 2, leaf-like, close together, much longer than the inflorescence; spikes 2-4, sessile in a terminal cluster or one a little lower down, ovoid, 6-10 mm long, with a few male flowers at the base, the greater part female; glumes acuminate, greenish or pallid or tinged with yellow; utricles much longer than the glumes, the margins in the upper part glabrous, ovate and tapering into a bifid beak, smooth between the veins or with transverse bars; style-branches 2.

Occurs in all Australian States except N.T., and New Zealand. Recorded in S.Aust. from the Eyre Pen., Flinders Ranges, Southern Lofty and S.E. regions.

Flowers Sept.-April.

Grows in damp places. Black (1943) recognised two varieties in S.Aust.—var. *inversa* and var. *major* Boott, *Ill.Gen.Carex* 4:151 (1867). Var. *inversa* is smaller (to 30 cm high) and without the transverse bars on the utricle, but the justification for separating these varieties requires investigation.

11. *C. iynx* Nelm., *Proc.Linn.Soc.Lond.* 155:279 (1944). **Sedge.** Coarse tufted perennial, with short ascending tough woody rhizomes forming large clumps, base of culms covered with the fibrous remains of old leaf sheaths; spikes 1-several at the nodes of the culm, mature female spikes usually 5-8 mm diam., the lowermost drooping on long slender peduncles longer than the spikes, upper 1-4 spikes predominantly male; utricles to 6 mm long, including the conspicuous long slightly incurved beak which is c. 2 mm long, glabrous except setulose on the margins above, strongly nerved on the abaxial faces and much exceeding the glumes; glumes of the female flowers yellow-chestnut with hyaline margins, 5-7-5 x 2-5-4 mm, the strong midnerve usually produced into a short awn. (Description from Burbidge & Gray (1970) *Flora of the A.C.T.*)

Occurs in N.S.W., Vic., Tas. and S.Aust., (one record from near Adelaide in the Southern Lofty region).

12. *C. pumila* Thunb., *Fl. Japon.* 39 (1784). **Strand sedge.** Rootstock creeping; stems triquetrous, 10-30 cm high; leaves keeled in lower part, flat above; spikes 4-7, the males terminal, 1-4 and close together; the remainder female or with a few males at top, distant, the lowest shortly pedunculate; floral bracts long; female glumes reddish-brown, acute; utricle c. 5 mm long, much longer than the glume, golden-brown, thick in texture, with a short 2-toothed beak; style-branches 3.

Occurs in South America, Asia and all Australian States except N.T. and W.Aust. Recorded in S.Aust from the Flinders Ranges and Southern Lofty regions.

Flowers Aug.-Jan.

13. *C. tereticaulis* F. Muell., *Fragm. Phyt. Aust.* 8:256 (1874). **Sedge.** Densely tufted, in clumps to 1 m diam., to 1 m high or more; stems terete or obtusely triangular near the top only, smooth, finely striate; leaves often rudimentary or reduced to their sheaths, sometimes laminae well-developed but these are relatively inconspicuous among the numerous culms; inflorescence a long narrow spike-like panicle mostly less than 10 cm long, the lowest bracts usually inconspicuous; glumes somewhat obtuse, the female glumes with a conspicuous wide hyaline border; utricle ovate to suborbicular with a short indistinctly toothed beak, distinctly biconvex and decidedly turgid on one face, c. 4 mm long.

Occurs in all Australian States except N.T. and ?Qld. Recorded in S.Aust. from the Flinders Ranges, Eyre Pen., Southern Lofty and S.E. regions.

Flowers Aug.-April.

Grows in damp ground, especially if subject to occasional flooding.

3. CAUSTIS R.Br.

Prod. Fl. Nov. Holl. 239 (1810).

(Greek *kaustos*, burnt, scorched; from the appearance of the sheathing bases.)

Perennials; spikelets 2-flowered, the upper flower bisexual, the lower male or sometimes all unisexual by abortion; glumes imbricate all round the rhachilla, acuminate, a few of the outer ones empty and shorter; stamens 3-6; no hypogynous bristles; nut crowned by the hard persistent base of the style. 10 Australian species.

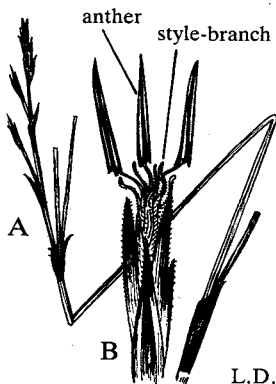


Fig. 225—*Caustis pentandra*. A, portion of inflorescence; B, spikelet, x 2.

1. *C. pentandra* R.Br., *Prod. Fl. Nov. Holl.* 240 (1810). **Thick twist-rush.** Stems 50-60 cm high or more, erect from a creeping root-stock, reiterately branched, the branches stiff, plano-convex; leaves reduced to blackish closed pointed sheaths, distant along the stems; spikelets brown, narrow, 12-15 mm long, erect, usually 2 from the same sheath of which 1 is pedicellate; glumes stiff, acuminate, outer empty ones 4-5, then a male flower, and above it a fertile flower with 5 stamens; style-branches 3, but 1 or 2 often bifid; nut crowned with the larger persistent pubescent base of the style.

Occurs in all Australian States except N.T. Recorded in S.Aust. from the Southern Lofty, S.E. and Kangaroo I. regions.

Flowers Oct.-March.

4. CHORIZANDRA R.Br.

Prod. Fl. Nov. Holl. 221 (1810).

(Greek *chōrizō*, I separate; *andros*, a male; referring to the separate male flowers.)

Perennials; spikelets of 1 terminal female flower surrounded by several male flowers, each of 1 stamen and 1 glume; glumes

imbricate round the rhachilla; the flowering head dense, solitary, terminal, but apparently lateral owing to the erect involucre bract which continues the stem, and consisting of numerous spikelets, with a circle of flat, permanent, empty glumes at the base; style-branches 2; nut with c. 8 prominent longitudinal ribs. 4 Australian species.

1. *C. enodis* Nees in Lehm., *Pl. Preiss.* 2:73 (1846). **Black bristle-rush.** Stems slender but wiry, c. 30 cm high, from a creeping rhizome; leaves basal, the inner stem-like, the outer reduced to sheathing bases; inflorescence a dense, globular, reddish-black head, 10-12 mm diam., with a long, slender, stiff, erect involucre bract; spikelets obconical, 3.5 mm long; the male flowers 10-12, each enclosed in a reddish 3-toothed ciliate glume; nut biconvex, almost globular, 2.5 mm long, muricate and minutely pubescent between the longitudinal ribs.

Occurs in all Australian States except N.T. and Qld. Recorded in S.Aust. from the Eyre Pen., Southern Lofty, Murray, S.E. and Kangaroo I. regions.

Flowers recorded Aug.-Nov. and April-May.

Grows in wet places.

5. *CLADIUM* Browne

Hist. Jamaic. 114 (1756).

(Greek *kladion*, a branchlet; alluding to the paniculate inflorescence.)

Perennials, with creeping stolons; stems hollow; leaves 3-ranked, horizontally flat, serrate-scabrous on the margins; spikelets paniculate, with 2-3 bisexual flowers, but usually the lowest only fertile; panicle-branches each with a sheathing bract at base; glumes few, imbricate all round, the one bearing the fertile flower usually the largest, 1-3 outer ones empty; stamens 3, rarely 2; style somewhat enlarged at the base, branches 3; no hypogynous bristles; nut supported by a disc, crowned by the adnate discoloured often hispid base of the style. 2 species widespread in tropical and temperate areas.

1. *C. mariscus* (L.) Pohl, *Tent. Fl. Boh.* 1:32 (1809). **Leafy-twist-rush.** Stems hollow, stout, more or less distinctly trigonous, 1-2 m high, several-noded, sometimes with a few leafy branches from the upper nodes; leaves long, flat, tapering, minutely but rigidly denticulate on keels and margins; panicle leafy, 20-30 cm long, 6-8 cm broad, of distant dense pedunculate corymbose umbels; spikelets brown, numerous, with 2 bisexual flowers, only the lower one fertile as a rule; glumes obtuse; stamens 2; nut ovoid-conical, shining.—*Schoenus mariscus* L., *Sp. Pl.* 42 (1753); *C. procerum* S. T. Blake, *Trans. R. Soc. S. Aust.* 67:57 (1943); *Machaerina procera* (S. T. Blake) Koyama, *Bot. Mag., Tokyo* 69:65 (1956).

Occurs in tropical and temperate parts of the world, including all Australian States except ?Tas. Recorded in S.Aust. from the Northern and Southern Lofty and S.E. regions.

Flowers throughout the year.

Experts disagree on whether or not the Australian species should be separated (under the name *C. procerum*) from the cosmopolitan species *C. mariscus*.

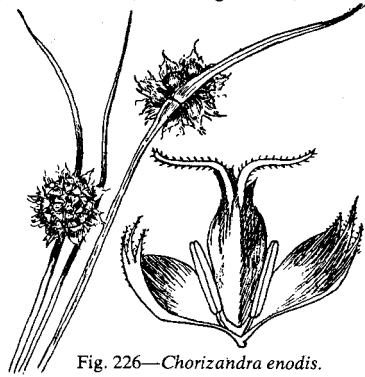


Fig. 226—*Chorizandra enodis*.



Fig. 227—*Cladium mariscus*.

6. CYPERUS L.

Sp. Pl. 44 (1753).(Latin from Greek *kypeiros*, some species of sedge.)

Annual or perennial herbs, sometimes with creeping often stoloniferous rhizomes; all leaves near the base of the stems; sometimes reduced to the sheaths; inflorescence terminal, capitate or umbel-like with simple or compound rays, rarely with rays distant from one another; spikelets spicate or digitate on the rays; each ray subtended by a persistent involucre bract; spikelets compressed, 1-many-flowered; glumes in 2 opposite rows; flowers all hermaphrodite or the terminal one sometimes male; rhachilla straight or flexuose, never prominently zig-zag, sometimes bordered by hyaline or coloured membranous wings; hypogynous bristles or scales absent; stamens 3-1; style-branches 2 or 3. About 600 species mainly in the tropics and subtropics. (A thorough study of the S.Aust. species is much needed and this key is very tentative).

1. Leaves reduced to membranous sheaths at the base of the stem,
rarely the uppermost with a very short lamina.
2. Style-branches 2. *C. laevigatus* 16.
2. Style-branches 3.
3. Involucral bracts 25-50 cm long, 8-15 mm broad *C. flabelliformis* 11.
3. Involucral bracts to 15 cm long, to 6 mm broad.
4. Stems cylindrical at top, very faintly striate; involucre bracts hardly spinescent, usually at least 5, flat, at least 5 cm long; spikelets linear or oblong, 8-18 mm long *C. vaginatus* 24.
4. Stems trigonous at very top, prominently striate; involucre bracts almost spine-tipped, 3 or 4, with incurved margins, usually less than 5 cm long, very rigid; spikelets ovate or lanceolate-ovate, 3-5.5 mm long *C. gymnocaulos* 14.
1. Leaf-blades present.
5. Style-branches 2.
6. Spikelets 1-flowered in a more or less globose capitate spike; involucre bracts leafy; rhizome creeping *C. brevifolius* 2.
6. Spikelets several-flowered.
7. Nut dorsally flattened with a flat or concave face against the rhachilla; spikelets swollen, greenish *C. pygmaeus* 17.
7. Nut laterally flattened, equally biconvex with one edge next to the rhachilla; spikelets flat, blackish *C. sanguinolentus* 21.
5. Style-branches 3.
8. Rhachilla prominently winged.
9. Inflorescence a single head of crowded, more or less sessile, green spikelets *C. pygmaeus* 17.
9. Inflorescence variously compound, if occasionally a single head then the spikelets darkly pigmented.
10. Glumes to 2.5 mm long.
11. Spikelets in spikes at the end of the rays *C. exaltatus* 10.
11. Spikelets subumbellate or in globose heads on the ends of the rays.
12. Spikelets c. 4 mm broad, pallid or greenish *C. eragrostis* 9.
12. Spikelets 1.5-2.5 mm broad, brown.
13. Plants less than 30 cm high; spikelets 2-2.5 mm broad *C. rotundus* 19.
13. Plants usually more than 50 cm high; spikelets 1-2 mm broad.

- 14. Spikelets 8-14-flowered. *C. gunnii* 13.
- 14. Spikelets usually 20-50-flowered. *C. dactyloides* 7.
- 10. Glumes 3-5 mm long.
 - 15. Spikelets 2.5-4 mm broad. *C. gilesii* 12.
 - 15. Spikelets 1-2 mm broad.
 - 16. Spikelets 15-50 in each head or spike.
 - 17. Glumes subobtusate, reddish-striate. *C. congestus* 5.
 - 17. Glumes acute or mucronate, reddish but with a green keel. *C. rutilans* 20.
 - 16. Spikelets up to 10 in each head or spike.
 - 18. Inflorescence corymbose or spicate, the involucre bracts with their rays (if any) prominently separated from one another. *C. bulbosus* 3.
 - 18. Inflorescence umbel-like or a compound head, the involucre bracts and rays very close together.
 - 19. Stems cylindrical except near the top; lower involucre bract often suberect at base; umbel-rays often curved; glumes acute in profile; nut developed. *C. victoriensis* 25.
 - 19. Stems prominently 3-angled throughout; involucre bracts spreading; rays straight; glumes narrowly rounded in profile at the tip; nut not maturing. *C. rotundus* 19.
- 8. Rhachilla not winged (species with slightly developed wings are included under both leads).
 - 20. Nut less than half as long as the glumes which have prominent recurved points; plants curry-scented when dry. *C. squarrosus* 22.
 - 20. Nut more than half as long as the glume; plants not curry-scented when dry.
 - 21. Nut broadly obovate or elliptic, with acute angles and concave sides, not more than 1.5 mm long; annuals, sometimes small.
 - 22. Inflorescence of up to 4 spikelets in a single apparently lateral cluster. *C. tenellus* 23.
 - 22. Inflorescence of usually numerous spikelets, terminal and often compound.
 - 23. Inflorescence a dense head often less than 5 mm diam., partly concealed by the bracts; stems less than 10 cm long. *C. pygmaeus* 17.
 - 23. Inflorescence compound; stems usually more than 15 cm long.
 - 24. Spikelets to 8 mm long, in dense heads at the ends of the rays. *C. difformis* 8.
 - 24. The longest spikelets more than 8 mm long, in short but distinct spikes at the ends of the rays. *C. iria* 15.
 - 21. Nut narrowly oblong to linear or somewhat obovoid-oblong, usually more than 1.5 mm long with the angles more or less rounded and the sides flat to convex; mostly perennials.

25. Stems scabrous on the very acute angles in the upper part *C. clarus* 4.
25. Stems smooth throughout, sometimes with obtuse angles.
26. Stems usually above 50 cm high; umbelrays to 12 cm or more long; spikelets 1.5-2 mm wide; glumes not more than 2 mm long *C. dactyloides* 7.
26. Stems rarely above 30 cm high; umbel-rays rarely to 7 cm long; spikelets usually more than 2 mm wide; glumes usually more than 2.5 mm long.
27. Rhizomes long; inflorescence a dense simple head *C. arenarius* 1.
27. Rhizome 0 or very short; inflorescence usually compound.
28. Nut dorsally flattened with a flat or concave face against the rachilla *C. pygmaeus* 17.
28. Nut trigonous.
29. Glumes 4-5 mm long, with recurved mucro *C. gilesii* 12.
29. Glumes less than 4 mm long, shortly mucronate.
30. Glumes viscid; spikelets to 1 mm wide *C. cunninghamii* 6.
30. Glumes not viscid; spikelets 2.5-3 mm wide *C. rigidellus* 18.

*1. *C. arenarius* Retz., *Obs.Bot.* 4:9 (1786/7). Perennial, 15-30 cm high, with extensive somewhat brittle horizontal rhizomes, covered with fibrous sheaths, lacking tubers; from the rhizomes vertical leafy shoots arise; leaves grass-like, distinctly grey-green, channelled above but not keeled below, the margins often incurved, 10-20 cm long, 2 mm broad, with loose sheaths; stems erect, terete, longer than the leaves; inflorescence subtended by about 3 leaf-like bracts the shortest of which is 1-2 cm long and the longest 7 cm, consisting of a compact umbel 10-15 mm diam. of about 12-14 spikelets; spikelets 5-6 mm long, 10-12-flowered; flowering glumes 3 mm long, speckled brown; style-branches 3; stamens 3; nut obovoid, plano-convex, 1.5 mm long.

Native to Asia, naturalised in Port Augusta (Eyre Pen. region) where it was said to have been difficult to control (Symon, *Trans.R.Soc.S.Aust.* 88:6-7; 1964).

2. *C. brevifolius* (Rottb.) Hassk., *Plant.Hort.Bot.Bogor.* 24 (1844). **Globe kyllinga**. Low grass-like perennial with creeping rhizomes; stems scattered along the rhizome or tufted, obliquely ascending to erect, slender, triquetrous, usually 5-15 cm long; leaves shorter or longer than the stems, 1.5-3 mm broad, flaccid; bracts 3-4, always longer than the inflorescence, sometimes as long as the stems; spikelets green or yellowish in a single ovoid or subglobose capitate spike, elliptic-oblong or lanceolate-oblong, c. 3 mm long, nearly flat, 1-flowered; glumes 2, slightly unequal, mucronate, strongly keeled, the keel scabrous or smooth, the lower with 3-4 nerves on each side, the upper with 2; style bifid; nut ovoid or obovoid, strongly flattened laterally, half the length of the glumes.—*Kyllinga brevifolia* Rottb., *Descr. & Icon.* 13 (1773); *K. intermedia* R.Br., *Prod.Fl.Nov.Holl.* 219 (1810).

Occurs in the Americas, Africa, Asia and the eastern Australian States. Recorded in S.Aust. from the Southern Lofty region (one record from Adelaide) and by Black (1943) from the Murray region.

3. *C. bulbosus* Vahl, *Enum.Pl.* 2:342 (1805/6). **Nalgoo**. Perennial, 15-35 cm high, producing numeroid ovoid shining tunicated bulbils at the ends of capillary rhizomes, the latter very soon disintegrating; stems slender, triquetrous; leaves numerous, almost setaceous, about as long as the stem; inflorescence of rather few spikelets arranged in a simple or compound spike or short

corymb, with the rays and bracts distant from one another, one or more of the lower bracts longer than the inflorescence; spikelets reddish to pallid, linear or somewhat lanceolate, 10-15 (-30) mm long, 1.5-2 mm wide, 10-28-flowered; rhachilla broadly winged; glumes not prominently keeled, several-nerved, c. 5 mm long; style 3-branched; nut obovoid-ellipsoid, trigonous, rather less than half the length of the glumes.—*C. andrewsii* C. B. Clarke, *Kew Bull. add.ser.* 8:12 (1908).

Occurs in Africa, Asia, N.T., Qld, N.S.W. and S.Aust. (N.W., Lake Eyre, Flinders Ranges and Eastern regions).

Flowers March, April and July.

4. *C. clarus* S. T. Blake, *Proc.R.Soc.Qld* 51(5):44 (1940). Tufted erect perennial, 15-50 cm high; stems slender, triquetrous, striate, scabrid in the upper part; leaves shorter than or as long as the stems, rigid, flat or somewhat revolute or complicate, septate-nodulose, margins and keel irregularly scabrous, 2.5-6 mm broad; bracts 3-5, similar to the leaves, 2-3 longer than the inflorescence; umbel simple or subcompound or reduced to a compound head, the rays rather stout, to 6 in number and to 4 cm long; spikelets rather numerous, subdigitately arranged in dense globular heads, brightly coloured in various shades of brown and shining, oblong or narrow-oblong, 8-15 mm long, 2.7-5.3 mm broad, somewhat turgid; rhachilla not winged; glumes readily deciduous, rather dense, but soon somewhat spreading and their margins becoming inrolled; prominently several-nerved and with a very prominent recurved mucro, c. 3.5 mm long; stamens 3; style 3-branched; nut obovoid-oblong, trigonous with subacute angles and nearly flat sides, about two-thirds as long as the glume.

Occurs in Qld and N.S.W. Blake identified a specimen from Oodnadatta (Lake Eyre region) as probably belonging to this species; no further records have been made.

*5. *C. congestus* Vahl, *Enum.Pl.* 2:358 (1805/6). **Dense flat-sedge.** Tufted perennial, 20-60 cm high; stems rather robust, acutely triquetrous, smooth, somewhat bulbous at the base; leaves shorter or longer than the stem, rather rigid, flat or the scabrous margins revolute, 2.5-5 mm broad; bracts 3-6, like the leaves, the lower longer than the inflorescence; umbel simple or compound or reduced to a compound head; rays rather rigid, 2-7, to 12 cm long; spikelets rather numerous in dense ovate or hemispherical spikes, rich-brown, linear or somewhat lanceolate, 8-20-flowered, turgid and somewhat quadrangular, acute, 8-25 mm long, 1.5-2 mm broad; rhachilla winged; glumes not very close together, tightly appressed or the tips spreading, acute in profile with the obtuse keel nearly straight or upwardly distinctly incurved, prominently 9-nerved near the keel, the remainder nerveless, c. 4 mm long; stamens 3; style 3-branched; nut obovoid-oblong, trigonous, sides nearly flat and angles rather acute, rather less than half the length of the glume.

Native to South Africa, naturalised in W.Aust., N.S.W., Vic. and S.Aust. (Southern Lofty and S.E. regions).

Flowers Dec.-May.

6. *C. cunninghamii* (C. B. Clarke) C. A. Gardner, *Enum.Pl.Aust.Occ.* 12 (1930). Stems moderately slender, trigonous at the apex; leaves long and very narrow; umbel almost simple; spikes globose, more or less stellate, brownish straw-coloured; spikelets linear, 6-flowered; glumes somewhat remote, minutely apiculate; style 3-branched; nut narrowly oblong, three-quarters as long as the glumes.—*Mariscus cunninghamii* C. B. Clarke, *Kew Bull. add.ser.* 8:18 (1908).

Occurs in W.Aust. and N.T. S. T. Blake identified a specimen from the N.W. region of S.Aust. as probably belonging to this species. No further records are known.

7. *C. dactyloides* Benth., *Fl.Aust.* 7:273 (1878). Densely tufted, erect perennial, 30-120 cm high; stems relatively slender, though up to 5 mm thick, obtusely trigonous, finely striate, smooth; leaves narrow, mostly complicate, more or less distinctly septate-nodulose; more than half as long as the stems; involucre bracts 4-7, most of them longer or much longer than the inflorescence and similar in nature to the leaves; umbel compound or decompound, spreading, with several to numerous slender rays to 12 cm long; secondary rays well developed; spikelets

digitate or subdigitate, numerous in each cluster, linear, acute, rich-brown or becoming paler and dingy, 8-20 mm long, 1.5-2 mm wide, usually 20-50-flowered; rhachilla slender, practically unwinged; glumes rather distant and soon spreading, the margins then more or less involute, very obtuse and mucronate in profile, keeled and several-nerved, c.1.75-2 mm long; stamens 3; style 3-branched; nut linear-oblong, obtusely trigonous, 1.5 mm long, nearly as long as the glume.—*C. clelandii* J. M. Black, *Proc.R.Soc.S.Aust.* 48:253 (1924).

Occurs in N.T., Qld and S.Aust. (Lake Eyre region).

Flowers May (1 record).

8. *C. difformis* L., *Cent. 2.Pl.* 6 (1756). **Variable flat-sedge.** Green annual, to c. 30 cm high, with solitary or tufted, acutely triquetrous, softly compressible stems; leaves grass-like, flaccid, shorter than the stems; bracts 1-3, the lowest longer than the inflorescence and usually erect so that the inflorescence is thrown to one side; inflorescence a simple umbel or reduced to a dense head, the rays, when developed, up to 8, rather short, slender, spreading; spikelets usually reddish-black, rarely pallid, 8-20-flowered, very numerous and densely clustered on the rays or in the head (the clusters 6-12 mm diam.), very small, linear, 4-8 mm long and c. 1 mm wide; rhachilla not winged; glumes rather densely packed but at length spreading, very broad, very obtuse, the back with a more or less 3-nerved green stripe down the middle, but scarcely keeled; 0.75 mm long; stamen usually 1; style 3-branched; nut obovate-ellipsoid, acutely triquetrous with nearly flat sides, about as long as the glume.



Fig. 228 — *Cyperus difformis*.

Occurs in warm parts of Europe, Africa, Asia and all Australian mainland States. Recorded in S.Aust. from the N.W., Lake Eyre, Flinders Ranges, Eastern and Murray regions.

Flowers Jan.-July.

Grows in wet places.

*9. *C. eragrostis* Lam., *Tabl.Encycl.* 1:146 (1791). **Drain flat-sedge, umbrella sedge.** Tufted perennial, 20-100 cm high; leaves 3-4 mm broad, flat, with recurved margins; spikelets very numerous in each compact subglobose cluster (100's per culm), oblong, flat, 2.5-3 mm wide; pale; rhachilla not winged; glumes falling away from the base of the spikelet, acute, keeled, green-yellow or pale-brown, nearly nerveless, or with 1 prominent median nerve on each side, 2-2.5 mm long; styles 3-branched; nut almost equally 3-angular.—*C. vegetus* Willd., *Sp. Pl.* 1:283 (1797), nom.illegit.

Native to South America naturalised in N.S.W., Vic. and S.Aust. (S.E. region).

Flowers Dec. (1 record).

10. *C. exaltatus* Retz., *Obs.Bot.* 5:11 (1789). **Tall flat-sedge.** Stout tufted perennial, to 1 m high; stems triquetrous, 2-3 mm wide at the top; leaves about as long as the stem, 3-10 mm wide; bracts 3-6, like the leaves; serrulate on edges, the lower ones much exceeding the inflorescence (to 80 cm long); umbel compound, with several spreading rays; spikelets rather densely arranged in oblong or linear spikes at the end of the rays and their branches rich deep-brown to golden-brown, mostly linear, 20-40-flowered, to 15 mm long, 1-1.5 mm wide; rhachilla winged; glumes tightly packed, mucronate, keeled, 3-5-nerved on the back and nerveless on the sides, about 1.5 mm long; style 3-fid; nut ellipsoid to ovoid, trigonous, angles acute, rather less than half the glume.

Occurs in Africa, Asia, South America and all Australian mainland States. Recorded in S.Aust. from the N.W., Lake Eyre, Flinders Ranges and Murray regions.

Flowers Jan.-May, July and Sept.

Grows in wet places.

*11. *C. flabelliformis* Rottb., *Descr.Pl.rar.Progr.* 22 (1772). Perennial, with stout horizontal rhizome; stems stout, densely tufted, obtusely trigonous to subterete, sulcate, scaberulous at the top, 50-175 cm high; leaves only developed on the first sterile shoots, reduced on the culms to long wide brownish sheaths; inflorescence large, decompound, 10-30 cm across; involucre bracts numerous (up to 20), distinctly spaced, flat, nearly equal in length, much longer than the inflorescence, 25-50 cm long; primary rays numerous, slender, 5-10 cm long; spikelets digitately arranged, stellately spreading, in clusters of usually 3-7, ovate to oblong-linear, compressed, 10-40-flowered, 5-10 mm long, c. 2 mm wide; rhachilla wingless; glumes obliquely patent, acutely keeled, mucronulate, faintly 3-5-nerved, with green keel and shining ferrugineous sides, c. 2 mm long; stamens 3; nut trigonous, broadly ellipsoid or slightly obovoid, 0.6-0.75 mm long.

Native to Africa and Arabia; naturalised in Qld and in the Southern Lofty region.

Flowers March-May.

12. *C. gilesii* Benth., *Fl.Aust.* 7:273 (1878). Slender annual, to 30 cm high; stems usually tufted, erect, slender, trigonous, smooth but prominently striate; leaves shorter or longer than the stems, 1-3.5 mm wide, margins sparsely scabrous; bracts 2-4, leaf-like, the lower longer or much longer than the inflorescence; inflorescence a simple umbel or reduced to a head, the rays up to 5 in number, slender but rigid, to 3 cm long; spikelets approximate but not quite digitate, few to several on each ray, bright-brown, chestnut, or golden-brown, 15-40-flowered, lanceolate to linear, rather acute, very flat, c. 10-20 mm long or longer after the fall of the lower glumes, 2.5-4 mm wide; rhachilla wingless or nearly so; glumes rather dense but soon spreading and their margins inrolled, 4-5 mm long, prominently nerved with a finally recurved mucro; style 3-branched; nut linear-oblong, apiculate, trigonous, sides flat to slightly convex, at least two-thirds as long as the glume.

Occurs in N.T., Qld and S.Aust (Lake Eyre, Gairdner-Torrens and Eyre Pen. (Port Augusta) regions).

Flowers Sept.-April.

13. *C. gunnii* Hook.f., *Fl.Tasm.* 2:80 (1858). **Flecked flat-sedge.** Densely tufted perennial, with a short woody rhizome; stems rather stout, rigid, rarely under 60 cm high, acutely triquetrous, smooth, c. 2 mm wide; leaves rather numerous, about as long as the stem, 3-5 mm

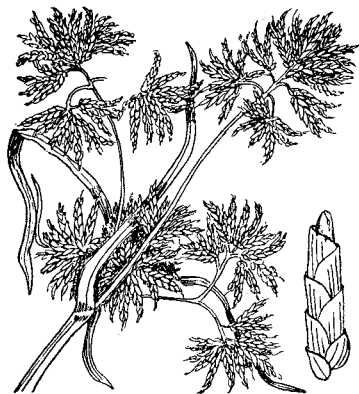


Fig. 229—*Cyperus gunnii*.



Fig. 230—*Cyperus gymnocaulos*.

broad, complicate, striate, with serrulate margins, the sheaths of the outer ones very broad and hardened; bracts similar to the leaves, 3-4, the two lowest very long (30-100 cm long); umbel compound, with 5-8 slender but rather short rays; spikelets numerous in dense clusters, brown or bright-brown, 8-14-flowered, linear or linear-lanceolate, 5-10 mm long, 1.5-2 mm wide, subcompressed; rhachilla distinctly winged; glumes not dense, at length spreading at the tip, rather obtuse in profile, keeled and strongly nerved on the sides, 2.25-2.5 mm long; style 3-branched; nut linear-oblong, trigonous, the angles rounded and sides flat to slightly convex, three-quarters as long as the glume.

Occurs in all Australian States except W.Aust. Recorded in S.Aust from the N.W., Lake Eyre, Gairdner-Torrens, Flinders Ranges, Eyre Pen., Southern Lofty and S.E. regions.

Flowers occur at most times except winter.

14. *C. gymnocaulos* Steud., *Synops.Pl.glumac.* 2:12 (1854). **Spiny flat-sedge.** Densely tufted perennial, with a short, stout, horizontal rhizome; stems erect or spreading, 15-70 cm long; cylindrical or somewhat trigonous particularly at the top, rather prominently and closely striate; leaves reduced to thin membranous sheaths; bracts mostly 3-6, sometimes longer than the inflorescence, usually less than 5 cm long, very rigid and pungent, the margins incurved, inflorescence a dense head or with 1-4 shortly pedunculate globose heads added (i.e. umbellate) often proliferous; spikelets very numerous (very rarely few) in the heads, 8-20-flowered, usually rich-brown or pallid, linear to lanceolate-ovate, acute, 3.5-5 mm long, 2.5-3 mm wide; rhachilla not winged; glumes tightly packed, with slightly spreading tips, acute in profile (thinner and less rigid than in *C. vaginatus* which they otherwise resemble), 3-nerved on the back and sometimes with 1-2 faint nerves on each side, shining, 2.5-3 mm long; nut ellipsoid or oblong-ellipsoid, trigonous, somewhat compressed, angles indistinctly ribbed and rather obtuse, sides convex, 1-1.25 mm long, almost half as long as the glume.

Occurs in all Australian mainland States. Recorded in S.Aust, from all parts of the mainland except the Nullarbor and Yorke Pen. regions, especially in the arid areas and becoming less frequent in the S.E.

Flowers throughout the year.

Grows in wet places.

15. *C. iria* L., *Sp.Pl.* 45 (1753). Annual, to c. 50 cm high; stems slender to setaceous, triquetrous, solitary or tufted; leaves narrow, flaccid, shorter or longer than the stems; bracts 2-5, spreading, the lower longer than the inflorescence; umbel very variable, simple or compound or loose, or in small specimens reduced to a small cluster; spikelets in well-developed inflorescences distinctly spicately arranged, bright-brown or golden to greenish, linear, 6-30-flowered, 4-20 mm long, 1.5-2.5 mm wide; rhachilla not winged; glumes somewhat distant, very broad and obtuse, obovate in profile, with a 3-5-nerved back and practically nerveless sides, 1.25-1.75 mm long; style 3-branched; nut ellipsoid or somewhat obovoid, triquetrous with concave sides, nearly as long as the glume.



Fig. 231—*Cyperus iria*. A, inflorescence; B, nut; C, glume.

Occurs in Africa, Asia and Australia (N.T., Qld, N.S.W. and S.Aust.) Recorded in S.Aust. from the N.W., Lake Eyre and Flinders Ranges regions.

Flowers Jan.-June.

Grows especially in wet places.

16. *C. laevigatus* L., *Mant.Alt.* 179 (1771). Rhizome creeping, often long; stems tufted or distant, sometimes curved, rigid, often rather stout, more or less trigonous,

striate, sometimes pitted, mostly 10-45 cm high; leaves usually reduced to coloured membranous sheaths, sometimes the uppermost with a short rigid stout lamina; bracts 2, the lower erect, appearing as though a continuation of the stem, longer or much longer than the inflorescence, the upper glume-like; spikelets 1-16, spreading in a single dense apparently lateral sessile head, deep reddish-brown or purplish to pallid, oblong-lanceolate, turgid, 5-20 mm long, 2-4 mm wide, 12-30-flowered, often curved or twisted; rhachilla stout, tetragonous, not winged; glumes dense, rigid, concave, mucronulate, several-nerved, 2-3 mm long; style 2-branched; nut ellipsoid or obovoid, plano- or concavo-convex, half to two-thirds as long as the glume.—*C. distachyos* All., *Auct. Fl. Pedem.* 48 (1789).

Cosmopolitan. Recorded by Black (1943) from all mainland Australian States, but not listed by Willis (1970) in Vic. Common in the Lake Eyre region, occurring also in the Flinders Ranges, Eastern, Northern and Southern Lofty and S.E. regions.

Flowers throughout the year.

17. *C. pygmaeus* Rottb., *Descr. & Icon.* 20 (1773). **Flat-sedge.** Small tufted densely leafy annual, rarely to 10 cm long and sometimes very small; stems triquetrous, sometimes very short or apparently absent; leaves grass-like, usually longer or much longer than the stems; involucre bracts 3 to several, leafy, much longer than the inflorescence; spikelets numerous in a single dense subglobose head, ovate-lanceolate, turgid, greenish, 3.5-5 mm long, c. 1.5 mm wide, 8-20-flowered; rhachilla very narrowly winged; glumes tightly packed, with short erect or spreading points, back 3-5-nerved, keeled, remainder nerveless, 1.5-2 mm long, narrowed at each end; style-branches 2 or sometimes 3; nut ellipsoid or somewhat oblong, compressed trigonous or plano-convex, 0.75 mm long. On the flooded plains of the Diamantina River, the stem is very short or absent; in the latter case the heads are apparently sessile on the ground.

Occurs in Africa, the Mediterranean, Asia and all mainland Australian States. Recorded in S.Aust. from the Lake Eyre, Eastern and Murray regions.

Flowers March-May and Aug.

Grows in wet or often temporarily wet places.

18. *C. rigidellus* (Benth.) J. M. Black, *Fl. S. Aust.* 676 (1929). **Flat-sedge.** Perennial, tufted, oblique to erect, to c. 25 cm high; stems slender, prominently and somewhat acutely trigonous, striate, smooth; leaves mostly longer than the stems, narrow, to 2 mm broad, the margins remotely scabrous and often incurved; bracts similar to the leaves, 2-4, some or all longer than the inflorescence; inflorescence varying from a compound head to a subcompound umbel, the rays few, rather rigid, to c. 7 cm long; spikelets practically digitate, few or several together, of various shades of brown to greenish, oblong to linear, 7-40 mm long, 2.5-3 mm wide, 10-24-flowered, frequently deciduous as a whole at maturity; rhachilla not winged; glumes deciduous or persistent, obtuse with a short recurved mucro, keeled, several-nerved, at first tight but soon

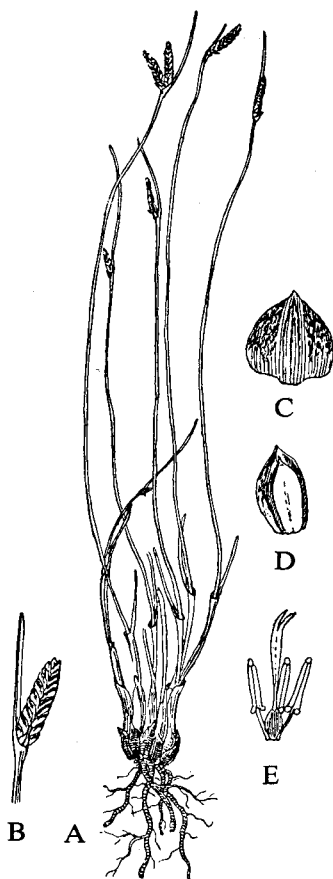


Fig. 232—*Cyperus laevigatus*. A, habit, x $\frac{1}{2}$; B, spikelet, natural size; C, glume, x 4; D, nut, x 4; E, stamens and gynoecium, x 4.

somewhat spreading and their margins inrolled, c. 2.75 mm long; style 3-branched; nut linear-oblong, somewhat oblanceolate, trigonous with convex sides, nearly as long as the glume.—*C. gracilis* R.Br. var. *rigidella* Benth., *Fl.Aust.* 7:266 (1878); *Mariscus rigidellus* (Benth.) C. B. Clarke, *Kew Bull.* add.ser. 8:18 (1908); *C. gracilis* non R.Br., sensu J. M. Black, *Fl.S.Aust.* 89 (1922); *C. enervis* non R.Br., sensu J. M. Black, *Fl.S.Aust.* 89 (1922).

Occurs in all Australian mainland States. Recorded in S.Aust. from throughout the N.W., Lake Eyre, Flinders Ranges and Murray regions.

Flowers March-April and July-Sept.

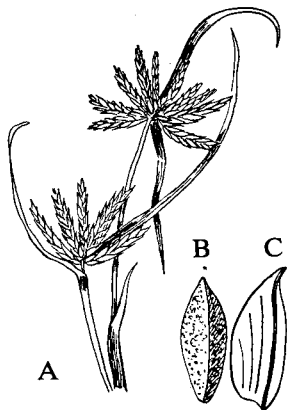


Fig. 233—*Cyperus rigidellus*. A, inflorescences; B, nut; C, glume.



Fig. 234—*Cyperus rotundus*.

19. *C. rotundus* L., *Sp.Pl.* 45 (1753). **Nut-grass.** Perennial, 15-75 cm high, with wiry rhizomes bearing prominent ellipsoid naked or fibrous-coated tubers, stems slender, triquetrous throughout; leaves grass-like, narrow, usually shorter than the stems; bracts 2-4, the lower about as long as or longer than the inflorescence; umbel usually simple, of few slender rigid rays; spikelets brown, 12-24-flowered, rather close together in small spikes of 3-10, 10-20 mm long, c. 2-2.5 mm wide; rachilla prominently winged; glumes 3-4 mm long, not mucronate, keeled, with nerved sides; style 3-branched; nut often not maturing; obovoid, trigonous, rather less than half the length of the glume.

Subsp. **rotundus**. Stems usually 15-30 cm high; scales of tubers usually not present in 2nd year; spikelets c. 2 mm wide; glumes 3-3.5 mm long, obliquely erect; nut rarely maturing.

Occurs in warm parts of the world including all Australian mainland States and ?Tas. Recorded in S.Aust from around Adelaide (Southern Lofty region) but likely to occur in most towns.

Flowers Nov.-May.

A troublesome weed in gardens and cultivated land.

Subsp. **retzii** Kuekenenthal, *Pflanzenreich* 101:114 (1935). Stems 50-75 cm high; scales of tubers usually persisting into 2nd year; spikelets c. 2.5 mm wide; glumes 3.5-4 mm long, soon spreading and inrolling; nut maturing.—*C. retzii* Nees in Wight, *Contr.Bot.India* 82 (1834), nom.illegit.; *C. bifax* C. B. Clarke, *Kew Bull.* add.ser. 8:13 (1908).

Occurs in Africa, Asia, South America and Australia (N.T., Qld, N.S.W. and S.Aust.). Recorded in S.Aust. from the Lake Eyre and Gairdner-Torrens regions.

Flowers recorded April-Aug.

20. *C. rutilans* (C. B. Clarke) Maiden & Betche, *Census N.S.W.Pl.* 28 (1916). **Flat-sedge.** Perennial, with a short somewhat creeping rhizome; stems tufted (but less densely so than in *C. clarus*), 10-60 cm high, rather slender, trigonous, finely striate, smooth; leaves shorter or longer than the stems, rather rigid but grass-like, flat or complicate, 3-4 mm broad; bracts like the leaves, 3-4, the lower much longer than the inflorescence; umbel simple to subcompound, with 5-7 somewhat stout more or less recurved rays to 5 cm long; spikelets subdigitate, numerous in dense subglobular heads, brown, oblong-lanceolate, 6-10 mm long, 2.5-4 mm, compressed, 8-12-flowered, usually deciduous as a whole when ripe; rhachilla not or but slightly winged; glumes rather close together, soon spreading with acute and mucronate erect or recurved tips, keeled and several-nerved, 3-3.5 mm long; style 3-branched; nut oblong or somewhat oblanceolate, trigonous, angles rounded, sides nearly flat, about two-thirds as long as the glume.—*Mariscus rutilans* C. B. Clarke, *Kew Bull.* add.ser. 8:18 (1908).

Occurs in all Australian mainland States except W.Aust. Recorded in S.Aust. from the N.W., Lake Eyre, Eyre Pen., Flinders Ranges, Southern Lofty and S.E. regions.

Flowers Aug.-May.

Grows in wet places.

21. *C. sanguinolentus* Vahl, *Enum.Pl.* 2:351 (1805/6). **Flat-sedge.** Annual, to 40 cm high, sometimes dwarfed to 2-3 cm high; stems solitary or tufted, ascending to erect, almost setaceous in small plants, coarser in others, triquetrous, striate, smooth; leaves grass-like, variable, to 3 mm wide, shorter than the stems; bracts 3-4, spreading, at least the lower longer to much longer than the inflorescence; inflorescence capitate or umbellate, the rays few, short, to 4 cm long; spikelets clustered, mostly dark, oblong or oblong-lanceolate, 5-14 mm long, 1.5-2 mm wide, 8-20-flowered, strongly flattened; rhachilla not winged; glumes rather loose, with a broad green keel, the sides with a dark-red blotch and almost nerveless, c. 2 mm long; style-branches 2; nut orbicular-obovoid, laterally biconvex with an edge near the rhachilla, rather less than half the length of the glume.—*C. eragrostis* non Lam., sensu Vahl, *Enum.Pl.* 2:322 (1805/6).

Occurs in Africa, Asia and all Australian mainland States except N.T. Recorded in S.Aust. from the Southern Lofty regions.

Flowers Nov.-April.

Grows in wet places.

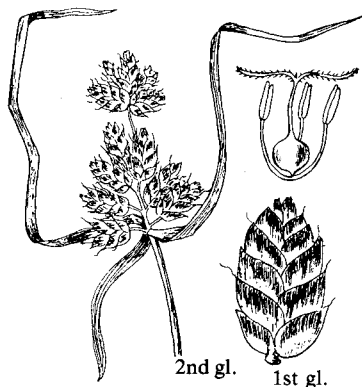


Fig. 235—*Cyperus sanguinolentus*.

22. *C. squarrosus* L., *Cent.2.Pl.* 6 (1756). **Bearded flat-sedge.** Annual, rarely above 15 cm high, sometimes only 5-6 cm, with strong curry odour when dry; stems solitary or tufted, sometimes relatively stout, acutely triquetrous but compressible, smooth; leaves up to as long as the stems; to 2 mm broad, often flaccid, flat or nearly so; bracts 2-5, at least some longer than the inflorescence, spreading; umbel simple, with up to 5 rays to 3 cm long or reduced to a single cluster; spikelets usually in dense ovate or oblong-ovate spikes, or when few nearly digitate, usually brightly coloured in various shades of brown or yellowish, linear or linear-oblong, flat, usually 4-12 mm long, 2-2.5 mm wide, 8-30-flowered, often deciduous as a whole at maturity; rhachilla not winged; glumes narrow, spreading and soon distinct from one another, with prominent spreading or recurved points or sharp awns, prominently several-nerved, c. 1.75 mm long; stamen 1; style-branches 3; nut obovoid-oblong to oblong, very obtuse, trigonous, sides flat or somewhat convex, c. 0.75 mm long and one-third to one-half the length of the glume.—*C. aristatus* Rottb., *Descr.Pl.rar.Progr.* 22 (1772).

Occurs in Africa, Asia, the Americas and all Australian mainland States. Recorded in S.Aust. from the N.W. and Lake Eyre regions.

Flowers March-July.

May grow in damp situations but also in relatively dry habitats.

23. *C. tenellus* L.f., *Suppl.* 103 (1781). **Tiny flat-sedge.** A small slender annual, to 8 cm high, with solitary or tufted setaceous stems; leaves setaceous, much shorter than the stems; bracts 1-2, setaceous, the lower appearing as though a continuation of the stem, shorter or longer than the spikelets; spikelets 1-4 in a single digitate cluster, 8-24-flowered, usually pallid or stained brown, oblong or lanceolate, 4-9 mm long, 2-2.5 mm wide; rhachilla not winged; glumes fairly dense but spreading, obtuse and practically pointless with several nerves and a prominent incurving keel, c. 1.75 mm long; style 3-branched; nut ellipsoid or somewhat obovoid, acutely triquetrous with concave sides, slightly more than half as long as the glume (1 mm long).



Fig. 236—*Cyperus tenellus*.

Occurs in all Australian States except N.T. Recorded in S.Aust. from the Eyre Pen., Southern Lofty, Kangaroo I. and S.E. regions.

Flowers Sept.-Jan.

Grows mainly on damp, especially sandy ground.

24. *C. vaginatus* R.Br., *Prod.Fl.Nov.Holl.* 213 (1810). **Flat-sedge.** Densely tufted perennial, with a short thick horizontal rhizome; stems 30-150 cm long, slender, erect, oblique or somewhat nodding, cylindrical, smooth, faintly striate; leaves reduced to membranous sheaths; bracts several, mostly 5-8, subequal, flat, 2-6 mm wide, acute, rigid, at least 5 cm and to 15 cm long, longer (usually at least twice) than the inflorescence; umbel simple or compound, rather dense or reduced to a compound head, the rays

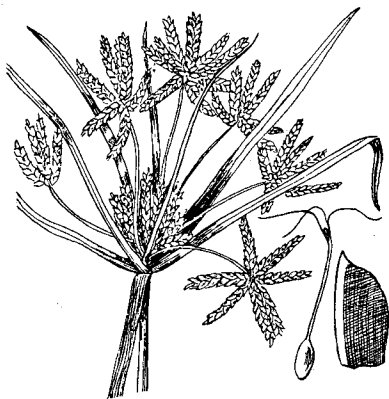


Fig. 237—*Cyperus vaginatus*.



Fig. 238—*Cyperus victoriensis*.

when present usually short, spikelets in digitate clusters, reddish-brown, chestnut, or pale-brown, 8-40-flowered, linear or oblong-linear, acute, 8-18 mm long, 2-2.75 mm wide; rhachilla not winged; glumes tightly packed, with slightly spreading tips, acute in profile, 3-nerved on the

back, sides nerveless, shining, c. 2 mm long; style 3-branched; nut ellipsoid or somewhat oblong, trigonous with narrow ribbed angles and convex sides, 0.75 mm long, rather less than half the length of the glume.

Occurs in all Australian mainland States. Recorded in S.Aust. from the N.W., Lake Eyre, Gairdner-Torrens, Flinders Ranges, Eastern, Eyre Pen., Yorke Pen., Northern and Southern Lofty and Kangaroo I. regions.

Flowers throughout the year except June-July.

Usually grows near creeks. Resembles *C. gymnocaulos*.

25. *C. victoriensis* C. B. Clarke, *Kew Bull.* add.ser. 8:12 (1908). **Flat-sedge.** Perennial, mostly 50-80 cm high, producing slender rhizomes bearing ellipsoid fibrous-coated tubers which give rise to new stems; stems relatively slender, somewhat trigonous at the top, the remainder cylindrical, the base thickened (an old tuber); leaves few, narrow, much shorter than the stems; bracts 2-3 at least, the lowest usually longer than the inflorescence and often suberect; umbel lax, often thrown to one side, usually simple, of few very slender rays; spikelets fairly close together but not clustered, usually 3-8 to each ray, spreading, rich-brown to pallid, linear, 2-3 cm long, c. 2 mm wide, many-flowered; rhachilla prominently winged; glumes appressed or slightly spreading, 3.5-4 mm long, in profile acute and straight on the back, keeled, not mucronate, the sides distinctly nerved; style 3-branched; nut narrowly obovoid, trigonous, almost half the length of the glume.

Occurs in all Australian mainland States. Recorded in S.Aust. from throughout the N.W., Lake Eyre and Murray regions.

Flowers Aug.-Dec. and April.

Generally follows inland watercourses.

7. ELEOCHARIS R.Br.

Prod.Fl.Nov.Holl. 224 (1810).

(From the Greek *helos*, *heleos*, a marsh and *chairō*, I delight in.)

Annual or perennial herbs, often stoloniferous, leafless; stems slender or stout, tufted or in a linear series along slender rhizomes; leaves represented by one or more sheaths at the base of the stems; spikelets solitary, terminal, erect, ebracteate, few- to many-flowered, without a bract continuing the stem; glumes imbricate all round the rhachilla; flowers bisexual; hypogynous bristles filiform or very slender, usually retrorsely barbellate, to 10 in number or absent; style 3-fid (sometimes 2-fid in other areas); stamens 1-3; nut crowned by the persistent enlarged base of the style. About 200 species, cosmopolitan. (S.T. Blake (1939) *Proc.R.Soc.Qld* 50 (12):88-132). Has been spelt *Heleocharis* by some early authors.

- | | |
|---|-------------------------|
| 1. Stems 4-12 mm wide, prominently transversely septate | <i>E. sphacelata</i> 7. |
| 1. Stems not more than 3 mm wide, not septate. | |
| 2. Leaf-sheaths hyaline, scarious or withered at the apex, not mucronate; hypogonous bristles much smaller than the nut or 0. | |
| 3. Nut with prominent vertical ribs and numerous fine transverse bars; stamens 3; capillary rhizomes usually present. | |
| 4. Plants not producing tubers; spikelets ovate to linear, often setting fruit; glumes 2.2-2 mm long | <i>E. pusilla</i> 6. |
| 4. Plants producing tubers; spikelets lanceolate to linear, rarely maturing; glumes 3 mm long or more | <i>E. atricha</i> 2. |
| 3. Nut with 3 rib-like angles, minutely striate or nearly smooth between; stamen 1; no rhizomes | <i>E. nigrescens</i> 4. |
| 2. Uppermost leaf-sheaths prominently thickened at its mouth; hypogonous bristles about as long as or longer than the nut. | |
| 5. Nut trigonous; leaf-sheath oblique at the mouth, usually not mucronate | <i>E. gracilis</i> 3. |

5. Nut biconvex; leaf-sheath truncate and mucronate at the top.
6. Rhizome creeping; margins of nut not thickened *E. acuta* 1.
6. No creeping rhizome; nut with rib-like margins *E. pallens* 5.

1. *E. acuta* R.Br., *Prod.Fl.Nov.Holl.* 224 (1810). **Common spike-rush.** Rhizome slender, woody, bearing tufts of stems at intervals; stems to 90 cm high, usually 1-2 mm wide or sometimes slightly more; mouth of uppermost sheath dark-brown, somewhat thickened, truncate or nearly so, prominently mucronate; spikelet linear, more or less acute, usually dark-brown or variegated with brown, 15-30 mm long; glumes ovate-lanceolate, subobtusate to very acute at the triangular apex, 3.5-4 mm long, 1-nerved; stamens 3; nut broadly obovate, plano-convex to biconvex, not thickened at the margins, c. 1.5-2 mm long, smooth; style-base ovate to triangular, laterally compressed; hypogonous bristles usually 7, longer than the nut.

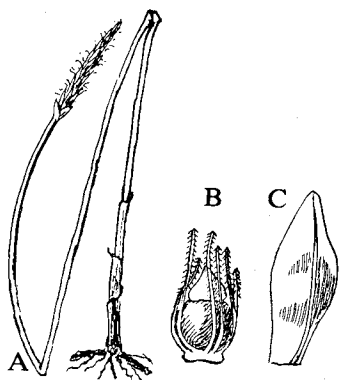


Fig. 239—*Eleocharis acuta*. A, habit; B, hypogynous bristles and nut; C, glume.

Occurs in New Zealand and all Australian States except N.T. Recorded in S.Aust. from the Lake Eyre, Gairdner-Torrens, Flinders Ranges, Eyre Pen., Murray, Southern Lofty and S.E. regions.

Recorded by Black (1943) from Kangaroo I.

Flowers mainly Sept.-April.

Grows in wet places.

2. *E. atricha* R.Br., *Prod.Fl.Nov.Holl.* 225 (1810). **Tuber spike-rush.** Stolons slender, bearing ovoid tunicated tubers c. 4 mm long; stems tufted, 3-40 cm high, 0.5-0.7 mm wide; leaf-sheaths membranous, oblique and somewhat scarious at the apex; spikelet lanceolate to linear, acute, chestnut brown, often proliferous, 10-20 mm long, 2-3 mm wide; glumes oblong or ovate-oblong, obtuse, membranous, narrowly keeled, sides stained reddish-brown and streaked with numerous linear red-brown glands, 3.5-5 mm long; stamens 3; nut obovate or oblong-obovate, constricted to a short neck immediately below apex, trigonous, sides convex, prominently vertically ribbed and with transverse ridges, 1.3-1.5 mm long; style-base pyramidal-deltoid or somewhat depressed, with a rather prominent annulus; hypogonous bristles 0.

Occurs in the eastern States and recorded from S.Aust. in the S.E. region from several localities near Penola.

Flowers only recorded in Jan.

3. *E. gracilis* R.Br., *Prod.Fl.Nov.Holl.* 224 (1810). **Slender spike-rush.** Rhizomes creeping; stems tufted or approximate, erect or curved, very slender, to c. 20 cm high; uppermost leaf-sheath dilated, thickened and discoloured at the prominently oblique mouth, which is sometimes also mucronate; spikelet ovoid to cylindrical, mostly 5-9 mm long; glumes ovate-oblong, rounded at the apex, c. 3.5 mm long, keeled; stamens 3; nut obovoid, trigonous and 3-ribbed, minutely punctulate to somewhat granular, c. 1.25 mm long; style-base pyramidal; hypogonous bristles 5-6 usually much overtopping the style-base.—*E. multicaulis* non (Sm.) Sm., sensu Benth., *Fl.Aust.* 7:295 (1878)—Bentham spelt the generic name *Heleocharis*.

Occurs in New Zealand, the eastern Australian States and S.Aust., Southern Lofty and Kangaroo I. regions.

Flowers Oct.-March, June.

Grows in damp places.

4. *E. nigrescens* (Nees) Steud., *Synops.Pl.glumac.* 2:77 (1855). Small tufted annual, with setaceous stems to 10 cm high; leaf-sheaths with a slightly dilated hyaline mouth, often

disintegrating; spikelets ovoid or oblong-elliptic, obtuse or retuse, keeled, c. 1 mm long; stamens 1; nut obovoid, triquetrous with rib-like angles and very finely reticulate or striate sides, c. 0.5 mm long; style-base depressed and exceedingly short, though nearly as wide as the nut; hypogynous bristles 0.—*Scirpidium nigrescens* Nees in Mart., *Fl. Bras.* 2(1):97 (1842).

Occurs in the Americas, Africa, Philippines, N.T. and Qld. (Recorded from S.Aust. by Black (1943) on the basis of material collected by Von Mueller on Mount Lofty in December, 1850; also recorded from S.Aust. by Kern in *Fl. Males.* 7(3):533, 1974.)

5. ***E. pallens*** (Benth.) S. T. Blake, *Proc. R. Soc. Qld* 49:154 (1938). **Pale spike-rush.** Rhizome very short or absent; stems densely tufted, slender, to 50 cm high; mouth of uppermost leaf-sheath thickened, discoloured, truncate and mucronate; spikelet linear-cylindrical, more or less acute, usually pale-coloured, 1.2–2 cm long, glumes ovate or oblong-ovate with an acutely triangular apex, faintly keeled, c. 3.3–5 mm long; stamens 3; nut broadly obovoid or suborbicular, biconvex or nearly plano-convex, the margins thickened and rib-like, the sides smooth or slightly wrinkled; style-base variable in shape and size, but always prominent; hypogynous bristles 7–10, usually stout, about as long as the nut.—*E. acuta* var. *pallens* Benth., *Fl. Aust.* 7:295 (1878).

Occurs in all Australian mainland States. Recorded in S.Aust. from the Lake Eyre, Gairdner-Torrens, and ?Southern Lofty regions.

Flowers May, Sept. and ?Oct.

Grows in dry areas. Fairly easily distinguishable from *E. acuta* by the complete absence of a creeping rhizome, the more slender stems, the thickened margins of the nut, the stouter bristles, and the more readily deciduous glumes.

6. ***E. pusilla*** R.Br., *Prod. Fl. Nov. Holl.* 225 (1810). **Small spike-rush.** Rhizomes capillary, bearing tufts of capillary stems mostly 2–10 cm long; top of leaf-sheaths hyaline or scarious, readily disintegrating; spikelet ovate to lanceolate, 2–7 mm long, few-flowered; glumes c. 2 mm long, ovate to obovate, obtuse or nearly so, membranous, keeled; stamens 3; nut narrowly obovoid, c. 0.75–1 mm long, obscurely trigonous, each face with 3–4 vertical ribs and finely transversely striate between; style-base very small, depressed; bristles few, very slender, small or absent.—*E. acicularis* non (L.) Roem. & Schult., sensu J. M. Black, *Fl. S. Aust.* 92 (1922).

Occurs in New Zealand and in all Australian States except W.Aust. and N.T. Recorded in S.Aust. from the Southern Lofty, Murray and S.E. regions.

Flowers Dec.-April.

Grows in wet places.

7. ***E. sphacelata*** R.Br., *Prod. Fl. Nov. Holl.* 224 (1810). **Tall spike-rush.** Rhizome creeping, very stout; stems close together, to 2 m high, 4–12 mm wide, hollow with transverse partitions; sheaths very thin, oblique at the orifice; spikelet cylindrical, 3–6 cm long; glumes flattish, obtuse, stiff, c. 8 mm long; nut compressed-globose, 2–2.5 mm long, finely pitted; style-base large, laterally flattened; bristles 6–10, reaching to beyond the top of the style-base.

Occurs in New Zealand and all Australian States except W.Aust. Recorded in S.Aust. from the Flinders Ranges, Southern Lofty, Murray, S.E. and Kangaroo I. regions.

Flowers Nov.-Feb.

Grows in marshes.

8. FIMBRISTYLIS Vahl

Enum. Pl. 2:285 (1805/6).

(Latin *fimbriae*, a fringe; *stylus*, style; the whole style is often fringed or ciliate.)

Tufted annuals or perennials; leaves all at the base of the stems, sometimes reduced to their sheaths; involucre bracts under the inflorescence similar to the leaves; spikelets several-flowered, solitary or in heads or in irregular umbel-like inflorescences; glumes imbricate all round the rhachilla, the lowest 1–4 empty; flowers bisexual; no hypogynous bristles; styles 2–3-

cleft, the branches 2 in our species, thickened at the base, but articulate on the ovary and wholly deciduous. About 300 species from tropical and warm countries, especially S.E. Asia and Australia. (Key adapted from Kern (1974) *Fl.Males.* 7).

1. Leaves ligulate (sheaths and blades separated from each other by a fringe of short hairs or a membranous projection).
2. Glumes hairy, at least in the apical part.
 3. Lower sheaths coriaceous, shining brown or castaneous; blades of the cauline leaves long, to 10 cm by 0.5-1.5 mm; involucre bracts usually shorter than the inflorescence; spikelets acute; glumes pubescent, ferrugineous *F. ferruginea* 3.
 3. Lower sheaths herbaceous, stramineous or ferrugineous; blades of the cauline leaves long, to 30 cm by 1.5-2 mm; lowest involucre bracts usually overtopping the inflorescence; spikelets obtusish; glumes densely tomentose, usually dark brown *F. sieberiana* 4.
2. Glumes glabrous *F. dichotoma* 2.
1. Leaves eligulate (sheaths on the inner side gradually passing into the blades).
 4. Base of the style fringed with a whorl of long pendent hairs covering at least the upper half of the nut *F. squarrosa* 5.
 4. Style-base glabrous or microscopically ciliate *F. aestivalis* 1.

1. *F. aestivalis* (Retz.) Vahl, *Enum. Pl.* 2:288 (1805/6). **Summer fringe-rush.** Tufted annual, to 20 cm high; stems filiform, smooth; leaves shorter than the stems, filiform, densely softly-hairy; ligule absent; inflorescence usually compound, loose, 1-7 cm long, with many spikelets; involucre bracts up to 6, similar to the leaves, the lower 1-2 somewhat shorter than the inflorescence or slightly overtopping it; spikelets solitary, ovoid or oblong-lanceolate, acute, densely many-flowered, greenish brown, 3-7 mm long, 1-1.5 mm broad; glumes c. 1.5 mm long, with an obscurely 3-nerved keel and prominent midnerve, mucronulate; stamen 1; style flat, sparsely ciliate at the top, glabrous or with a few short cilia at the base, 0.5-0.75 mm long; nut smooth or nearly so, shining, 0.5-0.7 mm long.—*Scirpus aestivalis* Retz., *Obs. Bot.* 4:12 (1786/7).

Occurs in Asia and Australia (all mainland States except N.T.) Recorded in S.Aust. from the Murray region.

Flowers March (1 record).

Grows in damp places.



Fig. 240—*Fimbristylis aestivalis*.



Fig. 241—*Fimbristylis dichotoma*.

2. ***F. dichotoma*** (L.) Vahl, *Enum.Pl.* 2:287 (1805/6). **Common fringe-rush.** Tufted slender perennial, with narrow leaves and bracts; leaves usually shorter than stems, ligulate; umbel loose, simple or compound, to 20 cm long; involucre bracts 2-5; spikelets solitary or aggregated, ovoid or oblong-ovoid, acute, usually 5-10 mm long and 2.5-3 mm broad; glumes with a poorly developed 3-nerved green keel, usually 2-3 mm long, appressed, concave; stamens 1-3; style flat, ciliate at least in the upper half, usually 2-2.5 mm long; nut with 5-9 prominent longitudinal ribs on each side and numerous transverse bars.—*Scirpus dichotomus* L., *Sp.Pl.* 50 (1753); *S. diphylla* Retz., *Obs.Bot.* 5:15 (1789); *F. diphylla* (Retz.) Vahl, *Enum.Pl.* 2:289 (1805/6).

Occurs in warm parts of the world, including all Australian mainland States. Recorded in S.Aust. from the Lake Eyre and Eastern regions.

Flowers Jan.-July.

Grows in, but not restricted to, damp places.

3. ***F. ferruginea*** (L.) Vahl, *Enum.Pl.* 2:291 (1805/6). Tufted often rigid though slender perennial, 20-60 cm high, glabrous or almost so; stems compressed; leaves few, usually less than half the stem, sometimes reduced to points; bracts 1-2, the lower shorter or a little longer than the inflorescence; rays short, sometimes 2-3 cm long; spikelets not numerous, lanceolate, usually c. 10 mm long; glumes appressed, concave and scarcely keeled, mucronate, ovate to oblong, dull brown, c. 4 mm long, minutely hoary-pubescent in the upper half; stamens 3; nut smooth, nearly 1.5 mm long.—*Scirpus ferrugineus* L., *Sp.Pl.* 50 (1753).

Occurs throughout warm areas. Considered by Black (1943) as likely to be found in S.Aust. as it had been collected near the border in N.T., and since discovered at Dalhousie Springs (Lake Eyre region).

4. ***F. sieberana*** Kunth, *Enum. Pl.* 2:237 (1837). Tufted perennial, cauline leaves well developed, to 35 cm long, sheaths pilose especially towards the top; inflorescence simple or compound; lowest involucre bracts usually distinctly longer than the inflorescence; spikelets obtusish; glumes very broadly ovate, usually dark castaneous, densely tomentose in the apical part, 3-4.5 mm long and wide; style c. 0.4 mm wide; nut broadly obovate or orbicular, distinctly stipitate, 1.25-1.5 mm long.

Occurs in Africa, Asia and Australia (Qld). Recorded from the Lake Eyre and Flinders Ranges regions, but these require investigation.

Flowers April-July.

5. ***F. squarrosa*** Vahl, *Enum.Pl.* 289 (1805/6). **Veiled fringe-rush.** Tufted, often spreading annual, to 15 cm high, usually white-pubescent though sometimes nearly glabrous; leaves filiform, usually shorter than the stem; involucre bracts leaf-like, shorter than or 1 or 2 longer than the inflorescence, the latter simple or compound, usually 1-2 cm long; spikelets pale brown or straw-coloured, 4-5 mm long; glumes 2 mm long or slightly less, with a prominent rigid 1-3-nerved keel running out into a prominent often spreading point; stamen usually 1; style ciliate, with a dense ring of relatively long white hairs at the base, hanging over the nut, nut smooth, slightly less than 1 mm long.—*F. propinqua* R.Br., *Prod.Fl.Nov.Holl.* 227 (1810).

Occurs in warm parts of the world.

Var. ***esquarrosa*** Makino, *Bot.Mag., Tokyo* 1903:47 (1903), is the variety occurring in Australia (all mainland States).

Recorded from along the Murray River.

Flowers Feb.-April.

Usually grows along the edges of rivers and lakes in temporarily inundated areas.

9. GAHNIA Forst. & Forst.f.

Char.Gen.Pl. 26 (1776).

(After Dr Henry Gahn, a Swedish botanist and friend of Linnaeus.)

Perennials, with short woody rhizomes, often forming large tussocks, often branching at the base, short or tall; stems leafy throughout; leaves terete and furrowed along the inside or with involute margins so as to appear terete, always ending in a long subulate point; bracts similar to the leaves, the upper ones gradually shorter; spikelets paniculate, rarely almost spicate, blackish or very dark brown in most species, with 1 bisexual flower and usually 1 male flower below it; glumes spirally imbricate, 3-many outer ones empty, the flowering glumes almost always thinner and smaller than the others; no hypogynous bristles; stamens 3-6, the filaments often lengthening and persistent so that the nut remains suspended by them after it has fallen from the spikelet; style slender, not thickened at the base, deciduous, 3-branched or 4-5-branched due to one or two of the branches being bifid; nut usually ovoid to obovoid, obscurely or not at all 3-angled, usually shining. About 30 species from Asia to Australasia and the Pacific Islands.

1. Spikelets about 4 in a simple spike-like inflorescence almost hidden by the leaves; dwarf plant *G. hystrix* 5.
1. Spikelets numerous, paniculate.
 2. Mature nut adhering to the persistent staminal filaments; culms stout, more than 120 cm high; glumes broadish, never long-acuminate; nut 2-4 mm long, shining.
 3. Glumes more than 12, all more or less obtuse, the lowermost without awns *G. clarkei* 2.
 3. Glumes up to 10, mostly acute, the lowermost with exerted awn-like midribs *G. sieberana* 8.
 2. Mature nut never held by the staminal filaments; culms usually less than 120 cm high; at least the outer glumes long-acuminate; nut 2 mm long or less, often dull or greyish.
 4. Spikelets 1-flowered, densely clustered.
 5. Lower leaf-like bracts of inflorescence coarsely scabrid, green or slightly tinted below *G. trifida* 9.
 5. Lower leaf-like bracts of inflorescence smooth or minutely scabrid, conspicuously reddish-purple below *G. filum* 4.
 4. Spikelets 2-flowered, more or less loosely arranged.
 6. Panicle ovate, broad *G. radula* 7.
 6. Panicle linear or linear-lanceolate.
 7. Leaves very scabrous at least in the upper half *G. deusta* 3.
 7. Leaves smooth.
 8. Leaves with straight tips; basal leaf-sheaths bearded at the mouth *G. lanigera* 6.
 8. Leaves with curved or coiled filiform tips; leaf-sheaths all glabrous *G. ancistrophylla* 1.

1. *G. ancistrophylla* Benth., *Fl.Aust.* 7:415 (1878). Stems slender, 30-80 cm high; leaves erect, filiform, smooth, with involute margins, nearly as long as the stem, with long fine hooked or curved not pungent points, the sheaths woolly at the orifice; panicle narrow, 15-40 cm long, interrupted; spikelets approximate but not clustered, 3-5 mm long, 2-flowered; lower glumes acuminate; stamens 3-4; nut obovoid, trigonous, 2 mm long.

Occurs in W.Aust. and S.Aust. (Eyre Pen., Southern Lofty and Murray regions).

Flowers throughout the year.

2. *G. clarkei* Benl, *Reprim nov.Spec.Regni veg.* 44:196 (1938). Tall saw-sedge. Stems stout, c. 2 m high; leaves inrolled, very scabrous, with long subulate points; panicle compound, oblong, 40-60 cm long, 3-6 cm broad, the branches erect or drooping; spikelets very numerous, at first

brown, finally black, not clustered, 2-flowered; empty glumes c. 10, obtuse, mucronate; flowering glumes small, obtuse; stamens 4-6; one or more of the style-branches bifid; nut ovoid, bright red, 3-4 mm long.—*G. psittacorum* non Labill., sensu J. M. Black, *Fl.S.Aust.* 169 (1943).

Occurs in the eastern Australian States and S.Aust. (Yorke Pen., Southern Lofty, Kangaroo I. and S.E. regions).

Flowers throughout the year.

3. *G. deusta* (R.Br.)Benth., *Fl.Aust.* 7:416 (1878). Rather stout, 30-50 cm high, more or less viscid, particularly the younger parts; leaves and bracts with woolly orifices to the sheaths (the wool is sometimes inconspicuous at the mouth of the sheaths); the blades rigid, with involute margins, scabrous downwards, becoming subulate and almost pungent-pointed in upper part; panicle narrow, 20-30 cm long, with erect distant branches; spikelets numerous in spike-like clusters with prominent secondary bracts; the primary bracts long, with black sheaths; glumes acuminate, the outer ones ciliate; stamens 5-6; nut whitish, somewhat obovoid, 2 mm long.—*Cladium deustum* R.Br., *Prod.Fl.Nov.Holl.* 237 (1810).

Occurs in Vic. and S.Aust. (Eyre Pen., Yorke Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions).

Flowers throughout the year.

4. *G. filum* (Labill.)F. Muell., *Key Syst. Vict.Plant.* 1:456 (1888). **Chaffy saw-sedge.** Stems tall, several noded, leafy; leaves long, involute, tapering into long subulate slightly scabrous points, passing into the bracts; panicle narrow, 20-35 cm long, 1-2 cm broad, each branch and spikelet subtended by a bract, the outer ones leaf-like, the inner ones passing into the glumes; spikelets pale-brown, 6-7 mm long, numerous and crowded, the branches thus spike-like; flowers 2; glumes acute; stamens 3; nut narrow-oblong, trigonous, 5 mm long, smooth.—*Schoenus filum* Labill., *Nov.Holl.Pl.Sp.* 1:18 (1805); *Cladium filum* (Labill.)R.Br., *Prod.Fl.Nov.Holl.* 237 (1810); *Baumea longifolia* Boeck., *Linnaea* 38:244 (1874).

Occurs in Vic., Tas. and S.Aust. (Eyre Pen., Yorke Pen., Southern Lofty and S.E. regions).

Flowers throughout the year.

5. *G. hystrix* J. M. Black, *Fl.S.Aust.* 678 (1922). Dwarf plant, 4-15 cm high; leaf-blades terete and more or less channelled, smooth, rigid, pungent-pointed, erect, 2-7 cm long, c. 0.5 mm wide, much exceeding and almost concealing the short stems and small spike-like panicle; spikelets sessile, about 4, 6-7 mm long, pale-coloured to brownish, partly enclosed in the sheaths of the leafy bracts, 1-2-flowered; flowering glumes about as long as the 3-4 outer empty ones; nut obovoid, white, 3 mm long; stamens 6.

Occurs only on Kangaroo I.

Flowers recorded Nov.-Jan. and April.

6. *G. lanigera* (R.Br.)Benth., *Fl.Aust.* 7:415 (1878). **Desert saw-sedge.** Slender plant, 10-30 cm high; leaves erect, straight, subulate, smooth, pungent-pointed, the brown sheaths woolly at the orifice; panicle slender; narrow, 4-12 cm long; spikelets not clustered, 3-4 mm long, 2-flowered; stamens 3; nut obovoid, whitish, c. 2 mm long.—*Cladium lanigerum* R.Br., *Prod.Fl.Nov.Holl.* 237 (1810).

Occurs in W.Aust., Vic., N.S.W. and S.Aust. (Eyre Pen., Yorke Pen., Northern and Southern Lofty, Murray and S.E. regions).

Flowers throughout the year.

7. *G. radula* (R.Br.)Benth., *Fl.Aust.* 7:417 (1878). **Thatch saw-sedge.** Stems stout, 50-100 cm high; leaves inrolled, with long subulate points, scabrous downwards; panicle 12-35 cm long, black, ovoid, with erect or erect-spreading branches; spikelets numerous, not clustered; stamens



Fig. 242—*Gahnia hystrix*.

3; nut obovoid, dark-coloured, trigonous.—*Cladium radula* R.Br., *Prod.Fl.Nov.Holl.* 237 (1810).

Occurs in the eastern Australian States, Tas. and S.Aust. (Southern Lofty, Murray and S.E. regions).

Flowers recorded March, July-Aug. and Oct-Nov.

8. *G. sieberana* Kunth, *Enum.Pl.* 2:332 (1837). **Red-fruit saw-sedge.** Perennial, with stiff erect cylindrical striate stems 1-2.5 m high; leaves long, stiff, filiform, with involute margins, scabrous with minute erect teeth, rising from close smooth sheaths, the uppermost leaf sometimes as long as the panicle; panicle compound, 25-65 cm long, 4-7 cm broad, dense, the primary branches erect-spreading, 5-10 cm long, the lower ones subtended by leafy bracts often as long as the branches; secondary branches 1-3 cm long; spikelets sessile, oblong, 2-flowered, at first yellowish-brown, later ovoid and almost black, 4-7 mm long; the outer empty glumes 4-6, the lowest minute, the others mucronate, keeled and faintly 3-nerved; flowering glumes 2, short, rounded, membranous, each with 4 stamens, but only the upper flower fertile; style-branches 3; nut ovoid, red, 3-4 mm long, bluntly 3-4-angled, finally pendulous from the spikelet by the filaments which are rather shorter than the nut or only equal to it in length.—*G. tetragonocarpa* Boeck., *Linnaea* 38:347 (1874).

Occurs in New Guinea, the eastern Australian States and S.Aust. (Southern Lofty, S.E. and Kangaroo I. regions).

Flowers throughout the year.

Grows in damp usually shady localities.

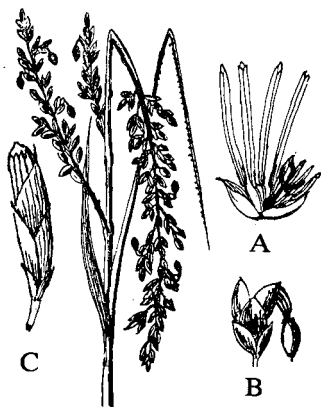


Fig. 243—*Gahnia sieberana*. A, 2 flowers; B, ripe spikelet with nut; C, young spikelet.



Fig. 244—*Gahnia trifida*.

9. *G. trifida* Labill., *Nov.Holl.Pl.Sp.* 1:89 (1805). **Cutting grass, coast saw-sedge.** Stems rigid, usually over 1 m high; leaves inrolled, with long subulate drooping points, very scabrous on the margins and lower face; panicle erect, narrow, interrupted, 20-40 cm long; spikelets brown, 4-5 mm long, in dense oblong spike-like clusters with the secondary bracts obscured, usually 1-flowered; glumes mucronate or shortly awned, scabrous on keel, the flowering glume as long as the others; stamens 4-5; nut obovoid-oblong, 2-2.5 mm long, turning black.

Occurs in all Australian States except N.T. and Qld. Recorded in S.Aust. from the Eyre Pen., Yorke Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers throughout the year.

Somewhat similar to *G. filum*, but distinguished by the leaf-blades being very rough to the touch, the shorter obovoid nut and the clusters of spikelets denser and with more conspicuous awns. In Vic. generally grows near the sea and sometimes in slightly saline ground, but in S. Aust. also widespread some distance from the sea.

10. GYMNOSCHOENUS Nees

Ann. Mag. nat. Hist. ser. 1, 6:47 (1841).

(Greek *gymnos*, naked; *schoinos*, a reed; alluding to the long naked stems.)

Spikelets 2-flowered, the upper one fertile, in terminal heads; glumes distichous; hypogynous bristles 3; nut on a short thick stipes. 2-6 species all Australian.

1. *G. sphaerocephalus* (R.Br.) Hook.f., *Fl. Tasm.* 2:83 (1858). **Button grass.** Coarse tussocky perennial; stems rigid, slender, over 1 m high; leaves all at and near the base of the stems, long, flat or channelled, 1-2 mm broad, with long, brown, broad, open sheaths; spikelets with 2 flowers, the lower male, the upper bisexual, numerous in a dense globular head, c. 12 mm diam., with a few broad short involucre bracts at base; glumes subdistichous; stamens 3; style 3-fid, enlarged and hispid towards the base; nut crowned by the narrow pubescent base of the style.—*Chaetospora sphaerocephala* R.Br., *Prod. Fl. Nov. Holl.* 233 (1810).

Occurs in all Australian States except W. Aust. and N.T. Recorded in S. Aust. only twice, from Mount Burr and Glencoe (S.E. region).

Flowers Nov. and March.

In Vic. grows in swampy depressions and along water courses.

11. LEPIDOSPERMA Labill.

Nov. Holl. Pl. Sp. 1:14 (1805).

(Greek *lepis*, *lepidos*, a scale; *sperma*, seed; alluding to the hypogynous scales surrounding the nut.)

Perennials usually with creeping rhizomes; stems tufted, cylindrical or biconvex or flat or with 1 side concave; leaves all basal, equitant, very similar to the stems in appearance or flatter, gradually acute; lowest bract subtending the panicle with an erect lamina similar in appearance to the leaves but short, the upper bracts under the primary panicle-branches more or less glume-like; spikelets sessile on the branches of a panicle which is sometimes reduced to a simple or branched spike, with 1 fertile flower and usually 1 or more male flowers below it; glumes spirally imbricate, 1 or more lower ones empty and 1 narrow empty one above the fertile flower; stamens usually 3; style 3-fid, its base much thickened but continuous with the ovary; nut ovoid or oblong or somewhat obovoid, obtusely trigonous, crowned by the whitish hemispherical or cushion-like persistent style-base; hypogynous scales about 6, usually small or narrow and hyaline when in flower, but enlarged, thickened, white and almost spongy under the nut, more or less ovate, acute or acuminate. About 40 species in South-East Asia and Australasia. (Key adapted from Willis (1970) *A handbook to plants in Victoria*).

1. Culms (and often the leaves) terete or angular or, if slightly flattened, then always less than 1.5 mm wide.

2. Axis of the short panicle very flexuose, finally deflexed; spikelets rather few, narrow and diverging widely; glumes obtuse or with a mucro

L. tortuosum 10.

2. Axis of panicle straight or slightly flexed; spikelets often numerous, more or less appressed to the panicle-branches; glumes acute to acuminate.

3. Panicle becoming blackish, condensed and spike-like; lowest bract rigid, almost pungent, very long, often as long as the inflorescence; all the glumes acuminate

L. carphoides 2.

3. Panicle brown or greyish, elongated or with spreading branches; lowest bract not rigid, usually much shorter than the inflorescence; glumes obtuse or acute, but never long-acuminate.
4. Leaves reduced to basal sheaths, with or without short capillary blades.
5. Culms 100-160 cm long, terete or obscurely furrowed; panicle of 1-several very slender dark spikes, the central manifestly longer; spikelets usually numerous (more than 12 per culm) and closely appressed to the axes. *L. urophorum* 11.
5. Culms less than 1 m long; panicle branches neither very long, slender and dark nor with closely-appressed spikelets *L. semiteres* 9.
4. Leaves normal, the blades well developed and conspicuous.
6. Leaf-blades terete or slightly flattened, with rounded edges; panicle branches short and appressed; hypogynous scales ciliate *L. canescens* 1.
6. Leaf-blades flat, with thin hyaline edges; panicle branches divergent, rather slender; hypogynous scales glabrous *L. semiteres* 9.
1. Culms and leaves distinctly flattened, the former nearly always (except in *L. lineare* which has only 2-5 spikelets) more than 1.5 mm wide.
7. Culms thick, soft, pithy and easily indented (sometimes hollowed), strongly biconvex, without sharp or cutting edges *L. longitudinale* 8.
7. Culms hard and solid, either biconvex or with sharp flattened edges and high central rib, or quite flat on one or both faces.
8. Panicle with densely aggregated spikelets, the lowest branch about equal to or shorter than its subtending bract.
9. Panicle short, congested and widely pyramidal, subtended by a broadish bract; culms usually more than 4 mm wide.
10. Culms usually 1 m long or more, more than 6 mm wide, with prominent central rib; hypogynous scales very broad, more or less one-third the length of nut. *L. gladiatum* 5.
10. Culms less than 1 m long, less than 6 mm wide, plano-convex; inner hypogynous scales long-acuminate, one-third to half the length of nut. *L. concavum* 3.
9. Panicle elongating; culms usually less than 4 mm wide.
11. Panicle blackish, interrupted, with the primary branches very short and spikelets in dense globoid clusters. *L. congestum* 4.
11. Panicle brown or greyish, not interrupted; spikelets not in globoid clusters.
12. Culms almost flat, often with resinous particles along edges; subtending bracts rather short and broad ... *L. viscidum* 12.
12. Culms often semi-terete; subtending bracts not very long-pointed *L. canescens* 1.
8. Panicle with loosely arranged spikelets, the lowest branch usually far exceeding its bract.
13. Panicle less than 4 cm long, scarcely higher than the leaves, with very few (usually 2-5) spikelets; culms and leaves less than 30 cm long and to 2 mm wide *L. lineare* 7.

13. Panicle more than 4 cm (usually more than 10 cm) long, exceeding the leaves; spikelets numerous; culms and leaves more than 30 cm long and more than 2 mm wide (except in reduced states of *L. viscidum*).
14. Nut strongly 3-costate; culms often bearing resinous particles along the edges *L. viscidum* 12.
14. Nut never costate; culms never resinous on margins *L. laterale* 6.

1. *L. canescens* Boeck., *Linnaea* 38:330 (1874). **Hoary rapier-sedge.** Stems slender, 25-100 cm high, cylindrical or nearly so, 1.25-1.75 mm wide, (stouter and stiffer than in *L. semiteres*); leaves cylindrical or somewhat biconvex and more or less grooved on the inner face, 1.5-2 mm wide, some or all reduced to the sheaths; panicle often reduced to a simple or branched spike, 3-6 cm long, the branches erect or nearly so; spikelets distinct, 5-7 mm long, more or less hoary; lower glumes more or less obtuse and mucronate, the upper more acute and acuminate; nut oblong-ellipsoid, 3.5 mm long, the style-base rather prominent; scales acuminate, with ciliate points, one-third to half as long as the nut.

Occurs in the eastern Australian States. Recorded in S.Aust. from the N.W., Eyre Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers throughout the year.

2. *L. carphoides* F. Muell. ex Benth., *Fl. Aust.* 7:400 (1878). **Black rapier-sedge.** Stems filiform, 20-40 cm high, rigid, grooved on one side otherwise cylindrical, 0.5-0.75 mm wide; leaves compressed or angular but similarly grooved; panicle black, 1.5-3 cm long, with a rhachis which is often zig-zag; the short partial spikes usually fan-shaped; bracts prominently awned; spikelets close together, 8-14 mm long; glumes acuminate or mucronate or shortly awned from just below the tip; nut oblong-ovoid, narrowly truncate, apiculate, 4 mm long, the style-base prominent; scales acuminate, with minutely ciliate points, about one-third to half as long as the nut.

Occurs in W.Aust., Vic. and S.Aust. (Eyre Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions).

Flowers throughout the year.

3. *L. concavum* R.Br., *Prod. Fl. Nov. Holl.* 234 (1810). **Sand-hill sword-sedge.** Stems solid, less than 6 mm wide, flat or concave on one side, to 60 cm high; leaves usually as long as the stems, 3-6 mm wide; panicle 4-7 cm long, with densely aggregated spikelets, the lowest branch about equal to or shorter than its subtending bract; glumes lanceolate to oblong, minutely pubescent; outer hypogynous scales narrow-oblong and shorter than the obovate-acuminate inner ones; nut shining, brown, at least twice as long as the scales.

Occurs in the eastern Australian States and Tas. Recorded in S.Aust. from the Eyre Pen., Yorke Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers throughout the year.

It generally grows on sand.

4. *L. congestum* R.Br. *Prod. Fl. Nov. Holl.* 234 (1810). **Clustered sword-sedge.** Stems 15-50 cm high, flat or slightly convex on one side, 3-5 mm broad, the edges acute, slightly scabrous; leaves similar, somewhat viscid at the margins of the sheaths; panicle narrow, dense, sometimes interrupted towards the base, 3-8 cm long, 1-2 cm broad; lowest bract half as long or sometimes



Fig. 245—*Lepidosperma carphoides*.

as long as panicle, all the bracts pungent-pointed, the upper ones long-awned; spikelets 4-5 mm long; lower glumes mucronate or shortly awned, the upper acutely acuminate; hypogynous scales broad, shortly pointed, the points ciliate, in all one-third to half as long as nut.

Occurs in Vic. and S.Aust. (Eyre Pen., Yorke Pen., Southern Lofty, Kangaroo I. and S.E. regions). Recorded by Black (1943) from the Murray Valley.

Flowers throughout the year.

5. *L. gladiatum* Labill., *Nov.Holl.Pl.Sp.* 1:15 (1805). **Sword rush, coast sword-sedge.** Stems rigid, over 1 m high, 8-20 mm broad, biconvex with sharp edges; leaves similar but flatter; panicle dense, thick, or the lower branches spreading, 4-15 cm long; spikelets pale-brown, 6-8 mm long, with or without a barren flower below the fertile one; scales thick, with ciliate points.

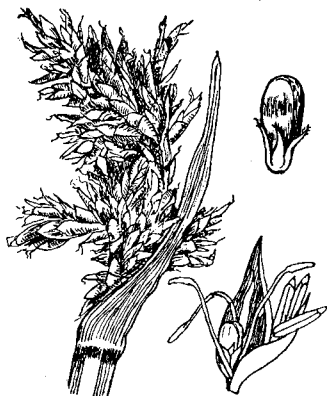


Fig. 246—*Lepidosperma gladiatum*.

Occurs in all Australian States except N.T. and Qld. Recorded in S.Aust. from the Eyre Pen., Yorke Pen., Southern Lofty, Kangaroo I. and S.E. regions.

Flowers throughout the year.

Grows along sandy coasts.

6. *L. laterale* R.Br., *Prod.Fl.Nov.Holl.* 234 (1810). **Variable sword-sedge.** Stems 40-100 cm high, 2-7 mm wide, flat or one side somewhat concave, with very sharp edges; leaves similar; panicle narrow, loose, 10-20 cm long; branches erect, the lowest whorl 5-12 cm long; lowest bract much shorter than the panicle; spikelets not clustered, 6-8 mm long, with 1 barren flower below the fertile; glumes acuminate; scales with long ciliate points and sometimes as long as or longer than the nut.

Occurs in New Zealand and all Australian States except W.Aust. and N.T. Recorded in S.Aust. from the Flinders Ranges, Eyre Pen., Yorke Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers throughout the year.

7. *L. lineare* R.Br., *Prod.Fl.Nov.Holl.* 235 (1810). **Little sword-sedge.** Stems 5-30 cm long, often quite short, 1-2 mm wide, biconvex though thin, the edges acute and finely scabrous; leaves rigid, sometimes very much longer than the stems when the latter are short, otherwise very similar; panicle oblong or linear, almost spike-like, 1.5-4 cm long, the lowest bract about as long or slightly longer; branches very short; spikelets very few, 5-7 mm long; glumes acuminate, the lower more or less prominently mucronate; nut ovoid, rather broad, 3-3.5 mm long; scales acuminate, glabrous, less than half as long as the nut.

Occurs in N.S.W., Vic., Tas. and S.Aust. (Flinders Ranges, Southern Lofty and S.E. regions).

Flowers throughout the year.

8. *L. longitudinale* Labill., *Nov.Holl.Pl.Sp.* 1:16 (1805). **Pithy sword-sedge.** Stems 1-2 m high, 4-8 mm broad, strongly biconvex with narrow acute edges; leaves similar; panicle 10-30 cm long, rather narrow, the lowest subtending bract 4-10 cm long; spikelets brown, 6-7 mm long, densely crowded along the erect branches, sometimes forming distinct clusters; scales ovate, acutely acuminate but not ciliate at tip, about one-quarter as long as the nut; nut ovoid-oblong, c. 3.5 mm long, the tip broadly conical.—*L. exaltatum* R.Br., *Prod.Fl.Nov.Holl.* 234 (1810).

Occurs in all Australian States except N.T. Recorded in S.Aust. from the Eyre Pen., Southern Lofty, Kangaroo I. and S.E. regions.

Flowers throughout the year.

9. *L. semiteres* F. Muell. ex Boeck., *Linnaea* 38:327 (1874). **Wire rapier-sedge.** Stems 30-100 cm high, c.1 mm wide, angular or strongly biconvex, with narrow acute more or less scabrous edges; leaves much flatter, flexible, 1-1.5 mm wide, striate, sometimes reduced to points; panicle reduced to a simple or usually branched spike, 2-6 cm long; bracts short; spikelets distinct from one another, 6-8 mm long; lower glumes obtuse, mucronate, upper more acute and acuminate; scales acuminate and glabrous at tip, nearly half as long as the nut; nut c.4.25 mm long.

Occurs in Vic. and S.Aust. (Flinders Ranges, according to Black, 1943, Northern and Southern Lofty, Murray, Kangaroo I. and S.E. regions).

Flowers throughout the year.

Resembles *Schoenus carsei*.

10. *L. tortuosum* F. Muell., *Fragm. Phyt. Aust.* 9:23 (1875). **Tortuous rapier-sedge.** Stems to 30 cm high, slender and often curved, 0.7-1 mm wide, biconvex with acute finely scabrous margins and also more or less striate or channelled; leaves biconvex, sometimes channelled, to 1.5 mm wide; bract shorter or longer than the inflorescence; panicle reduced to a short quasi-lateral spike with a flexuous rhachis; spikelets 2-5, sessile, close together, 6-8 mm long, often curved; lower glumes broadly emarginate and mucronate, the upper ones obtuse, the uppermost acuminate; scales thinner than in other species, acute, glabrous, rather less than half the length of the nut; nut 2.5 mm long with the style-base rather distinct.

Occurs in N.S.W., Vic. and Tas. A single specimen from Kangaroo I. was tentatively identified with this species by S. T. Blake.

11. *L. urophorum* Wakef., *Victorian Nat.* 70:76 (1953). **Tailed rapier-sedge.** This species occurs in the eastern Australian states and there is a single record from the N.W. region of S.Aust. Hj. Eichler, *Suppl.* 75 (1965), indicated that this record was probably erroneous. *L. urophorum* may be confused with *L. canescens*.

12. *L. viscidum* R.Br., *Prod. Fl. Nov. Holl.* 234 (1810). **Sticky sword-sedge.** More or less viscid; stems 20-50 cm high, thin and nearly flat or one side convex, with resinous very scabrous brown margins, 3-5 mm wide; leaves similar but slightly wider; panicle narrow, 4-15 cm long, the lowest bract variable in length, the upper ones shorter and not prominent, branches few, short, erect; spikelets 4-6 mm long, densely crowded all along the branches, forming spike-like oblong clusters; glumes obtuse, shortly mucronate; scales acute or very much acuminate, ciliate at summit, rather less than half as long as the nut; nut ovoid to ellipsoid, very obtuse, c.2-3 mm long.

Occurs in W.Aust., N.S.W., Vic. and S.Aust. (Eyre Pen., Yorke Pen., Flinders Ranges, Northern and Southern Lofty, Murray, Kangaroo I. and S.E. regions).

Flowers throughout the year.

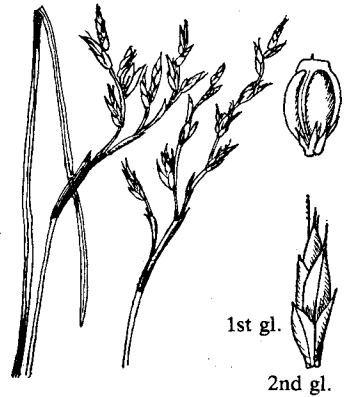


Fig. 247—*Lepidosperma semiteres*.



Fig. 248—*Lepidosperma viscidum*.

Fig. 249—*Lipocarpa microcephala*.

12. LIPOCARPHA R.Br. in Tuckey

Narr. Exped. Congo, app. 459 (1818).

(Greek *liparos*, shining; *karpheos*, chaff; alluding to the silvery glumes of some species.)

Annual or perennial glabrous herbs; stems tufted, leafy only at the base; inflorescence capitate; spikelets few, sessile, with many bisexual flowers; glumes imbricate all round the rachilla; style with 2 or 3 branches; nut enclosed in 2 hypogynous scales. About 15 species from America, Africa, Asia and Australia.

1. *L. microcephala* (R.Br.) Kunth, *Enum. Pl.* 2:268 (1837). **Button rush**. Annual, with slender stems and filiform basal leaves; involucre bracts like the leaves, usually 2, longer than the inflorescence; spikelets many-flowered, usually 3 together in a terminal cluster, ovoid, 3-4 mm long; glumes narrow, pointed; style-branches 2; nut compressed, linear-oblong, about as long as the hypogynous scales.—*Hypaeleptum microcephalum* R.Br., *Prod. Fl. Nov. Holl.* 220 (1810).

Occurs from South-East Asia to Australia in all mainland States. Recorded in S. Aust. from the Murray region.

Flowers March-April.

13. MACHAERINA Vahl

Enum. Pl. 2:238 (1805/6).

(Latin *machaira*, a sabre; -*ina*, resembling; referring to the shape of the leaves.)

Perennials, with rhizomes; stems tufted or along the rhizomes, pithy; leaves 2-ranked, usually more or less compressed, vertically flattened or angled or terete, smooth; bracts sheathing, with short blades; inflorescence a panicle; spikelets often clustered, ovate to lanceolate, compressed, 1- to several-flowered, often only 1 maturing; glumes distichous, keeled, the flowering glumes usually the largest; usually no hypogynous bristles; stamens usually 3; style thickened at the base, conical or pyramidal, often hairy, persistent in fruit, 3-branched; nut ovoid to oblong-ellipsoid, 3-angled or almost rounded, smooth or rugulose. About 45 species from America, Africa, Asia and especially Australia. S. T. Blake (1969) *Contrib. Qld Herb.* 8 treated these species under *Baumea*, but Koyama (1956) *Bot. Mag., Tokyo* 69:61 and Kern (1974) *Fl. Males.* ser.1, 7:690 placed *Baumea* in *Machaerina*.

1. Leaves and frequently also the stems transversely septate *M. articulata* 2.
1. Leaves and stems not septate, sometimes irregularly wrinkled or pitted.
2. Leaves and also the stems, at least in the upper part, prominently and equally 4-angled *M. tetragona* 8.
2. Leaves and usually also the stems terete or flattened.
3. Leaves and stems very flat and thin or concave-convex.
4. Spikelets rather scattered in a loose panicle with long slender branches *M. laxa* 6.
4. Spikelets rather densely congested in a short panicle *M. acuta* 1.
3. Leaves and stems terete or biconvex, or the leaves reduced to points.
5. Spikelets with 2 or more bisexual flowers, numerous in the panicle; glumes prominently ciliate; at least the basal leaves well-developed and long; stem-sheaths, if present, deeply split.

6. Nut 2.5-3.5 mm long, orange or reddish when ripe; spikelets in definite clusters *M. rubiginosa* 7.
 6. Nut 2-2.5 mm long, always whitish; spikelets approximate and rather evenly distributed along the branches *M. huttonii* 4.
 5. Spikelets with 1 bisexual flower, few or rather few in the inflorescence; glumes glabrous or nearly so, leaves usually absent; or if present then terete.
 7. Stems with a prominent longitudinal furrow, without nodes above the base; 1 or 2 leaves sometimes developed *M. gunnii* 3.
 7. Stems not furrowed, 2-3-noded; leaves always reduced to points *M. juncea* 5.

1. *M. acuta* (Labill.) Kern, *Acta Bot. Neerl.* 8:266 (1959). **Pale twig-rush.** Stems 15-30 cm high, flat with obtuse margins, c.1 mm wide, striate; leaves vertically flattened, similar or somewhat wider, all basal, acute; lowest sheathing bract usually shorter than the inflorescence, leaf-like, erect, and pungent; panicle short and rather dense, or to 8 cm and interrupted, with zig-zag branches; spikelets reddish-brown, 4-5 mm long, 1-flowered; glumes acute, smooth, glabrous or the margins sparsely ciliate, the upper ones somewhat spreading; nut ovoid, c. 2 mm long, with a large pyramidal or obtuse glabrous style-base, shortly stipitate, the middle part subglobose, finally blackish.—*Schoenus acutus* Labill., *Nov.Holl.Pl.Sp.* 1:18 (1805); *Cladium acutum* (Labill.)Poir., *Dict.Sci.Nat.* 9:344 (1817); *Baumea acuta* (Labill.)Palla, *Allg.Bot.Zeitschr.* 8:69 (1902); *Cladium schoenoides* R.Br., *Prod.Fl.Nov.Holl.* 237 (1810); *Machaerina schoenoides* (R.Br.) Koyama, *Bot.Mag., Tokyo* 69:65 (1956).

Occurs in N.S.W., Vic., Tas., ?W.Aust. and S.Aust. (Southern Lofly, Kangaroo I. and S.E. regions). Recorded by J. M. Black (1943) from Eyre Pen.

Flowers Oct.-April.

2. *M. articulata* (R.Br.) Koyama, *Bot.Mag., Tokyo* 69:62 (1956). **Jointed twig-rush.** Stems cylindrical, 1-2 m high, hollow, with more or less distinct transverse partitions; leaves basal, long, like the stems but the transverse partitions very prominent, the tips tapering and rather pungent; lowest bract rather similar but short; panicle loose, 20-40 cm long, 3-6 cm broad, drooping, interrupted; spikelets numerous, brown, 3-5-flowered, 1 flower fertile but not always the lowest; glumes acute to somewhat obtuse, glabrous, tuberculate-scabrous on the keel; nut trigonous, whitish, the style-base cushion-like.—*Cladium articulatum* R.Br., *Prod.Fl.Nov.Holl.* 237 (1810); *Baumea articulata* (R.Br.) S. T. Blake, *Contrib.Qld Herb.* 8:28 (1969).



Fig. 250—*Machaerina articulata*.



Fig. 251—*Machaerina gunnii*.

Occurs in New Guinea, New Zealand and the eastern Australian States. Recorded in S.Aust. from the Flinders Ranges, Southern Lofty, Kangaroo I. and S.E. regions.

Flowers mainly Oct.-March, but also at other times.

3. *M. gunnii* (Hook.f.) Kern, *Acta Bot. Neerl.* 8:266 (1959). **Slender twig-rush.** Stems slender, subterete, with a furrow and several fine striations running throughout their length, 30-100 cm high, 1-1.5 mm diam.; leaves all basal, similar to the stems with subulate tips but shorter, sometimes all reduced to sheaths; bracts very short, subulate; panicle narrow, 5-20 cm long, interrupted, not dense; branches erect, the lower ones distant; spikelets few on each branch, rather distant, brownish or greyish, 6-8 mm long, 1-flowered; glumes acute, spreading in fruit, the margin almost glabrous and, in the upper ones, becoming incurved upwards; nut obovoid, very turgid with 3 indistinct ribs, shining, brownish-red, 3-4 mm long, the style-base bluntly conical, glabrous.—*Cladium gunnii* Hook.f., *Fl. Tasm.* 2:95 (1858); *Baumea gunnii* (Hook.f.) S. T. Blake, *Contrib. Qld Herb.* 8:27 (1969).

Occurs in New Guinea, New Zealand, ?Qld, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty and Kangaroo I. regions).

Flowers throughout the year.

4. *M. huttonii* (Kirk) Koyama, *Bot. Mag., Tokyo* 69:64 (1956). Stems 1-2 m high, slender, subterete or compressed, at times somewhat pitted or indistinctly septate; stem-leaf with a short lamina or almost reduced to the sheath; bracts almost or quite reduced to their sheaths which are more or less membranous; panicle narrow, interrupted, 10-25 cm long, the branches usually in distant clusters; spikelets brown, 2-3-flowered, clustered, the clusters mostly close together giving the branches the appearance of spikes; glumes ciliate, the keels tubercular-scabrous; nut oblong or somewhat obovate, trigonous, shining, whitish, 2-2.25 mm long, style-base small, pyramidal, slightly pubescent, not much differentiated from the lower part.—*Cladium huttonii* Kirk, *Trans. N.Z. Inst.* 9:551 (1877); *Baumea huttonii* (Kirk) S. T. Blake, *Contrib. Qld Herb.* 8:29 (1969).

Occurs in New Zealand, Qld, ?N.S.W. and S.Aust. (?Flinders Ranges, Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Sept.-March.

5. *M. juncea* (R.Br.) Koyama, *Bot. Mag., Tokyo* 69:64 (1956). **Bare twig-rush.** Stems slender, terete, smooth, 30-100 cm high, 2-3-noded, 1 mm thick or slightly more; leaves all reduced to mucronate sheaths; lowest bract reduced to a mucronate sheath; panicle small, spike-like, 1-5 cm long or the lower branches somewhat distant; spikelets few, reddish-brown, densely crowded together, c. 5 mm long, with 1 bisexual flower; glumes scabrous on upper part of keel; nut obovoid, turgid, 3-ribbed, somewhat rugose, c. 3.5 mm long, the style-base small, pyramidal or depressed, pubescent.—*Cladium junceum* R.Br., *Prod. Fl. Nov. Holl.* 237 (1810); *Baumea juncea* (R.Br.) Palla, *Allg. Bot. Zeitschr.* 8:69 (1902).

Occurs in New Zealand and all Australian States except N.T. Recorded in S.Aust. from the Eyre Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers usually Sept.-April.

6. *M. laxa* (Nees) Koyama, *Bot. Mag., Tokyo* 69:64 (1956). **Lax twig-rush.** Stems 15-60 cm long, very flat with acute edges or one side somewhat concave, striate, 1-8 mm wide; leaves all basal, equitant and like the stems, acute;



Fig. 252—*Machaerina juncea*.

lowest bract and sometimes others with a short lamina like the leaves, panicle occupying about half the length of the plant, narrow, very loose and interrupted, 5-10 cm long or longer when the lower branches are distant; branches very slender, up to about 4 altogether in the axil of each bract, more or less divided; spikelets solitary, scattered, 1-2-flowered, 4-5 mm long; glumes acute or nearly so, puberulous or glabrous; nut obovoid, attenuate towards the base, obtusely trigonous with rather prominent narrow angles, 2-2.5 mm long; style-base prominent but rather short, depressed ovoid, somewhat hispid.—*Chapelliera laxa* Nees in Lehm., *Pl. Preiss.* 2:76 (1846); *Cladium laxum* (Nees) Benth., *Fl. Aust.* 7:405 (1878); *Cladium gracile* J. M. Black, *Trans. R. Soc. S. Aust.* 53:261 (1929); *Machaerina gracilis* (J. M. Black) Koyama, *Bot. Mag., Tokyo* 69:63 (1956).

Occurs in W. Aust., Vic. and S. Aust. (Southern Lofty and S.E. regions).

Flowers Oct.-May.

7. *M. rubiginosa* (Spreng.) Koyama, *J. Fac. Sci. Un. Tokyo* 3, 8:123 (1961). **Soft twig-rush.** Stems subterete or somewhat angled or compressed, 30-100 cm high, usually with 1 node above the base; basal leaves rather wider than the stems, more or less compressed, the stem-leaves with long sheaths and short channelled blades, all the blades pungent-pointed; bracts still shorter, the upper ones more or less membranous to scarious; panicle narrow, dense or interrupted and with a zig-zag rhachis, 5-15 cm long; spikelets reddish or brown, in erect ovoid clusters close together along the branches, 3-5-flowered; glumes acuminate, ciliate, nut trigonous, 2.5-3.5 mm long, smooth, finally orange or reddish, crowned by the depressed or shortly pyramidal pubescent style-base.—*Fuirena rubiginosa* Spreng., *Fl. Hal. Mant.* 29 (1807), *Melancranis rubiginosa* (Spreng.) Spreng., *Syst. Veg.* 1:236 (1824); *Baumea rubiginosa* (Spreng.) Boeck., *Linnaea* 38:241 (1874), *Cladium rubiginosum* (Spreng.) Domin, *Bibliotheca Bot.* 85:476 (1915); *Schoenus rubiginosus* Soland. ex Forst. f., *Fl. Insul. Aust. Prod.* 89 (1786), nom. nud.; *Cladium glomeratum* R. Br., *Prod. Fl. Nov. Holl.* 237 (1810); *Gahnia glomerata* (R. Br.) F. Muell., *Key Syst. Vict. Plant.* 1:455 (1888); not *Machaerina glomerata* (Gaud.) Koyama, *Bot. Mag., Tokyo* 69:63 (1956).

Occurs in Asia, New Zealand and Australia (all States). Recorded in S. Aust. from the Eyre Pen., Flinders Ranges, Northern and Southern Lofty, Kangaroo I. and S.E. regions.

Flowers throughout the year.



Fig. 253—*Machaerina rubiginosa*.

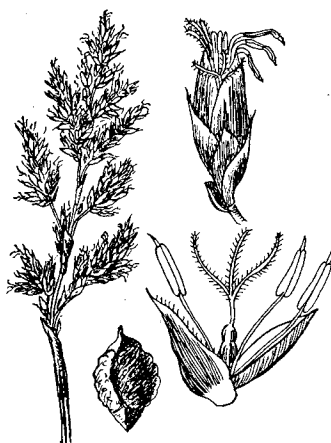


Fig. 254—*Machaerina tetragona*.

8. *M. tetragona* (Labill.) Koyama, *Bot. Mag., Tokyo* 69:66 (1956). **Square twig-rush.** Stems rather slender, 30-120 cm long, mostly 1.5-2 mm wide, prominently 4-angled in the upper part, often compressed or subterete in lower part; leaves all basal, much wider, acutely 4-angled, sometimes as long as the stem, the tip very acute, the inner ones often reduced to the sheath, lowest bract reduced to its sheath, the upper ones gradually glume-like; panicle 5-10 cm long, more or less oblong to lanceolate, rather dense but interrupted towards the base, with clusters of erect branches, spikelets reddish-brown, close together, 3-5.4 mm long, 1-flowered; glumes acute, more or less distinctly ciliate; nut turgid, indistinctly 3-ribbed, obovoid, acute or acuminate by reason of the small pyramidal glabrous style-base, the upper part irregularly rugose, the lower part finely punctate, c. 2 mm long. — *Lepidosperma tetragonum* Labill., *Nov. Holl. Pl. Sp.* 1:17 (1805); *Cladium tetragonum* (Labill.) J. M. Black, *Fl. S. Aust.* 95 (1922); *Baumea tetragona* (Labill.) S. T. Blake, *Contrib. Qld Herb.* 8:30 (1969); *Cladium tetraquetrum* Hook.f., *Fl. Tasm.* 2:95 (1858).

Occurs in all Australian States except W. Aust. and N.T. Recorded in S. Aust. from the Southern Lofty and Kangaroo I. regions.

Flowers throughout the year.

14. SCHOENUS L.

Sp. Pl. 42 (1753).

(Latin for some grass or reed, from Greek *schoinos*.)

Annuals or more often perennials, with woody usually creeping rhizomes; leaves sometimes reduced to mucronate sheaths; spikelets 2-5-flowered, solitary, capitate or paniculate, the uppermost flowers often male or sterile; rachilla prominently flexuose or zig-zag between the flowers; glumes distichous, the lower ones sometimes appearing somewhat spiral if the spikelets are crowded, some of the outer lower ones empty; stamens 3 in all but two of the S. Aust. species, 6 in some others; style-branches 3; hypogynous bristles present or absent, linear-lanceolate to filiform, smooth, scabrous or plumose, sometimes broad, thick and scale-like; nut more or less trigonous, often 3-ribbed, in some species falling with the hypogynous bristles attached, in others the latter remain attached to the base of the flower. About 80 species in Europe and South America (few), Asia and Australasia.

1. Spikelet 1, terminal, very rarely with a second sessile one inserted a little lower down the stem; spikelets 6 mm or more long.
2. Leaves reduced to their sheaths; hypogynous bristles represented by broad thick scales *S. tenuissimus* 17.
2. Leaves well developed; hypogynous bristles linear-lanceolate to filiform, or absent.
3. Stems usually much shorter than the leaves, never conspicuously longer, not more than 10 cm long; leaves basal; plant not floating.
4. Leaf-sheaths and glumes glabrous; hypogynous bristles absent; stems always very short.
5. Rhizome absent, stems often few together; leaves not hard and rigid; spikelets 6-9 mm long *S. discifer* 6.
5. Rhizomes creeping; plant mat-forming with densely tufted stems; leaves hard and rigid, often recurved; spikelets 9-11 mm long *S. breviculmis* 3.
4. Mouth of leaf-sheaths and margins of glumes densely ciliate; hypogynous bristles well developed, plumose; stems to c. 10 cm long *S. deformis* 5.

3. Stems elongated and floating, very slender with capillary leaves along them *S. fluitans* 7.
1. Spikelets more than 1 on each stem or, if 1 or 2 only on weak specimens, then less than 6 mm long or else hypogynous bristles not plumose throughout.
6. Spikelets all in a single capitate cluster, rarely reduced to 1 or 2.
7. Leaves much longer than culms which are hidden; plants forming dense mats *S. breviculmis* 3.
7. Leaves not usually exceeding the inflorescence; plants not matted.
8. Leaf-blades obsolete *S. subaphyllus* 16.
8. Leaf-blades present.
9. Annual, lacking a rhizome *S. nanus* 12.
9. Perennial, with a rhizome.
10. Spikelets 1-4; inflorescence bract usually much longer than the head *S. nitens* 13.
10. Spikelets exceeding 5; inflorescence bract often not conspicuously longer than inflorescence which appears terminal *S. kennyi* 9.
6. Spikelets not all in a single head.
11. Stems rush-like or long and wiry, the leaves and bracts very short in proportion to the size of the plant, often reduced almost to points, the sheaths tight, brown, shining; inflorescence a terminal raceme or panicle; bristles very small or 0; rhizome prominent, often creeping.
12. Glumes and leaf-sheaths glabrous; nut smooth; stems wiry and slender, 30-75 mm long *S. carsei* 4.
12. Glumes, at least when not over-mature, woolly-ciliate on the margins; nut rugose; stems c. 1 mm thick, rigid.
13. Leaf-sheaths glabrous at mouth, sometimes 1 present in upper part of the stem; scales at base of stem and rhizome purplish *S. brachyphyllus* 2.
13. Leaf-sheaths bearded at mouth, all basal; scales of rhizome yellowish-brown *S. racemosus* 14.
11. Stems slender or short, never wiry, leaves and bracts prominent; spikelets more or less clustered in the axils of leafy bracts; the latter, at least the lower ones, much longer than the clusters; bristles often well developed; rhizome inconspicuous.
14. Hypogynous bristles very short and few or absent.
15. Annuals; nut reticulate; spikelets pale or brownish to purplish.
16. Nuts minutely reticulate; leaf-sheaths and spikelets pale *S. latelaminatus* 10.
16. Nuts coarsely reticulate; leaf-sheaths and spikelets brownish to purplish *S. sculptus* 15.
15. Perennials; nut often smooth; spikelets blackish *S. tesquorum* 18.
14. Hypogynous bristles almost as long as to slightly longer than the nut.

17. Bristles scabrous; nut at most very shortly and abruptly apiculate-acuminate.
18. Spikelets 2.5-3 mm long, 1-3 to each bract; nut smooth; stems more or less prostrate, sometimes branched *S. maschalinus* 11.
18. Spikelets 4-6 mm long, few to several in the clusters, sometimes on rather long pedicels; stems more or less erect, not branched; nut more or less distinctly reticulate *S. apogon* 1.
17. Bristles plumose; nut ovate and prominently acuminate, coarsely and deeply reticulate *S. humilis* 8.

1. *S. apogon* Roem. & Schult., *Syst. Veg.* 2:77 (1817). **Common bogrush.** Tufted slender perennial, mostly 5-25 cm high; stems filiform, rather prominently striate, 1-3-noded below the inflorescence; both basal and stem-leaves setaceous or nearly so, as long as the stems in small plants, much shorter than they in taller plants; inflorescence consisting of 2-5 loose or dense, sessile or pedunculate clusters (usually dense and sessile) of spikelets, one terminal, the other axillary, distant or close together, sometimes compound; bracts like the leaves, the lower ones exceeding the spikelets, gradually shorter upwards, the topmost often inconspicuous; spikelets prominently pedicellate to sessile, brown to blackish, lanceolate or somewhat oblong, 4-7 mm long, rather compressed, usually 2-3-flowered; glumes glabrous, 3-4.5 mm long, often somewhat scabrid on the keel, bristles 6, capillary, scabrous, from a little shorter to a little longer than the nut; nut subglobose, 1 mm long, trigonous with rib-like angles, white, closely reticulate to almost smooth.—*Chaetospora imberbis* R.Br., *Prod. Fl. Nov. Holl.* 233 (1810); *Schoenus brownii* Hook.f., *Handb. N.Z. Fl.* 298 (1867).



Fig. 255—*Schoenus apogon*.

Occurs in New Zealand, ?New Guinea, and all Australian States except W.Aust. and N.T. Recorded in S.Aust. from the Eyre Pen., Flinders Ranges, Northern and Southern Lofty, Kangaroo Island and S.E. regions.

Flowers usually Oct.-Jan. but also winter.

2. *S. brachyphyllus* F. Muell. ex J. M. Black, *Fl. S. Aust.* ed. 1, 4:677 (1929). Rhizome horizontal, rather stout, it and also the base of the stems with glossy dark-brown scales; stems in a linear series, fairly close together, stiff, terete, c. 1 mm thick, 30-60 cm high including the inflorescence, with or without a node in the upper part; leaves mostly near base, rarely to 2.5 cm long, subulate, rigid, often reduced to a point, the sheaths rigid, glossy, dark-brown, glabrous; panicle 5-20 cm long, rather loose; lower sheathing bract to 2 cm long, the upper gradually shorter; spikelets on rather long clustered pedicels, lanceolate, 8-10 mm long, dark-purple, with 2 perfect flowers; glumes with ciliate margins, but the hairs wearing away with age, 3-4 empty; 3-5 hypogynous bristles very small, ciliate; nut pyriform, obtusely trigonous with obtusely ribbed angles, rugose, reddish.

Occurs only in S.Aust. (Southern Lofty and S.E. regions).



Fig. 256—*Schoenus brachyphyllus*.

Flowers Oct.-Jan. and May.

Resembles *S. brevifolius* R.Br., a species of the eastern States, W.Aust. and New Zealand, which has no hypogynous bristles and shorter bracts. These differences require investigation.

3. *S. breviculmis* Benth., *Fl.Aust.* 7:364 (1878). **Matted bog-rush.** Dwarf densely matted rhizomatous perennial; leaves often c. 5 cm high, dense, much longer than the culms which are hidden, flat or subulate, dilated at the base into a short open sheath, the outer leaves often reduced to linear acute scales, sheaths glabrous; inflorescence terminal, usually consisting of 1 or 2 spikelets subtended by 2-3 leaf-like floral bracts; spikelets lanceolate, c. 10 mm long, purplish-brown, 1-2-flowered; bracts glume-like, with a subulate point, glabrous; glumes narrow, thinly membranous, almost hyaline, with a prominent acute keel; staminal filaments less than 5 mm long; hypogynous bristles 0; nut obovoid to nearly globular, brown spotted with black, slightly 3-angled, tuberculate and often minutely hispid.—*S. tepperi* F. Muell., *Fragm.Phyt.Aust.* 11:106 (1881).

Occurs in W.Aust., Vic. (rare) and S.Aust. (Eyre Pen., Yorke Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions).

Flowers throughout the year.

4. *S. carsei* Cheesem., *Man.N.Z.Fl.* 781 (1906). Rhizome thick, short, scales dark-brown; stems densely tufted, very slender, 30-75 cm high, terete, nodeless; leaves mostly basal, the sheaths glabrous, dark-brown, the inner with subulate blades 1-4 cm long; inflorescence paniculate, panicle narrow, loose, 4-12 cm long, branches slender, clusters of 3-4 from the sheaths of the bracts; bracts shorter than the branches, like the leaves; spikelets linear-lanceolate, 5-9 mm long, mostly with 1 perfect flower; glumes glabrous, 3-6 lowest empty; no hypogynous bristles; nuts oblong-ovoid, obtusely trigonous, whitish, smooth.—*S. monocarpus* J. M. Black, *Trans.R.Soc.S.Aust.* 52:225 (1928); *Cladium monocarpum* (J. M. Black) J. M. Black, *Fl.S.Aust.* ed. 1, 4:678 (1929); *Tetraria monocarpa* (J. M. Black) J. M. Black, *Trans.R.Soc.S.Aust.* 58:168 (1934); *Machaerina monocarpa* (J. M. Black) Koyama, *Bot.Mag.,Tokyo* 69:64 (1956).

Occurs in New Zealand and S.Aust., but not apparently elsewhere in Australia. Recorded in S.Aust. from the Eyre Pen., Southern Lofty, Kangaroo I. and S.E. regions.

Flowers Oct.-April.

5. *S. deformis* (R.Br.)Poir., *Encycl.Suppl.* 2(1):251 (1811). Small densely tufted perennial, 4-10 cm high, with a branched creeping rhizome; stems rigid, setaceous, usually shorter than the leaves, leafy at the base only; leaves rigid, often curved, setaceous, concave-convex, usually longer than the stem, the hard dark-coloured sheaths densely bearded at the orifice; bracts leaf-like, at least the lower with a stiff filiform blade longer than the spikelet, recurved or erect; spikelet 1, terminal, erect or slightly oblique, dark-brown, lanceolate or linear-lanceolate, turgid, 3-4-flowered, 10-13 mm long; glumes stiff, 6-9 mm long, with ciliate margins, only the lowest empty; bristles 6, longer than the nut, densely plumose; nut obovoid, 2-5 mm long, trigonous, with the angles only obscurely ribbed, smooth.—*Chaetospora deformis* R.Br., *Prod.Fl.Nov.Holl.* 232 (1810).

Occurs in S.Aust. (Eyre Pen., Yorke Pen., Southern Lofty, Murray and S.E. regions) and W.Aust.

Flowers recorded Aug.-April.

6. *S. discifer* Tate, *Trans.R.Soc.S.Aust.* 12:131 (1889). Tiny tufted annual; stems to c. 1 cm high, frequently obsolete, always hidden by the leaves;

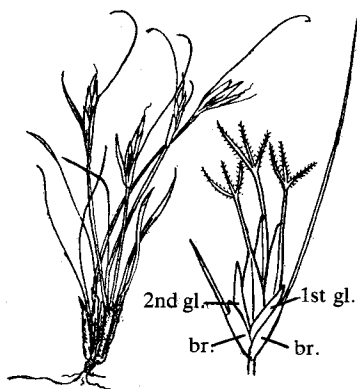


Fig. 257—*Schoenus deformis*.

leaves numerous, flat, firm, 1-4 cm long, glabrous; bracts similar, with rather glume-like bases, 1 to each spikelet and much exceeding it; spikelet usually 1 only, though sometimes there is a second one a short distance below, erect, lanceolate, pallid, 2-3-flowered, 6-8 mm long; glumes glabrous, the lowest fertile; bristles 0; nut ovoid, somewhat acuminate, 3-ribbed, smooth or minutely rugulose, pallid and spotted with black to quite blackish.

Occurs only in S.Aust. (Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Oct.-Nov.

7. *S. fluitans* Hook.f., *Fl. Tasm.* 2:81 (1858). **Floating bog-rush.** Plant floating; stems more or less elongated and branched, mostly 10-25 cm long, slender, flaccid, several-noded; leaves capillary, flaccid, 2-6 cm long; spikelets solitary, terminal on the stems or their branches rarely with 1 or 2 sessile ones lower down, linear to lanceolate, 9-11 mm long, compressed, 2-4-flowered, bract glume-like or that of the second or third spikelet with a long capillary lamina; glumes glabrous, membranous, subobtusate, the lowest alone empty or sometimes also fertile; hypogynous bristles 0; nut somewhat ellipsoid to obovoid-oblong, trigonous with prominent angles, reddish, smooth.

Occurs in New Zealand, Vic., Tas. and S.Aust. (Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Oct.-Feb.

Grows rooted in the bottom of usually still water, with the rest of the plant floating.

8. *S. humilis* Benth., *Fl. Aust.* 7:374 (1878). Weak annuals; stems tufted, to 10 cm long, rather thick, but soft and compressible; leaves shorter than the stem, narrow, flaccid; inflorescence racemose; bracts 2-8, the lower much longer than the inflorescence and leaf-like, the upper gradually shorter; spikelets sessile or nearly so, the upper ones solitary, the lower in groups of 2-4 in the axils of the bracts, somewhat reddish to dark-brown, linear-lanceolate, 5-7 mm long, acute, compressed, 3-5-flowered; glumes glabrous, only 1 empty; hypogynous bristles 6, usually rather longer than nut, plumose; nut broadly ovoid, acuminate, trigonous, prominently 3-ribbed, coarsely and deeply reticulate.

Known with certainty only from W.Aust. A specimen in the Tate Herbarium (AD) of unknown origin was assumed by Black (1943) to have originated in S.Aust., but no further records exist.

9. *S. kennyi* (F. M. Bail.) S. T. Blake, *Proc. R. Soc. Qld* 51:48 (1940). Stems tufted, from a hard woody rhizome, terete, c. 2 mm thick, 30-45 cm high; the uppermost basal leaf-sheath closed almost to the top or, if more deeply split, then tightly convolute, lamina always obvious, often rather well-developed, sheaths reddish-brown; culm usually 1-noded; inflorescence a terminal head of spikelets, globular, 8-10 mm diam., with sometimes a secondary much smaller one below it; involucre bracts 0; spikelets numerous, 2-4 mm long; glumes usually whitish, hyaline; stamens 6; nut 1-8 mm long, ellipsoid or somewhat obovoid, narrowed at the base, the apex somewhat pyramidal, rather prominently 3-ribbed, the sides brown or brownish and wrinkled.—*Arthrostylis kennyi* F. M. Bail., *Qld Agric. J.* 28:278 (1912).

Occurs in Qld, N.S.W. and S.Aust. (Gairdner-Torrens and Murray regions).

Flowers June, Sept., Nov.

10. *S. latelaminatus* Kuekenenthal, *Reprim nov. Spec. Regni veg.* 44:88 (1938). **Medusa bog-rush.** Pale green lax annual, 10-25 cm high; leaves and bracts flat, grass-like, usually with pale sheaths; culms without nodes below the inflorescence; spikelets pale, or occasionally the glumes reddish on the sides, 0.9-1.2 cm long, subsessile or pedicellate in clusters of usually 1-3 in the axils of the leafy bracts; hypogynous bristles minute or absent; nut (including the ribs) coarsely alveolate, 1.5-2.0 x 0.8-1.0 mm, pale becoming minutely dark-spotted or fuscous and more or less shining at maturity, subequally trigonous with convex sides and raised ribs in cross section broadly oblong or elliptical in outline, rather abruptly constricted to the prominent base (Description from Burbidge & Gray (1970) *Flora of the A.C.T.*)

Occurs in N.S.W., Vic., Tas. and S.Aust. (Kangaroo I. and S.E. regions).

Flowers Oct.-Jan.

Grows in temporarily wet places.

11. *S. maschalinus* Roem. & Schult., *Syst. Veg.* 2:77 (1817). **Leafy bog-rush.** Weak slender plant, sometimes shortly creeping; stems tufted, prostrate and ascending, to 20 cm long, filiform, sometimes branched, leafy throughout; leaves very narrow, flat, flaccid, mostly 1-3 cm long, 2-4 uppermost acting as bracts and gradually shorter, but usually longer than spikelets, somewhat curved; spikelets sessile or shortly pedicellate, 1-3 together in the upper axils, lanceolate, 2-3 mm long, 1-2-flowered; glumes glabrous, sometimes scabrous on the keel, 2 lowest empty; hypogynous bristles 6 or sometimes fewer, capillary, reddish to white, slightly shorter to slightly longer than the nut; nut ovoid or broadly ellipsoid, trigonous, the angles ribbed, white to brown, smooth.—*Chaetospora axillaris* R.Br., *Prod.Fl. Nov.Holl.* 233 (1810); *S. axillaris* (R.Br.)Poir., *Encycl.Suppl.* 2.(1):251 (1811), nom. illegit.; *Scirpus foliatus* Hook.f., *J.Bot., Lond.* 3:414 (1844); *Schoenus foliatus* (Hook.f.) S. T. Blake, *Proc.R.Soc.Qld* 51:48 (1940); *Schoenus subaxillaris* Kuekenenthal, *Reprium nov.Spec.Regni veg.* 44:89 (1938).

Occurs in the Philippines, New Guinea, New Zealand and all Australian States except N.T. Recorded in S.Aust. from the Southern Lofty, Kangaroo I. and S.E. regions.

Flowers Oct.-Feb.

Grows in damp places.

12. *S. nanus* (Nees)Benth., *Fl.Aust.* 7:364 (1878). **Tiny bog-rush.** Small tufted annual, 2-5 cm high; stems setaceous, nodeless; leaves basal, setaceous, shorter than the stems, with glabrous sheaths; bracts 2, at least the lower as long as or longer than the inflorescence and to 1.5 mm below the upper; spikelets 2-5, sessile or subsessile in the terminal cluster, rarely solitary, narrow-lanceolate, 4-7 mm long, 3-4-flowered, somewhat reddish-brown; glumes glabrous, 1-2 empty; hypogynous bristles capillary, whitish, ciliate at the base, remainder scabrous, longer than the nut; nut turbinate-pyriform, trigonous, with prominent narrow rib-like angles, sides convex, irregularly and coarsely reticulate, brownish.—*Chaetospora nana* Nees in Lehm., *Pl. Preiss.* 2:85 (1846).

Occurs in W.Aust., Vic. and S.Aust. (Eyre Pen., Yorke Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions).

Flowers June-Nov.

13. *S. nitens* (R.Br.) Poir., *Encycl.Suppl.* 2:252 (1811). **Shiny bog-rush.** Perennial, 3-25 cm high; rhizome creeping, rather slender but woody, with purplish-brown or black-brown shining scales; stems tufted or distant, slender, usually rigid, subterete, striate, with a few basal leaves; leaves shorter or longer than the stems, semi-terete, rigid, subterete, striate, with a few basal leaves; leaves shorter or longer than the stems, semi-terete, rigidly setaceous with glabrous shining sheaths; inflorescence appearing lateral, capitate, of usually less than 5 (up to 12) spikelets, sometimes 1 only; bract erect, sometimes very short, appearing as though a continuation of the stem, concave-convex, pungent, sometimes with a short divergent second one; spikelets usually rather obtuse, chestnut, shining, rather turgid, 1-3-flowered, 3-5 mm long; glumes glabrous, 2-3 mm long, coriaceous except for the hyaline margins, 2-3 lower ones empty and sometimes appearing somewhat spiral due to twisting of the spikelet; bristles 6, longer than the nut, densely plumose in the lower part, barbellate in the upper part; nut ellipsoid to obovoid, nearly 2 mm long, trigonous, the lateral angles indistinctly ribbed, the dorsal one usually obscure, smooth and shining, straw-coloured to brown.—*Chaetospora nitens* R.Br., *Prod.Fl. Nov.Holl.* 233 (1810); *Scirpus nitens* (R.Br.)Boeck., *Linnaea* 36:696 (1870).

Occurs in South America, New Guinea, New Zealand and all Australian States except N.T. Recorded in S.Aust. from the Yorke Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers Sept.-March.

Grows in brackish coastal swamps and on damp slopes.

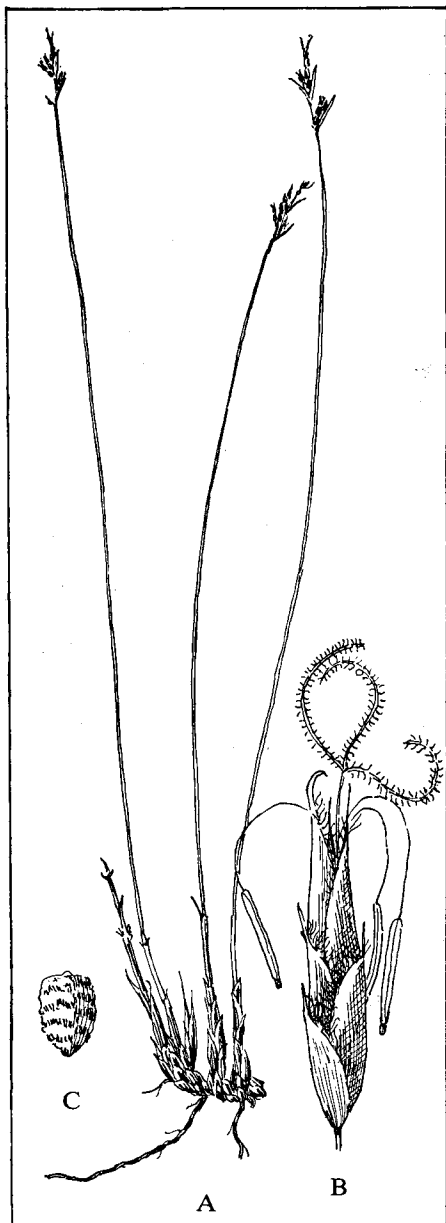


Fig. 258—*Schoenus racemosus*. A, habit, x $\frac{1}{2}$; B, spikelet, x 5; C, nut, x 5.

14. *S. racemosus* J. M. Black, *Trans. R. Soc. S. Aust.* 63:242 (1939). Rhizome horizontal, rather stout, its scales and those at the base of the stem shining, brown or yellowish-brown; stems terete, erect, 12-30 cm long, 1 mm thick, without nodes above the base; leaves all near the base, the dark brown inner sheaths densely bearded at the orifice, bearing short erect subulate blades to 15 mm long; panicle reduced almost to a raceme, 2-4 cm long, rather dense; bracts very short, subulate; spikelets pedicellate, solitary in the axils of the bracts or in groups of 2-4, lanceolate, acute, 9-13 mm long, with 1 fertile flower; glumes woolly-ciliate in the margins, 3-4 lowest empty; hypogynous bristles 0; nut white, obovoid, 2 mm long, obscurely trigonous, 3-ribbed, transversely rugose.

Occurs only in S. Aust. (Eyre Pen., Murray and S.E. regions).

Flowers Aug.-Dec.

15. *S. sculptus* (Nees) Boeck., *Linnaea* 38:286 (1874). **Gimlet bog-rush**. Small annual, 3-20 cm high, with tufted rather slender erect or curved compressible striate stems; leaves shorter than the stems, almost setaceous, channelled or the lower ones reduced to the sheaths; inflorescence racemose, to 7 cm long; bracts usually 2-4, distant, leaf-like, the lowest much longer than the raceme, the upper gradually shorter, each with 1-3 sessile or nearly sessile spikelets in its axil; spikelets lanceolate or linear-lanceolate, brownish to purplish, 5-7 mm long, 2-4 flowered; glumes glabrous but often with more or less scabrous keels, the first usually empty; bristles 2-3, minute or absent; nut pyriform-rostrate, attenuate at top and bottom, trigonous with prominently ribbed angles, whitish, coarsely reticulate and pitted.—*Elynanthus sculptus* Nees in Lehm., *Pl. Preiss.* 2:78 (1846).

Occurs in W. Aust., Vic. and S. Aust. (Eyre Pen., Southern Lofty and Kangaroo I. regions).

Flowers recorded July, Oct., Nov.

16. *S. subaphyllus* Kuekenenthal, *Reprim nov. Spec. Regni veg.* 44:7 (1938). **Desert bog-rush**. A densely tufted perennial, mostly 15-25 cm high, with oblique to erect, often flexuose, slender wiry stems; leaves reduced to glossy-brown basal sheaths, these deeply split or quite open, oblique and sometimes mucronate at the apex, ciliate on the margins; spikelets in a single dense obovoid or turbinate or hemispherical terminal head, sometimes slightly oblique, brown, ovoid to oblong-lanceolate, 5-6 mm long, not much flattened, usually 2-flowered, the upper flower often male; bracts 2-3, glume-like, short, or the lower one pointed and a little longer than the inflorescence; glumes with ciliate margins, 3 lower ones empty; stamens mostly 6; bristles 0; nut ellipsoid or oblong-ellipsoid, trigonous, c. 2 mm long, not at all ribbed except at the very base, smooth, rather tawny and spotted with red.—*S. aphyllus* Boeck., *Linnaea* 38:280 (1874), nom. illegit.

Occurs in all Australian mainland States except N.T. Recorded in S. Aust. from the Eyre Pen., Murray Valley and S.E. regions.

Flowers Sept.-May.

17. *S. tenuissimus* Benth., *Fl. Aust.* 7:365 (1878). **Slender bog-rush**. Rhizome creeping, horizontal, thick, with shining purplish-brown scales; stems close together but not in a linear series, slender, rigid, 10-20 cm high, c. 0.5 mm thick, angular-striate; leaves reduced to basal mucronate glabrous sheaths, oblique at the orifice; spikelet solitary, terminal, erect or nearly so, oblong-lanceolate, 10-11 mm long, with a short more or less glume-like bract and 1 fertile flower;



Fig. 259—*Schoenus sculptus*.

glumes dark purplish-brown, margins glabrous, 3-4 lowest empty; hypogynous scales 6, broad and thick; nut subglobular, wrinkled.—*Chaetospora tenuissima* F. Muell. ex Hook.f., *Fl. Tasm.* 2:81 (1858), nom. illegit.

Occurs in N.S.W., Vic., Tas. and S.Aust. (Southern Lofty region and by Black (1943) from the S.E.).

Flowers recorded Jan., June, Oct.

18. *S. tesquorum* J. M. Black, *Trans.R.Soc.S.Aust.* 46:565 (1922). **Bog-rush.** Rhizome very short; stems densely tufted, filiform, 15-40 cm long, 1-noded; basal leaves capillary, 6-18 cm long, stem-leaf to 5 cm long; inflorescence 1.5-2 cm long, composed of 2 rather distant clusters, with bracts rather coarser than the leaves and 1-4 cm long; spikelets shortly and unequally pedicellate, 1-3 in each cluster, linear-lanceolate, 2-flowered, c. 6 mm long, blackish; glumes glabrous, 2 lowest empty; hypogynous bristles none or minute; nut ellipsoid to obovoid, 3-ribbed, smooth, white.

Occurs in Vic. and S.Aust. (Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Oct.-Feb.



Fig. 260—*Schoenus tesquorum*.

15. SCIRPUS L.

Sp.Pl. 47 (1753).

(Latin for a reed or rush.)

Annual or perennial herbs, tufted or with stolons; stems erect or procumbent, sometimes floating, leaves with or without blades; ligule minute or 0; inflorescence terminal but often appearing lateral; involucre bracts

sometimes few and unequal but more frequently there is only 1 stiff erect bract continuing the stem; spikelets several-flowered, clustered, umbellate or rarely solitary; glumes spirally imbricate round the rhachilla, the lowest 1 or 2 sometimes empty; flowers bisexual; stamens 1-3; style slender throughout, deciduous, 2-3-fid; hypogynous bristles absent or, if present, usually slender, rarely flattened and plumose. Cosmopolitan with c. 200 species. (Key modified from Willis (1970) *A handbook to plants in Victoria*).

1. Small or weak (sometimes annual) plants normally less than 30 cm high; spikelets greenish to bright chestnut-brown; hypogynous bristles absent (except in the very rare *S. dissachanthus*).
2. Spikelets never simultaneously 4-10 mm long, in clusters, and with transversely rugose flattened nuts.
3. Nut flattened, smooth; style-branches 2; spikelet solitary (perennials usually growing in or near water).
4. Plant usually pale green; stems floating or erect; nut not thickened at the edges
4. Plant purplish (at least on leaf-sheaths and glumes); stems always floating; nut more or less thickened at the edges
3. Nut 3-angled or prominently convex on the back and style-branches 3, or else the spikelets mostly 2-several in a cluster.
5. Inflorescence with 1 sessile cluster of spikelets and usually also with 1 or 2 pedunculate clusters; nut narrow-oblong, broadest at the apex

S. fluitans 7.

S. productus 18.

S. hamulosus 9.

5. Inflorescence with spikelets either in a single cluster or solitary but proliferating in some species; nut never more than twice as long as wide.
6. Nut with a subconical basal foot, equally triquetrous with flat faces and subacute angles, becoming dark chestnut-brown, c. 0.7 mm long (more than half as long as the glume); glumes rigid, boat-shaped, incurved, usually reddish or purplish-brown on the wings..... *S. antarcticus* 2.
6. Nut without a foot or with only a more or less obsolete or discoid basal receptacle; plants further differing from the last in glume or nut characteristics.
7. Glumes broadly winged up to apex, the tips not or hardly spreading; nut trigonous or flattened; usually perennials.
8. Nut prominently and subequally 3-angled; stamen 1 *S. inundatus* 11.
8. Nut strongly convex on the back without any or with only a trace of a third angle; stamens 3..... *S. cernuus* 4.
7. Glumes strongly keeled, the apices usually acute and somewhat spreading; nut subglobose or about twice as long as wide; apparently annuals.
9. Stamens 3; nut more than 0.5 mm long, more or less globular, becoming blackish and shiny.
10. Nut beautifully ornamented with numerous longitudinal ribs and fine intervening transverse wrinkles or trabeculae; leaf-blades very short or obsolete..... *S. hookeranus* 10.
10. Nut minutely reticulated with a hexagonal cell-pattern, but without vertical ribs and intervening trabeculae; leaf-blades short but well developed. *S. platycarpus* 17.
9. Stamen 1; nut never as above.
11. Nut acutely triquetrous, finally becoming dull black; apices of glumes with acute points exceeding the wings and very divergent..... *S. stellatus* 19.
11. Nut not becoming black; apices of glumes not or hardly exceeding the wings and only slightly spreading.
12. Wings of glumes broad, hyaline, with conspicuous broad cells; nut silver-grey in colour, acutely triquetrous, the 3 faces concave..... *S. congruus* 5.
12. Wings of glumes with narrow-oblong cells, not hyaline; nut not as above.
13. Nut almost globular, pale grey, with raised surface-cells; spikelets normally 3-5 mm long, without reddish markings; culms more or less erect..... *S. victoriensis* 20.
13. Nut triquetrous, the 3 faces more or less flat, normally longer than wide, finally pale orange in colour; spikelets 2-3 mm long, usually marked with red or purple tinted; culms spreading..... *S. australiensis* 3.

2. Spikelets 5-10 mm long, a few together forming an apparently lateral cluster, the subtending bract very conspicuous (2-6 mm long); style-branches and stamens normally 2; nut dark, somewhat flattened, transversely ridged.
14. Spikelets more or less ovoid, some usually pedunculate, marked with reddish-brown; hypogynous bristles absent or much reduced; nut black; culm without any basal flower *S. lateriflorus* 13.
14. Spikelets cylindrical, all sessile, pale; hypogynous bristles present, well developed; nut brown; a solitary female flower present within a sheath at base of culm *S. dissachanthus* 6.
1. Stout perennials normally more than 30 cm high; spikelets wholly dull brown; hypogynous bristles present.
15. Involucral bracts 2 or more, flat and leaf-like; culm more or less triquetrous.
16. Style-branches 2; nut flattened; hypogynous bristles usually 2 *S. maritimus* 15.
16. Style-branches 3; nut 3-angled; hypogynous bristles 6 *S. fluviatilis* 8.
15. Involucral bracts 1, erect and appearing to be a continuation of the culm.
17. Culm triquetrous, with grass-like basal leaves *S. americanus* 1.
17. Culm cylindrical at least in lower part, with basal leaves reduced to sheaths.
18. Culm 2-4 mm wide, wiry, tough and hard; inflorescence a globular cluster *S. nodosus* 16.
18. Culm more than 4 mm wide, soft and easily flattened; inflorescence a loose branched panicle.
19. Hypogynous bristles scabrous, filiform; glumes more or less ciliate; bract grooved in front *S. lacustris* 12.
19. Hypogynous bristles plumose, rather broad; glumes glabrous or nearly so *S. litoralis* 14.
1. *S. americanus* Pers., *Syn.Pl.* 1:68 (1805). **American club-rush, sharp-leaf rush.** Rhizome creeping; stems rather stout, acutely triquetrous, 30-60 cm high; leaves basal, with long sheaths, shorter than the stems; spikelets 1-5, in an apparently lateral head, reddish-brown, ovoid, 6-10 mm long, the solitary involucral bract appearing as though a continuation of the stem c. 3-6 cm long; glumes mucronate from a more or less distinct notch, broad and thin; stamens 3; style-branches 3; nut obovoid, plano-convex, smooth, 3 mm long, and more than half as long as the glumes; hypogynous bristles shorter than the nut.—*S. pungens* Vahl, *Enum.Pl.* 2:255 (1805/6).

Occurs in the Americas, Europe, New Zealand, W.Aust., Vic. and S.Aust. (Lake Eyre, Gairdner-Torrens, Eyre Pen., Flinders Ranges, Northern and Southern Lofty, Murray and S.E. regions).

Flowers usually Oct.-March.

Grows in fresh and brackish water.

2. *S. antarcticus* L., *Mant.Alt.* 181 (1771). (**Coarse club-rush.** Small tufted plant, usually less than 8 cm, sometimes 1.5-2 cm high; stems setaceous; leaves usually well-developed, setaceous, shorter than the stems; bract 1, erect or spreading, longer than the spikelets; spikelets 1-6 in a single cluster, ovoid or oblong, prominently angular, 3-4 mm long, few-flowered; glumes boat-shaped, 2 mm long, incurved, rigid, keel unusually stout, green, the sides shining, each with 4-6 curved nerves and a bright-brown or



Fig. 261—*Scirpus antarcticus*.

purplish-brown patch; stamens 1-3; style-branches 3; nut ellipsoid to obovoid, subobtuse, regularly trigonous, angles subacute but not ribbed, sides nearly flat, finely granular, not shining, chestnut to brown; the short stipes white and prominent.

Occurs in South America, Africa, New Zealand and all Australian States except N.T. and ?Qld. Recorded in S.Aust. from the Flinders Ranges, Eyre Pen., Yorke Pen., Northern and Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers usually Sept.-Jan.

Grows in damp places.

3. *S. australiensis* (Maiden & Betche) S. T. Blake, *Proc.R.Soc.Qld* 51:179 (1940). **Club-rush.** A small slender annual, stems solitary or tufted, capillary; leaves 3-10 cm long; bract erect or spreading, mostly longer than the spikelets, and to 10 mm long, spikelets 1-4 but usually 2-3, pale or brownish, ovoid or oblong, angled, 2.5-4 mm long; glumes rather spreading, mucronate, with broad green keel, sides thin, hyaline, nerveless or each with one faint nerve; stamen 1; style 3-branched; nut somewhat variable in shape, ellipsoid or obovoid, trigonous, apex rounded, angles narrow, prominent, sometimes ribbed, sides somewhat concave to slightly convex, slightly granular, pallid to dark-grey, not shining, about half as long as the glume, slightly above 0.5 mm long, but distinctly narrower.—*S. cernuus* var. *australiensis* Maiden & Betche, *Proc.Linn.Soc.N.S.W.* 33:316 (1908).

Occurs in the eastern Australian States and S.Aust. (N.W., Lake Eyre, Eastern, Southern Lofty and Kangaroo I. regions).

Flowers throughout the year except May-June.

Grows in damp places especially near the edge of water.

4. *S. cernuus* Vahl, *Enum.Pl.* 2:245 (1805/6). **Nodding club-rush.** Small tufted plant, rarely more than 10 cm high, and often much less, sometimes with a short slender rhizome; stems setaceous, erect or more or less curved, usually rigid; leaves usually reduced to a small point, rarely longer and setaceous; involucre bract 1, as though a continuation of the stem but somewhat glume-like at the base, mostly 3-7 mm long, shorter or longer than spikelet; spikelet nearly always solitary, oblique, broadly ovoid, 2.5-3 mm long, usually chestnut and more or less shining, not angular; glumes tightly appressed, suborbicular, concave and indistinctly keeled; stamens 3; style-branches 3; nut orbicular-obovate, compressedly trigonous, the dorsal angle faint, finely reticulate and somewhat granular, brown, nearly 1 mm long and about half as long as the glume.—*Isolepis cernua* (Vahl) Roem.&Schult., *Syst.Veg.* 2:106 (1817); *S. arenarius* non Boeck., sensu Benth., *Fl. Aust.* 7:325 (1878); *Isolepis riparia* R.Br., *Prod.Fl.Nov. Holl.* 222 (1810); *S. riparius* (R.Br.) Poir., *Encycl. Suppl.* 5:103 (1817).

Occurs in most parts of the world, including all Australian States except N.T. Recorded in S.Aust. from the Flinders Ranges, Eastern, Eyre Pen., Yorke Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers throughout the year, especially early summer.

Grows in damp places, especially near the sea.

5. *S. congruus* (Nees) S. T. Blake, *Proc.R.Soc.Qld* 48:90 (1937). **Club-rush.** Very slender annual, mostly not higher than 5 cm; stems solitary or tufted, capillary; leaf-blades about as wide as the stems, to 2 cm long or reduced to a point; bract suberect or spreading, 3-10 mm long, glume-like at the base; spikelets up to 5 but usually 2-3, pallid or pale-brown, oblong or ovoid, very obtuse, angular, mostly 3-4 mm long, rather few-flowered; glumes not densely packed, 1.5 mm long, the stout green keel running out into an acute erect or spreading point, the sides very thin but firm, nerveless, hyaline or stained with brown; stamen 1; style branches 3; nut orbicular-obovoid, truncate, or emarginate at the apex, sharply triquetrous, the sides concave, minutely reticulate, silver-grey, about one-third as long as glume, not shining, 0.5 mm long and almost as wide.—*Isolepis congrua* Nees in Lehm., *Pl.Preiss.* 2:75 (1846); *S. kochii* Maiden & Betche, *Proc.Linn.Soc.N.S.W.* 33:318 (1908).

Occurs in W.Aust., ?N.S.W., Vic and S.Aust. (Eyre Pen., Flinders Ranges, Eastern and Southern Lofty regions).

Flowers recorded July, Sept., Oct.

6. *S. dissachanthus* S. T. Blake, *Victorian Nat.* 63:116 (1946). **Club-rush.** Annual, to 30 cm high; culm tufted, straight or curved, compressed-trigonal, closely striate-ribbed, glabrous, less than 1 mm thick, sometimes with a single node shortly above the base; leaves usually reduced to sheaths, lamina rarely to 6 cm long and setaceous; bract 1, erect, to 9.5 cm long, spikelets 1-3 in a cluster, sessile, yellowish or greenish-yellow, oblong, cylindrical, obtuse, usually 7-10 mm long, many-flowered; glumes closely appressed, cuspidulate, very thinly membranous with broadly hyaline sides, broadly but shallowly keeled in upper part; stamens 2; style 2-fid; hypogynous bristles 6, minutely scabrous or smooth, as long as or shorter than the nut; nut dark brown, suborbicular or somewhat obovoid, unequally biconvex, closely and prominently undulate-ridged, 1.25-1.35 mm long.

Occurs in all mainland Australian States except N.S.W. Recorded rarely in S.Aust. from the N.W. and Lake Eyre regions.

Flowers March-April (2 records).

7. *S. fluitans* L., *Sp.Pl.* 48 (1753). **Floating club-rush.** Stems filiform, weak, creeping or floating, often many-noded; leaves very slender, often capillary, alternate, with their sheaths pale-green; spikelet solitary, terminal on a long peduncle rising from the tuft of leaves, ovoid 3-5 mm long; glumes 6-10, nearly all containing bisexual flowers; stamens usually 2; style-branches 2; nut broad obovoid to suborbicular, whitish to brown, 1.5 mm long, smooth, plano-convex to somewhat biconvex, thin throughout.—*Isolepis fluitans* (L.) R.Br., *Prod.Fl.Nov.Holl.* 221 (1810).

Occurs in Europe, Africa, Asia and in all Australian States except N.T. and Qld. Recorded in S.Aust. from the Eyre Pen., Southern Lofty, Kangaroo I. and S.E. regions.

Flowers Oct.-Feb.

On drier ground the species forms small tufts of short, often erect stems with the leaves apparently clustered at their bases, and the lower glume frequently produced as a very short leafy bract. At first sight this state looks very different from the floating form, but under suitable conditions all intermediate states can be seen, many indeed on the same plant. This short, sometimes minute, form is very common and is occasionally found in swamps.

8. *S. fluviatilis* (Torr.) A. Gray, *Man.Bot.N.U.S.* 527 (1848). **Marsh club-rush.** Rhizome creeping, often bearing hard ovoid tubers; stems triquetrous, 1-2 m high; leafy throughout; leaves often c. 50 cm long, 7-11 mm broad, grass-like; involucre bracts up to as many as the rays, much longer than the inflorescence, similar to the leaves, unequal; inflorescence umbel-like, with 6-9 rays; spikelets dull red-brown, 1.2-5 cm long, ovoid or cylindrical; glumes notched or jagged, the keel ending in a recurved mucro; stamens 3; style-branches 3; hypogynous bristles 6, variable in length, shorter than the nut; nut obovoid-trigonal, 3-4 mm long.—*S. maritimus* L. var. *fluviatilis* Torr., *Ann.Lyceum nat.Hist.N.Y.* 3:324 (1836).

Occurs in North America, Europe, Asia, New Zealand and the eastern Australian States. Recorded in S.Aust. from the Northern and Southern Lofty regions (Torrens Gorge and Nuriootpa).

Flowers Jan. (2 records).

*9. *S. hamulosus* (Bieb.) Steven, *Mem.Soc.Nat.Moscou* 5:356 (1814). **Club-rush.** Small annual, 4-8 cm high, curry-scented when dry; stems sometimes with a node and a leaf-sheath in the middle part; leaf-blades short, setaceous; bracts 2-3, setaceous, 1 or 2 longer than the inflorescence; inflorescence of 1-3 clusters of 2 to several spikelets, one cluster terminal, sessile, the others on short peduncles to 1 cm long; spikelets ovoid, pale-greenish, c. 3 mm long; glumes oblong, acuminate, c. 1.5 mm long, with short spreading points, prominently 5-nerved; stamen 1; style-branches 3; nut narrow-oblong, slightly expanded at the very obtuse apex, trigonal, angles not ribbed, sides flat, somewhat chestnut-brown.—*Cyperus hamulosus* Bieb., *Fl.Taur.-Caucas.* 1:35 (1808).

Native to Europe and Asia. Naturalised in Vic., ?N.T. and S.Aust. (Lake Eyre and Murray regions).

Flowers Jan.-May.

10. *S. hookeranus* (Boeck.) S. T. Blake, *Contr. Qld Herb.* 8:19 (1969). **Club-rush.** Small tufted annual, to 12 cm high; stems setaceous; leaf-blades to 3 mm long, filiform, more often absent; bract shorter or longer than the cluster, somewhat glume-like; spikelets 1-2 in a cluster, oblique, ovoid to oblong, angular, several-flowered, 2.5-3.5 mm long; glumes c. 1.5 mm long, 5-7-nerved, with green keel, the lateral nerves faint, the tip spreading; stamens 3; style-branches 3; nut brown to black, glistening, nearly globular, about one-third as long as glume, with prominent longitudinal striations and numerous fine transverse bars.—*Isolepis hookerana* Boeck., *Flora* 41:418 (1858), *S. calocarpus* S. T. Blake, *Proc.R.Soc.Qld* 51:179 (1940).

Occurs in all Australian States except N.T. Recorded in S.Aust. from the Eyre Pen., Yorke Pen., Flinders Ranges, Northern and Southern Lofty, Kangaroo I. and S.E. regions.

Flowers usually Sept.-Feb.

11. *S. inundatus* (R.Br.) Poir., *Encycl.* 13:103 (1817). **Swamp club-rush.** Rather variable perennial; stems tufted, sometimes coarser than in most species, rigid or flaccid, 10-30 cm high but S.Aust. specimens usually much smaller, sometimes proliferous; leaf-blades usually reduced to a mere point, sometimes more developed; bract usually longer than the spikelets, erect or oblique; spikelets mostly 3-12 in a cluster, ovoid to oblong, 4-6 mm long, somewhat angled, usually stained with dark purplish-brown; glumes with green keel and scarious 3-4-nerved sides, slightly mucronate, the tip erect; stamen 1; style-branches 3; nut obovate or elliptic in outline, rounded and shortly mucronate at the apex, triquetrous, slightly compressed, angles narrowly ribbed, sides convex, finely reticulate, pallid to pale straw-coloured, shining, c. 1 mm long and more than half as long as the glume.—*Isolepis inundata* R.Br., *Prod.Fl.Nov.Holl.* 222 (1810).

Occurs in South America, South-East Asia, New Zealand and all Australian States except W.Aust. and N.T. Recorded in S.Aust. from the Flinders Ranges, Eyre Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers usually Oct.-April.

12. *S. lacustris* L., *Sp.Pl.* 48 (1753). **River club-rush.** Rhizome creeping; stems cylindrical, stout, tall and to 2 m or more high; leaves almost reduced to the sheathing bases, rarely the uppermost sheath with a short lamina; bract solitary, erect, shorter or longer than the inflorescence, rigid, concavo-convex; inflorescence umbel-like, 2-7 cm long and about the same breadth, loose, the rays simple or divided, the lower ones usually spreading or decurved; spikelets several, ovoid or oblong-ovoid, brown, 5-10 mm long; glumes numerous, keeled, mucronate, more or less notched, more or less ciliate on the margins; hypogynous bristles 5-6, slender, about as long as the nut; stamens 3; style-branches 2; nut broadly-obovoid, plano-convex, smooth, 2 mm long and more than half as long as the glume.—*S. validus* Vahl, *Enum.Pl.* 2:268 (1805/6); *Schoenoplectus lacustris* (L.) Palla, *Bot.Jb.* 10:299 (1889).

Cosmopolitan. Occurs in all Australian States except N.T. Recorded in S.Aust from the Lake Eyre, Flinders Ranges, Eyre Pen., Northern and Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers Nov.-April.

The Australian plants have been attributed to subsp.

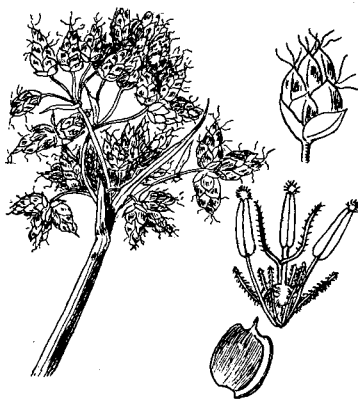


Fig. 262—*Scirpus lacustris*.

validus (Vahl) Koyama, *Canad. J. Bot.* 40:927 (1962). There is a strong superficial similarity with *S. litoralis* which lacks the distinct ciliation of the glumes and has broad hypogynous scales.

13. *S. lateriflorus* Gmel., *Syst. Nat.* 2:127 (1791). **Soft club-rush.** Annuals; stems slender, densely tufted, obtusangular to subterete, with a single node above the base, to 25 cm high; leaves reduced to 2-3 sheaths, often with a rudimentary blade; inflorescence apparently lateral, with usually 4-10 spikelets, sometimes capitate, usually with one of the rays developed and at least 1 cm long; involucre bracts 1-2, the lower similar to and continuous with the stem, to 15 cm long; the second shorter; spikelets oblong-ovoid, angular, densely many-flowered, usually 5-10 mm long; glumes membranous, distinctly keeled nearly throughout, ovate, straw-coloured to ferruginous, often reddish, 2-2.5 mm long, sides nerveless, bristles 0; stamens 3; style-branches 3; nut compressed-trigonal, obovoid, shortly apiculate, conspicuously transversely wavy-ridged, black, 1-1.2 mm long.

Occurs in Asia and all Australian States except Tas. Recorded by Willis (*A handbook to plants in Victoria* 1:227, 1970) from S.Aust., but no material in AD.

14. *S. litoralis* Schrad., *Fl. Germ.* 1:142 (1806). Perennial; rhizome creeping; stems cylindrical, stout, tall and to 150 cm high, triquetrous in the upper part; leaves reduced to the sheathing bases or with a short lamina; bract solitary, erect, continuous with the stem, 5-10 cm long, rigid, concavo-convex; inflorescence simple or compound, 2-8 cm long; spikelets solitary, ovoid to oblong-ovoid, ferruginous or brown, 8-15 mm long, 3-5 mm broad; glumes numerous, mucronate, obtuse or slightly notched, minutely ciliate at the apex but otherwise glabrous; hypogynous scales usually 4, ligulate-spathulate, plumosely fringed in the upper part; stamens usually 3; style-branches 2; nut unequally biconvex, strongly dorsiventrally compressed, elliptic to obovoid, apiculate, smooth, castaneous to blackish, c. 2 mm long.—*Schoenoplectus litoralis* (Schrad.) Palla, *Bot. Jb.* 10:299 (1889).

Occurs in Africa, Europe, Asia, Australia (W.Aust., N.T., ?Qld, N.S.W. and S.Aust.). Recorded in S.Aust. from the Lake Eyre, Flinders Ranges, Eastern, Northern and Southern Lofty, Murray and S.E. regions.

Flowers throughout the year.

Easily confused with *S. lacustris*.

15. *S. maritimus* L., *Sp. Pl.* 51 (1753). **Sea club-rush.** Rhizome creeping, often bearing hard ovoid tubers; stems acutely triquetrous, 30-80 cm high, leafy throughout; leaves long, grass-like; involucre bracts 2-3, much longer than the inflorescence, similar to the leaves, unequal; inflorescence umbel-like, with the rays erect or spreading or reduced to 1 or 2 spikelets; spikelets golden-brown, large, ovoid, 10-20 mm long, many-flowered; glumes notched or jagged, the keel ending in a spreading mucro; stamens 3; style-branches 2; hypogynous bristles 6 or fewer, shorter than the nut; nut flattened, obovate, nearly 3 mm long and about one-third as long as the glume and mucro.



Fig. 263—*Scirpus nodosus*.

Almost cosmopolitan, including all Australian States. Recorded in S.Aust. from the Lake Eyre region but commoner in the Flinders Ranges, Eyre Pen., Northern and Southern Lofty, Murray and S.E. regions.

Flowers throughout the year but usually Oct.-April.

Usually grows in fresh or brackish water.

16. *S. nodosus* Rottb., *Descr. & Icon.* 52 (1773). **Knobby club-rush.** Rhizome short, horizontal; stems densely tufted, rigid and rather stout, erect or nearly so, 50-150 cm high; leaves reduced to their sheaths; spikelets brown, ovoid, 4-5 mm long, numerous in a dense, apparently lateral head, 8-20 mm diam., the short involucre bract appearing as though a continuation of the stem; glumes obtuse, 2-3 mm long; style-branches 3; nut smooth, plano-convex, about half as long as the glume.—*Isolepis nodosa* (Rottb.) R.Br., *Prod. Fl. Nov. Holl.* 221 (1810).

Almost cosmopolitan, including all Australian States except N.T. Recorded in S.Aust. from the Nullarbor, Eyre Pen., Flinders Ranges, Yorke Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions and Wedge Island (Spencer Gulf).

Flowers throughout the year, especially summer.

17. *S. platycarpus* S. T. Blake, *Proc. R. Soc. Qld* 51:180 (1940). **Club-rush.** Small tufted annual, usually less than 8 cm high; stems setaceous; leaf-blades to 3 cm long and setaceous, sometimes absent; bract sometimes longer than the cluster, similar to the leaves, to 5 mm long; spikelets 1-2, often solitary, ovoid-ellipsoid, 2.5-3.5 mm long (similar to those of *S. hookeranus* but rather broader and less distinctly angled); glumes 1.5 mm long, with spreading points, the sides somewhat opaque; nut suborbicular in outline, about half as long as the glume, the side next the axis nearly flat, the back very strongly convex but scarcely angled except at the base, brown or whitish and opalescent, coarsely and prominently reticulate, the reticulations hexagonal.

Occurs in New Zealand and all Australian States except N.T. and Qld. Recorded in S.Aust. from the Eyre Pen., Flinders Ranges, Yorke Pen., Southern Lofty, Kangaroo I. and S.E. regions.

Flowers Sept.-April.

18. *S. productus* C. B. Clarke, *Kew Bull.* add.ser. 8:28 (1908). **Club-rush.** Stems filiform, weak, floating, often many-noded (similar to *S. fluitans* but sometimes more slender and always strongly tinged with purple, particularly on the leaf-sheaths and at the edges of the glumes); leaves very slender; spikelet solitary, terminal on long peduncles rising from the tufts of leaves, ovoid, 3-5 mm long; glumes 6-10, nearly all containing bisexual flowers, the lowest glume always produced into a leafy point as long as or longer than the spikelet; stamens usually 2; style-branches 2; nut thinned towards the margins and there rather abruptly thickened, so that the margins are ribbed.

Occurs in Vic., Tas., and S.Aust. (Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Oct.-March.

Similar to *S. fluitans* but lacking the special terrestrial form.

19. *S. stellatus* C. B. Clarke, *Kew Bull.* add.ser. 8:29 (1908). **Star club-rush.** Slender tufted annual, to c. 6 cm high; stems rather rigid, but very slender; leaf-blades setaceous, to 2.5 cm long or reduced to short points; bract 1, erect or more or less thrown to one side, usually exceeding the inflorescence and to 7 mm long; spikelets up to 8 in the cluster, rarely less than 3, densely packed and stellately spreading, oblong or ovoid-oblong, very obtuse, 3-4 mm long, greenish, several-flowered; glumes rather spreading, the tip mucronate and also spreading, keel stout and broad, green sides stained with brown, each with 1-2 slender nerves; stamen 1; style 3-branched; nut obovoid, abruptly apiculate, prominently and acutely 3-ribbed, dark-brown to blackish, closely reticulate, sides nearly flat between the margins 0.75 mm long and about half as long as the glume.

Occurs in ?W.Aust., N.S.W., Vic., ?Tas. and S.Aust. (Eyre Pen., Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Oct.-Feb.

20. *S. victoriensis* N.A. Wakefield, *Victorian Nat.* 73:163 (1957). Erectly tufted annual, to 12 cm high; leaf-blades absent or to 15 mm long; bract 2-11 mm long; spikelets usually 3 or 4, 2.5 mm long, more or less



Fig. 264—*Scirpus stellatus*.

cylindrical; glumes narrow, the keel prominent, the wings always pale, the apex spreading a little; hypogynous bristles 0; stamens 1; style-branches 3; nut subglobose, 0.4-0.5 mm long, 0.3-0.4 mm wide, obscurely 3-ribbed, the faces very convex, pale grey, regularly granular. (Description from Wakefield, 1957).

Occurs in N.S.W., Vic and recorded from S.Aust. by Willis (*A handbook to plants in Victoria* 1:232;1970). No specimen in AD or ADW.

16. TETRARIA Beauv.

Mem.Acad.Sci.Inst.Fr. 1812(2):54 (1816).

(Greek *tetra*, four; some species have four style-branches.)

Perennial herbs with a short woody rhizome; stems tufted, erect, terete; leaves usually all basal, subulate or flat; inflorescence paniculate; bracts leafy; spikelets 2-flowered, the upper one fertile, rarely 1-flowered; glumes distichous, the 3-5 outer ones empty; stamens 3-6; style-branches 3-4; hypogynous bristles various; nut crowned by the persistent base of the style. About 35 species, mostly in temperate S. Africa, also Borneo and Australia.

1. Spikelets 1-2-flowered, few in short racemes or panicles *T. capillaris* 1.
1. Spikelets 1-flowered, solitary, terminal *T. halmaturina* 2.

1. *T. capillaris* (F. Muell.) J. M. Black, *Trans.R.Soc.S.Aust.* 58:169 (1934). **Hair sedge.** Rhizome creeping, slender; stems almost capillary, 20-40 cm long; leaves all basal, almost reduced to their sheaths, the blades very fine, less than 5 mm long, ciliate; bracts inconspicuous, shorter than the spikelets; spikelets very few in a short panicle or raceme, mostly prominently pedicellate, narrow-lanceolate or the glumes spreading at maturity, 3.5-5 mm long, 2-flowered with the lower flower barren or sometimes 1-flowered; glumes almost distichous, the upper ones shortly ciliate on the margins, the others glabrous, all smooth; stamens 3; style 3-fid, prominently swollen at the base but continuous with the ovary and nut; hypogynous bristles minute or 0; nut ellipsoid or somewhat obovoid, constricted below the style-base, turgid, obscurely trigonous, smooth, and together with the style-base 3-4.5 mm long; style-base persistent, stout, conical, scabrous, as long as the body of the nut.—*Chaetospora capillaris* F. Muell., *Fragm.Phyt.Aust.* 9:34 (1875); *C. capillacea* non Nees, sensu Hook.f., *Fl.Tasm.* 2:81 (1858); *Elynanthus capillaceus* Benth., *Fl.Aust.* 7:377 (1878); *Cladium capillaceum* C. B. Clarke in Cheesem., *Man.NZ.Fl.*



Fig. 265—*Tetraria capillaris*.

789 (1906); *Machaerina capillacea* Koyama, *Bot.Mag., Tokyo* 69:63 (1956).

Occurs in New Zealand and all Australian States except ?W.Aust. and N.T. Recorded in S.Aust. from the Southern Lofty, Kangaroo I. and S.E. regions.

Flowers Oct.-Feb.

2. *T. halmaturina* (J. M. Black) J. M. Black, *Fl.S.Aust.* 153 (1943). Small perennial, branching from near base, with slender but rigid stems 4-8 cm long, slightly compressed, 0.5 mm broad, grooved along one edge, arched or curved in various directions; leaves almost reduced to sheaths which are imbricate at base of stems, the uppermost with a subulate point 2-5 mm long; spikelet linear, acute, solitary, 6-7 mm long, under 1 mm broad; glumes c. 6, the lowest subulate, with 2 membranous auricles at base, erect, bract-like and appearing to continue the stem, about as long as the rest of the spikelet, the second glume rather short, obtuse, mucronate, the others linear-oblong, acute, subequal, reddish, 1-nerved on back, the terminal glume enclosing the

solitary bisexual flower and a small glume; stamens 3; style with 3 long branches and a conical persistent scabrous base 3 mm long; hypogynous bristles 6, barbellate in upper half; nut not known ripe.—*Heleocharis halmaturina* J. M. Black, *Trans.R.Soc.S.Aust.* 51:378 (1927).

Known only from Rocky River, Kangaroo I.

Flowers Nov. (1 record).

17. TRICOSTULARIA Nees in Lehm.

Nov.Stirp.Pugill. 8:50 (1844).

(From Latin *tres*, three; *costula*, a little rib; referring to the 3-ribbed nut.)

Perennial herbs with a short rhizome; stems tufted, erect, terete; leaves basal but sometimes with 1 or 2 along the stem, often reduced to sheaths; inflorescence a spike or panicle; spikelets 1-3-flowered, the upper one fertile, 2-4 outer glumes empty; stamens 3; style slender, deciduous, 3-branched; hypogynous bristles 6 or fewer, slender; nut sessile, trigonous. About 5 species in Australia and South East Asia.

1. *T. pauciflora* (F. Muell.) Benth., *Fl.Aust.* 7:383 (1878). **Needle bog-rush.** Tufted perennial; stems 10-30 cm long, mostly curved, very slender, rigid, subterete; leaves few, basal and usually also 1 higher up the stem, short and subulate, sometimes reduced to points; spikelets 2 or 3 in a short spike with short nearly glume-like bracts, brown, ovoid, 4 mm long, 2-flowered, the lower flower barren; glumes broad, acutely acuminate, 2 outer ones empty; hypogynous scales or bristles 6, very short, slightly dilated at the base; nut obovoid, constricted below, narrowly 3-ribbed, somewhat pubescent especially at the top, 2-2.5 mm long.—*Lepidosperma pauciflorum* F.Muell., *Fragm.Phyt.Aust.* 9:23 (1875).

Occurs in N.S.W., Vic. and S.Aust. (Southern Lofty region).

Flowers Jan. (1 record).

In Vic. confined to damp southern heathlands; habitat in S.Aust. not known and only collected at Mount Compass.

FAMILY 34.—ARACEAE

Usually perennial herbs with tuberous or rhizomatous stems; leaves usually entire, often petiolate and often with reticulate venation; inflorescence a spike of tightly packed small unisexual or bisexual flowers in the axil of a spathe which is sometimes large and showy; flowers with or without a perianth; ovary sessile, superior; fruit a berry. About 115 genera and 2 000 species, predominantly tropical.

1. Upper part of spadix without flowers ARUM 1.

1. Upper part of spadix covered with male flowers ZANTEDESCHIA 2.

1. ARUM L.

Sp.Pl. 964 (1753).

(Greek *aron*, classical name for a member of the genus.)

Perennial herbs with tuberous rootstocks; leaves net-veined, petioles sheathing at the base; inflorescence a dense-flowered simple spadix supported at its base by a leaf-like or coloured bract the spathe, the upper part of the spadix without flowers; flowers all unisexual, in the lower part female with only the lowest fertile, in the upper part male of which the upper are sterile; perianth absent; ovary 1-celled, stigmas sessile. (Description from Symon (1964) *Trans.R.Soc.S.Aust.* 88:5). 15 species from Europe and the Mediterranean.

1. *A. italicum* Miller, *Gard. Dict.* ed. 8:2 (1768). **Italian arum, Italian cuckoo-pint, Aaron's rod.** Erect glabrous perennial, to 50 cm high; tuber depressed globular, 3-4 cm diam.; autumn leaves small, hastate, uniform green, later leaves long-petiolate, sagittate, white patterned above

the larger veins, c. 15 cm long; spathe 20-30 cm long, erect, pale greenish yellow; fruit 1 cm diam., fleshy, scarlet, the fruiting spike standing naked and showy after the leaves have withered. (Description from Symon (1964) p.5.)

Native to southern Europe, occasionally naturalised in S. Aust.; recorded from the Southern Lofty region.

Flowers Nov.-Dec.

Widely grown as a garden ornamental.

2. ZANTEDESCHIA Spreng.

Syst. Veg. 3:765 (1826).

(After Dr Giovanni Zantedeschi (1773-1806), Italian physician and botanist.)

Perennial herbs with tuberous rootstocks; leaves net-veined, petioles sheathing at the base; inflorescence a dense-flowered simple spadix supported at its base by a leaf-like or coloured bract the spathe; flowers all unisexual, in the upper part (including the apex) male, in the lower part female; perianth absent; ovary 1-5-celled, styles short. 6 species from Africa (Letty, C. (1973). The genus *Zantedeschia*. *Bothalia* 11:5-26).

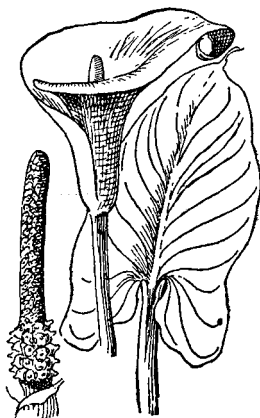


Fig. 266—*Zantedeschia aethiopica*.

1. *Z. aethiopica* (L.) Spreng, *Syst. Veg.* 3:765 (1826). (White) **arum lily**. Erect glabrous perennial, with a thick rhizomatous rootstock; leaves large, petiolate, radical, dark-green, ovate-cordate, pointed, the lamina often to 50 cm long; spathe large, white, funnel-shaped, slit to the base, spreading in the upper part, pointed and recurved at summit; spadix bright-yellow, on a stout radical peduncle; stamens covering the upper part, the numerous female flowers clustered round the much shorter lower part of the spadix and surrounded by barren stamens; fruit a berry, 1-5-celled.—*Calla aethiopica* L., *Sp.Pl.* 968 (1753); *Richardia africana* Kunth, *Mem.Mus.Hist.Nat.Paris* 4:433 (1818).

Native to South Africa naturalised in W.Aust., Vic. and S.Aust. (Southern Lofty region).

Flowers throughout the year especially spring and early summer.

Introduced as a garden ornamental but becoming established especially in damp situations.

FAMILY 35.—LEMNACEAE

Small plants, floating free in the water, each consisting of a leaf-like thallus or shoot and propagating themselves by the minute seeds, but chiefly by the outgrowth of new leaf-like thalli emerging from small slits or pockets in the edges of the thalli; the young thalli remaining attached to the parent thallus for some time; rootless or with 1-several simple roots; flowers very rare, unisexual and monoecious, the males consisting of 1 stamen and the female of 1 carpel, growing on the thallus and sometimes contained in a minute spathe; fruit a small utricle. 4 genera and about 40 species throughout the world. (Key and much other material from Aston (1973). *Aquatic plants of Australia*.)

1. Thallus 1-12 mm long, more or less flattened, with 2 lateral pockets; roots present (*Lemna trisulca* mostly rootless); inflorescence emerging from one of the lateral pockets of the thallus, consisting of 1 female and 2 male flowers together in a membranous spathe; anther bilocular, opening transversely in two valves.

2. Thallus without dorsal and ventral scales; root 1 or none per thallus; nerves of the thallus 1-3 and often indistinct; thallus stalk marginally attached; brown pigment cells and star-shaped crystals of calcium oxalate absent LEMNA 1.
2. Thallus with a dorsal and a ventral scale; roots 1-18; nerves 3-15; thallus stalk ventrally attached; brown pigment cells and star-shaped crystals of calcium oxalate present in the thallus tissue SPIRODELA 2.
1. Thallus 1-1.5 mm long in surface view, quite turgid and more or less ellipsoid to subglobose, with 1 lateral pocket, rootless; inflorescence breaking through the upper surface of the thallus, consisting of 1 female and 1 male flower together in a hollow but not surrounded by a spathe; anther unilocular, opening at the apex WOLFFIA 3.

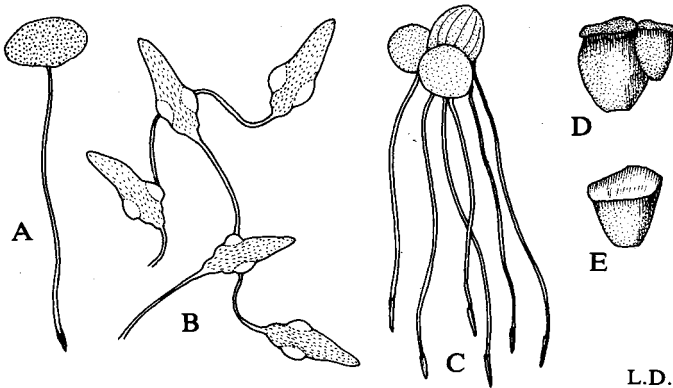


Fig. 267—*Lemnaceae*. A, *Lemna minor*, x 10; B, *L. trisulca*, x 3; C, *Spirodela oligorrhiza*, x 10; D, *Wolffia australiana*, x 15; E, *W. globosa*, x 20.

1. LEMNA L.

Sp.Pl. 970 (1753).

(Greek name of a water-plant.)

Thallus 1-12 mm long, more or less flattened, with 2 lateral pockets; roots 0 or 1; inflorescence produced in one of the 2 lateral pockets, consisting of 1 female and 2 male flowers together in a membranous spathe; male flower composed of 1 stamen with terminal 2-celled anther; female flower composed of a flask-shaped ovary with 1-several ovules and a solitary terminal style and concave stigma. About 15 species, cosmopolitan.

1. Thallus floating on the water surface, elliptic to obovate or rounded *L. minor* 1.
1. Thallus floating beneath the water surface, broadly linear to linear-lanceolate *L. trisulca* 2.
1. ***L. minor* L., *Sp.Pl.* 970 (1753). Common duckweed.** (Ill. Aston (1973) fig. 100). Thallus floating on the water surface, 1-4 mm long, mostly biconvex, elliptic to obovate or rounded, thick and opaque, without a stalk except in the bud stage; root 1, usually 1-4 cm long.

Almost cosmopolitan, occurring in all Australian States. Recorded in S.Aust. from the S.E. region.

Aston (1973) and others have expressed doubt about the identity of this species with plants identified with it from other parts of the world. It is likely that several species have been included under this name.

2. *L. trisulca* L., *Sp.Pl.* 970 (1753). **Ivy-leaf duckweed.** (Ill. Aston (1973) fig. 100). Thallus floating beneath the water surface, 2-8 mm long, contracting abruptly at the base into a slender stalk 1-13 mm long, flat on both surfaces, broadly linear to linear-lanceolate, thin and translucent; root 0 or rarely 1.

Occurs in North America, Europe, Africa, Asia and all Australian States except N.T. Recorded in S.Aust. by Black (1943) from the Murray and S.E. regions.

2. SPIRODELA Schleid.

Linnaea 13:391 (1839).

(Greek *speira*, a coil; *dēlos*, conspicuous; on account of the spiral vessels in the structure of the plant.)

Each thallus has a dorsal and a ventral scale; the dorsal scale is small, almost round, membranous, situated at the base of the dorsal side of a very young thallus while still within the parent pocket; the ventral scale is a membrane present on the thallus undersurface at the position from which the roots arise; roots few to several; inflorescence produced in one of the 2 lateral pockets, consisting of 1 female and 2 male flowers together in a membranous spathe; male flower composed of 1 stamen with terminal 2-celled anther; female flower composed of a flask-shaped ovary with 1-several ovules and a solitary terminal style and concave stigma. 6 species in all continents except Africa.

1. *S. oligorrhiza* (Kurz) Hegelm., *Lemnaceen* 147 (1868). **Thin duckweed.** (Ill. Aston (1973) fig. 100). Thallus 2-5 mm long, somewhat biconvex, elliptic to obovate, opaque; roots usually 2-8, to 4 cm long.—*Lemna oligorrhiza* Kurz, *J.Linn.Soc.(Bot.)* 8:267 (1866).

Occurs in Asia and all Australian mainland States except N.T. Recorded in S.Aust. from the Southern Lofty, Murray and S.E. regions.

3. WOLFFIA Horkel ex Schleid.

Linnaea 13:389 (1839).

(After J. F. Wolff (1778-1806), German physician and botanist.)

Thallus turgid, more or less ellipsoid or globose, floating at the surface; most of the thallus submerged; lateral pocket 1; roots 0; inflorescence breaking through the upper surface of the thallus, composed of 1 female and 1 male flower together in a hollow but without a spathe; male flower consisting of a single stamen with a terminal 1-celled anther; female flower composed of a flask-shaped ovary with 1-several ovules and a solitary terminal style and concave stigma. About 10 species, almost cosmopolitan.

- | | |
|---|--------------------------|
| 1. Emerged face of thallus distinctly convex; thallus depth to twice the length of the emerged face | <i>W. australiana</i> 1. |
| 1. Emerged face of thallus flat; thallus depth about equal to length of the emerged face | <i>W. globosa</i> 2. |

1. *W. australiana* (Benth.) Hartog & Plas, *Blumea* 20:151 (1972). **Tiny duckweed.** (Ill. Aston (1973) fig. 100) Floating on the water surface; thallus emerged face to c. 1 mm long, elliptic in outline, distinctly convex; ventral side laterally compressed; thallus depth to twice the length of the emergent face.—*W. arrhiza* (L.) Horkel ex Wimmer var. *australiana* Benth., *Fl.Aust.* 7:162 (1878); *W. arrhiza* non (L.) Horkel ex Wimmer, sensu J. M. Black, *Fl.S.Aust.* 172 (1943), partly.

Occurs in N.S.W., Vic., S.Aust. and possibly New Zealand. Recorded in S.Aust. by Aston (1973) from the S.E. region.

2. *W. globosa* (Roxb.) Hartog & Plas, *Blumea* 8:367 (1970). **Tiny duckweed.** Floating on the water surface; thallus emerged face 0.3-0.7 mm long, elliptic to oblong in outline, flat; ventral side strongly inflated; thallus depth approximately equal to length of emergent face.—*Lemna globosa* Roxb., *Fl.Ind.* ed. Carey 3:565 (1832).

Occurs in Asia and all Australian mainland States except N.T. and Vic. Recorded in S.Aust. along the Murray River by Aston (1973).

FAMILY 36—**RESTIONACEAE**

(Prepared by C. Marsden)

Rush-like perennials; leaves reduced to brown sheathing bracts, imbricate at the base of and distant along the stem, split on one side and not tubular, (unlike Cyperaceae); flowers unisexual and mostly dioecious, or rarely bisexual, arranged in spikelets or panicles, rarely solitary, each flower in the axil of a rigid glume; perianth of 6 or fewer scale-like segments, rarely 0, male flowers usually with 3 stamens opposite the inner perianth-segments; anthers 1-celled, oblong and dorsifixed (in *S.Aust.* genera), introrse by longitudinal slits, a rudimentary ovary occasionally present in the centre of the flower; female flowers with a 1-3-celled ovary, and 1-3 slender styles or branches; staminodes present in some species; ovule 1 in each cell, pendulous, orthotropous; fruit a capsule or nut; seed albuminous. 30 genera and more than 250 species almost limited to South Africa, Australia, and New Zealand. (Evans & Johnson *Contr. N.S.W.natn.Herb., Flora Ser.* no. 25; 1966).

(Key I: female plants)

- | | |
|--|----------------|
| 1. Ovary 2-3-locular; styles or style branches 2-3; fruit a capsule. | |
| 2. Glumes longer than perianth; bracteoles absent; ovary 2-locular; styles or style branches 2 (in <i>S.Aust.</i> species); flowers arranged in true spikelets | RESTIO 7. |
| 2. Glumes loose, not closely imbricate, often shorter than perianth; bracteoles 1-2; ovary 3-locular, style or style branches 3; flowers not in true spikelets, more or less loosely and paniculately arranged | LEPYRODIA 5. |
| 1. Ovary 1-locular; style or style branches 1-3; fruit a nut, or rarely splitting down one side. | |
| 3. Styles or style branches 2 or 3. | |
| 4. Female spikelets several-flowered | LEPTOCARPUS 4. |
| 4. Female spikelets 1-flowered. | |
| 5. Female spikelets axillary (in the <i>S.Aust.</i> species) | CALOROPHUS 1. |
| 5. Female spikelets terminal | HYPOLAENA 2. |
| 3. Style simple. | |
| 6. Female spikelets several-flowered | LEPIDOBOLUS 3. |
| 6. Female spikelets 1-flowered | LOXOCARYA 6. |

(Key II: male plants)

- | | |
|--|----------------|
| 1. Flowers distinct, not arranged in spikelets; glumes gaping | LEPYRODIA 5. |
| 1. Flowers aggregated in definite spikelets, glumes closely imbricate. | |
| 2. Leaf sheaths broad, loose and soon deciduous | LEPIDOBOLUS 3. |
| 2. Leaf sheaths persistent. | |
| 3. Spikelets sessile | CALOROPHUS 1. |
| 3. Spikelets pedicellate. | |
| 4. Anthers exerted beyond glumes (in <i>S.Aust.</i> species) | |
| 5. Spikelets 5 cm long | RESTIO 7. |
| 5. Spikelets arranged in a panicle 5 cm long | LOXOCARYA 6. |
| 4. Anthers not exerted. | |
| 6. Stems much branched | HYPOLAENA 2. |
| 6. Stems simple, occasionally with 1 or 2 branches or branched at the base | LEPTOCARPUS 4. |

1. *CALOROPHUS* Labill.*Nov.Holl.Pl.Sp.* 2:78 (1806).(Greek *kalosrophos*, ropemaker; to indicate similarity to *Restio*.)

Perennial, dioecious, rarely monoecious; male spikelets several together, rarely solitary, 1- or several-flowered; female spikelets solitary, 1-flowered; male flower with 6 glume-like or membranous perianth-segments; stamens 3; anthers 1-locular; female flowers with 6 or 4 perianth-segments; staminodes 3 or 0; ovary 1-locular; style branches 2 or 3; fruit a small nut. 3 species, 1 in Tas., 1 in W. Aust. and 1 in both Australia and New Zealand.

1. *C. minor* Hook.f., *Fl.N.Z.* 1:267 (1853). Stems slender, branched and flexuose; sheathing bracts and floral bracts with short subulate spreading blades and woolly at the orifice; male spikelets sessile, distant along the wavy branches, c. 4 mm long, with 2 linear floral bracts not exceeding the spikelets at base, glumes narrow, not imbricate; flowers 2-3 in each spikelet, perianth-segments 6, hyaline, flat, 3 mm long, the anthers exserted; female spikelets few, narrow, distant, sessile, 4-6 mm long, 1-flowered, the perianth-segments 4-6, hyaline; nut almost globular, c.1.5 mm long.—*Restio lateriflorus* R.Br., *Prod.Fl.Nov.Holl.* 247 (1810), partly; *Calorophus* ("Calostrophus") *lateriflorus* F. Muell., *Fragm.Phyt.Aust.* 8:87 (1873); *Hypolaena lateriflora* (F. Muell.) Benth., *Fl.Aust.* 7:238 (1878).

Occurs in New Zealand, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty and Kangaroo I. regions). Sometimes forms tangled masses in swamps.

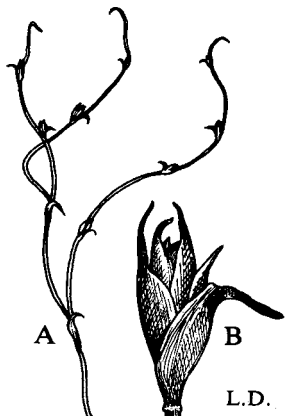


Fig. 268—*Calorophus minor*, male. A, habit; B, spikelet, x 7.



Fig. 269—*Hypolaena fastigiata*, male. A, habit; B, spikelet, x 4.



Fig. 270—*Hypolaena fastigiata*, female. A, habit; B, spikelet, x 3; C, nut.

2. *HYPOLAENA* R.Br.*Prod.Fl.Nov.Holl.* 251 (1810).

(Greek *hypo*, below; *laina*, a cloak; alluding to the bracteoles and empty glumes at the base of the spikelets.)

Flowers dioecious; perianth segments 6; male spikelets several-flowered, female 1-flowered; stamens 3; style branches 2-3; ovary 1 celled; fruit an indehiscent nut sessile on a short, thick, stalk-like receptacle or carpophore. 2 species endemic in Australia but until recently also considered to occur in South Africa.

1. *H. fastigiata* R.Br., *Prod.Fl.Nov.Holl.* 251 (1810). **Tassel rope-rush.** Stems with numerous flexuose branches and dark sheathing bracts with an erect mucro; male spikelets on slender white-tomentose pedicels numerous in a loose terminal panicle 6-8 mm long, ovoid oblong, glumes broad, mucronate, reddish-brown, imbricate; 2 outer perianth-segments complicate and keeled, one flat and the 3 inner ones smaller; female spikelets 6-10 mm long, usually terminal and solitary; perianth-segments broadly ovate, membranous scale-like, fruit an ovoid nut 4 mm long.

Occurs in all States except W.Aust. and N.T. Recorded from S.Aust. from the Eyre Pen., Flinders Ranges, Southern Lofty, Kangaroo I. and S.E. regions

3. *LEPIDOBOLUS* Nees in Lehm.*Pl.Preiss.* 66 (1846).

(Greek *lepidos*, a scale; *bolos* throwing away; referring to the very deciduous sheathing bracts of the stems.)

Stems simple, erect or flexuose; sheathing scales very deciduous leaving distinct annular scars; flowers dioecious; perianth-segments 5 or 6; male and female spikelets several-flowered; male flowers with 3 stamens, filaments filiform, anthers one-celled; female flowers without staminodes, ovary 1-celled, style simple, filiform; fruit a small indehiscent nut. 3 species confined to temperate Australia.

1. *L. drapetocoleus* F. Muell., *Fragm.Phyt.Aust.* 8:84 (1873). **Scale shedder.** Rigid wiry perennial, c. 30 cm high; rhizomes thick, creeping, woolly; stems simple, rigid, but flexuose in upper part, with distinct, brown, annular scars from sheathing bracts; flowers dioecious, both male and female in many-flowered spikelets, which form terminal globular heads, 5-7 mm diam.; glumes brown, truncate-mucronate; perianth-segments 5, the 2 outer concave, keeled, the 3 inner ones flat; style simple; nut small, ovoid indehiscent, 1-seeded.

Occurs in Vic. and S.Aust. (Yorke Pen., Southern Lofty and S.E. regions).

4. *LEPTOCARPUS* R.Br.*Prod.Fl.Nov.Holl.* 250 (1810).

(Greek *leptos*, thin; *karpos*, fruit.)

Stems simple; rootstock a creeping rhizome; flowers dioecious; spikelets of both sexes several-flowered; perianth-segments 6 or 5; stamens and styles 3, the styles united in lower part, so as to appear like a 3-branched style; ovary 1-celled; fruit a small dehiscent capsule. About 15 species of which 12 are endemic to Australia.

1. Male spikelets 5-12 mm long; females in short clusters *L. brownii* 1.
1. Male spikelets 2-4 mm long; female spikelets in erect panicles *L. tenax* 2.



Fig. 271—*Lepidobolus drapetocoleus*.

1. *L. brownii* Hook.f., *Fl. Tasm.* 2:73 (1858.) **Coarse twine-rush.** Stems simple, 50 cm to 1 m high; the sheathing bracts 5-7 mm long, male spikelets 5-12 mm long, shortly pedicellate, few, in a short spreading reddish-brown panicle; glumes acuminate; perianth-segments lanceolate; female spikelets of 3-6 flowers (but each flower looking like a 1-flowered spikelet), the spikelets clustered in a short compact golden-brown panicle or head, each flower with an acuminate glume and bracteole at base; outer perianth-segments acuminate, glume-like, the inner smaller but thick.

Occurs in ?W.Aust., N.S.W., Vic., Tas. and S.Aust. (Eyre Pen., Southern Lofty and S.E. regions).



Fig. 272—*Leptocarpus brownii*, male.

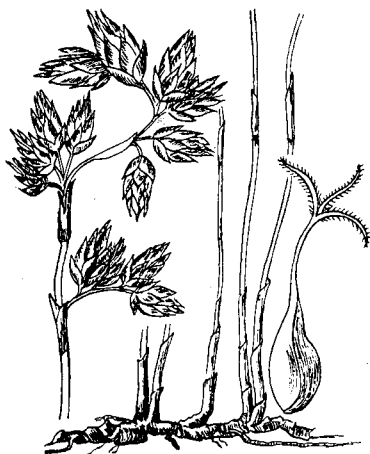


Fig. 273—*Leptocarpus brownii*, female.



Fig. 274—*Leptocarpus tenax*, male. A, inflorescence, $\times \frac{1}{2}$; B, flower.

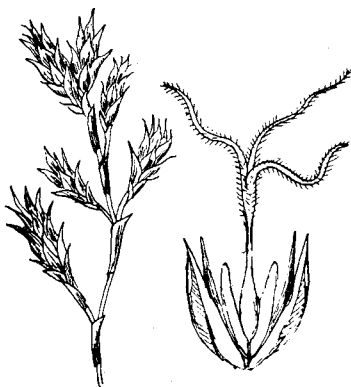


Fig. 275—*Leptocarpus tenax*, female.

2. *L. tenax* (Labill.) R.Br., *Prodr.Fl.Nov.Holl.* 250 (1810). **Slender twine-rush.** Stems simple, 50 cm to 1 m high with dark appressed sheathing bracts 5-10 mm long at intervals; male spikelets c. 3 mm long, numerous in a loose panicle, reddish-brown, often drooping; glumes obtuse; perianth-segments hyaline, obtuse, 1 mm long; female spikelets erect, c. 10 mm long, almost sessile, in a dense erect panicle, the lowest branch often distant; glumes acuminate, with spreading-erect points; the 2 outer perianth-segments complicate and winged on the keel, longer than the 4 inner ones, the 2 innermost flat and hyaline.—*Schoenodum tenax* Labill., *Nov.Holl.Pl.Sp.* 2:80 (1806).

Occurs in all Australian States except N.T. Recorded in S.Aust. from the Southern Lofty, Kangaroo I. and S.E. regions.

5. LEPYRODIA R.Br.

Prod.Fl.Holl.Nov. 247 (1810).

(Greek *lepyrodes*, furnished with bracts.)

Stems simple; flowers sessile, mostly monoecious, rarely bisexual, in narrow panicles; perianth-segments 6, glume-like, with an outer often caducous bract and 2 lateral hyaline bracteoles usually shorter than the flower; bracts and bracteoles not imbricate; stamens 3, reduced to small staminodes in the female flower or absent; ovary 3-celled, 3-angled; styles 3, free; capsule opening loculicidally at the obtuse salient angles; male and female inflorescences not arranged in spikelets. About 20 species confined to Australia.

1. Flowers in clusters, stems rather rigid *L. muelleri* 1.

1. Flowers solitary or in pairs along the panicle-branches, stems flexible . . . *L. valliculæ* 2.

1. *L. muelleri* Benth., *Fl.Aust.* 7:215 (1878). **Common scale-rush, erect scale-rush.** Stems simple, erect, 40-60 cm high, from a creeping scaly rhizome; sheathing bracts distant, 10-25 mm long, appressed, with a short filiform blade, those under the inflorescence looser; flowers clustered in compound distant pale-brown spikes, forming a narrow interrupted panicle 3-12 cm long; upper floral bracts and glumes acuminate or obtuse; perianth-segments 6, c. 3 mm long, acute; capsule 1.5 mm long and broad.

Occurs in N.S.W., Vic., Tas. and S.Aust. (S.E. region).



Fig. 276—*Lepyrodia muelleri*, female.

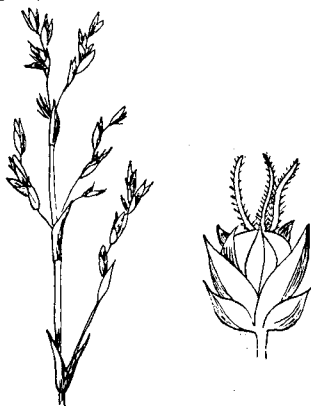


Fig. 277—*Lepyrodia valliculæ*, female.

2. *L. valliculæ* J. M. Black, *Trans.R.Soc.S.Aust.* 52:225 (1928). Stems filiform, simple, erect, 6-30 cm high; rootstock slender, not creeping; basal sheaths and those along the stem appressed, 8-12 mm long, with short points; flowers erect, conical, approximate or rather distant, but never

clustered, in a narrow spike-like panicle 1-7 cm long, the lower branches sometimes 1-2 cm long and naked in lower part; segments acute, 3-4 mm long, the outer segments slightly exceeding the inner, all rather larger in the female than the males; no staminodes or rudimentary ovary; capsule subglobular, 1-5 mm long and rather broader.

Occurs only in S.Aust. (Southern Lofty—Fleurieu Pen.—and Kangaroo I. regions).

6. LOXOCARYA R.Br.

Prod.Fl.Nov.Holl. 249 (1810).

(Greek *loxos*, oblique; *karyon*, nut.)

Stems usually much branched and often flexuose, the branches often densely clustered, the sheathing scales persistent; flowers usually dioecious; male spikelets several-flowered, female 1-flowered; ovary 1-celled; style not branched, stigmatic from below the middle; fruit a small ovoid usually indehiscent nut. About 7 Australian species mostly in W.Aust.

1. *L. fasciculata* (R.Br.), Benth., *Fl.Aust.* 7:242 (1878). Stems 10-20 cm high, glabrous or pubescent; the persistent sheathing bracts, brown, broad, distant along the stem, each bract at the base of a dense, whorled cluster of angular barren, often curved branches, 1-2.5 cm long; female spikelets solitary, subsessile, in the cluster of branches, 1-flowered, 4-5 mm long; glumes 6-7, closely imbricate, emarginate-mucronate, ciliate, 4-8-nerved; style simple, the stigmatic portion rather longer than the base; perianth-segments none; male spikelets solitary, terminal, oblong, c. 4 mm long, on peduncles as long as and mixed with the whorls of short barren branches, the glumes rigid, the perianth-segments 6, narrow, thin, hyaline; nut indehiscent.—*Restio fasciculatus* R.Br., *Prod.Fl.Nov.Holl.* 247 (1810).



Fig. 278—*Loxocarya fasciculata*.

Occurs in W.Aust. and S.Aust. (Eyre Pen. region).

7. RESTIO L.

Syst.Nat.ed. 12:752 (1767).

(Latin *restio*, a rope maker; some South African species are used for thatching and making cords.)

Stems erect; rootstock creeping, often woolly; flowers dioecious; glumes imbricate; perianth-segments 4-6, the inner ones almost hyaline; stamens 2-3, with 1-celled anthers; ovary 2-3-celled; styles free, 2-3; flowers more or less concealed behind the imbricate glumes and forming small spikelets, which are usually arranged in a panicle; fruit a capsule, flat and 2-celled in our species. About 110 species all South African or Australian, the Australian species numbering about 30, all endemic.

- | | |
|---------------------------------|---------------------------|
| 1. Stems flat, unbranched | <i>R. complanatus</i> 1. |
| 1. Stems terete, branched | <i>R. tetraphyllus</i> 2. |

1. *R. complanatus* R.Br., *Prod.Fl.Nov.Holl.* 245 (1810). **Flat cord-rush.** Stems flat, erect, simple; spikelets ovoid-oblong, 5-10 mm long, several-flowered in both sexes and arranged in a narrow panicle or raceme; perianth-segments 4 in both sexes, the 2 outer ones narrow, folded and keeled, the 2 inner ones flat; capsule flat, opening along the margins, 2 mm long by 2.5 mm broad, 2-celled, or 1 cell sometimes abortive, seeds ovoid, white, 1.5 mm long; stamens and styles only 2.

Occurs in Qld, N.S.W., Vic., Tas. and S.Aust. (Kangaroo I. region).

2. **R. tetraphyllus** Labill., *Nov. Holl. Pl. Sp.* 2:77 (1806). **Tassel cord-rush, feather plant.** Stems stiff, slender, cylindrical, with sheathing bracts appressed, becoming brown, 1-2 cm long, the middle bracts producing filiform much-divided barren branches 10-15 cm long, the barren branchlets with minute distant leaves or scales of which the sheaths and subulate blades are each c. 2 mm long; spikelets several-flowered, ovoid to nearly globular, 6-10 mm long, the acuminate imbricate glumes much longer than and concealing the small flowers; the spikelets arranged in both sexes along the erect branches of a rather loose, usually long panicle (to 20 cm or more); male perianth-segments 6, unequal; female perianth-segments 4, the 2 outer ones lanceolate and folded; styles 2; capsule flat.

Occurs in Qld, N.S.W., Vic., Tas. and S.Aust. (in sphagnum bog near Millicent, S.E. region).

FAMILY 37—CENTROLEPIDACEAE

Small annuals, with filiform radical leaves, the sheaths open on one side; flowers bi- or unisexual, surrounded by 1-3 capillary scales or naked, arranged in terminal heads or spikes; stamen 1, with a 1-celled or rarely 2-celled anther; carpels 1 or more, each with 1 pendulous orthotropous ovule; when there are several carpels they are superposed spirally in 2 rows, each with a slender style; pericarp membranous; seed albuminous. 5 genera and c. 40 species mainly in Asia, Australia and New Zealand.

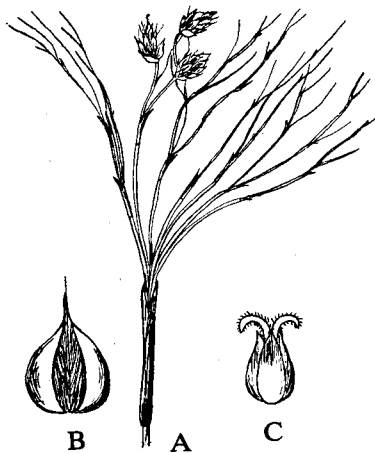


Fig. 279—*Restio tetraphyllus*. A, habit; B, glume; C, female flower.

- | | |
|--|----------------|
| 1. Ovary of several superposed carpels; flowers in a short spike or head within 2 alternate bracts | CENTROLEPIS 2. |
| 1. Ovary of 1 carpel; flowers in a depressed head or a flat spike with 4-16 bracts. | |
| 2. Flowers in a depressed head surrounded by bracts | TRITHURIA 3. |
| 2. Flowers in a flat spike with several distichous bracts | APHELIA 1. |

1. APHELIA R.Br.

Prod. Fl. Nov. Holl. 251 (1810).

(Greek *apheles*, simple; alluding to the ovary with 1 carpel, 1 ovule and 1 style.)

Small tufted annuals; flowers monoecious, solitary within distichous closely imbricate glume-like bracts, forming a flat terminal spike; the males (each of a single stamen and 1-celled anther, with or without a scale) few at the base of the spike; the females (each of a single carpel) above; flowers rarely bisexual; style undivided. 6 species all Australian.

- | | |
|--|----------------|
| 1. Spike turned to one side; upper bracts obtuse | A. gracilis 1. |
| 1. Spike erect; super bracts acuminate | A. pumilio 2. |

1. **A. gracilis** Sond., *Linnaea* 28:227 (1856/7). **Slender aphelia.** Scapes filiform, 15-25 mm high; spike ovate, 4-5 mm long, bent to one side; bracts about 8, hairy, the lowest much longer than the others and containing 1 or 2 male flowers each within a hyaline scale; the female flowers without scales, the upper bracts obtuse, 3-nerved, ciliate on the margins and on the 2 outer nerves.—*Brizula gracilis* (Sond.) Hieron, *Abh. Naturf. Ges. Halle* 12:206 (1873).

Occurs in all Australian States except N.T. and Qld. Recorded in S.Aust. from the Southern Lofty, Kangaroo I. and S.E. regions.

Flowers Oct.

Grows in damp places especially beside creeks.

2. *A. pumilio* F. Muell.ex Sond., *Linnaea* 28:226 (1856/7). Dwarf *aphelia*. Scapes filiform, 15-25 mm high; spike ovate, 4-5 mm long, erect; bracts 8-16, hairy, the 2 lowest spreading and often long, each containing 1-3 male flowers within scales; the female flowers also within folded unequal-sided scales; the upper bracts with spreading points, ciliate on the broad white sides and with gland-seated hairs along the thick green keel.—*Brizula pumilio* (F. Muell.ex Sond.) Hieron., *Abh.Naturf.Ges.Halle* 12:206 (1873).

Occurs in N.S.W., Vic., Tas and S.Aust. (Southern Lofty, Kangaroo I. and S.E. regions). Flowers Oct.-Nov.

Grows in damp places.

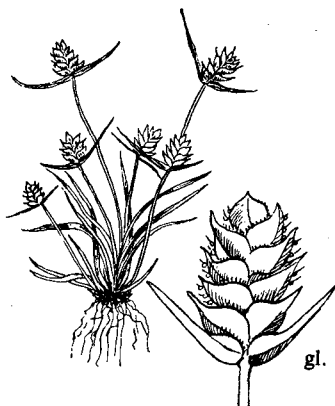


Fig. 280—*Aphelia pumilio*.

2. CENTROLEPIS Labill.

Nov.Holl.Pl.Sp. 1:7 (1804).

(Greek *kentron*, a spur; *lepis*, a scale; the 2 floral bracts have long points.)

Small tufted annuals, with linear radical leaves; flowers bisexual, each with 1-3 hyaline scales and forming a small terminal spike or head of 1-several flowers enclosed within 2 herbaceous floral bracts; stamen 1, with 1-celled anther; carpels 3 or more, on slender stalks of unequal length, which are united into an erect carpophore, on 1 face of which are affixed the adnate carpels, so that they are superposed in 2 rows, or they may appear spirally arranged round the carpophore; each carpel with an undivided style, the styles sometimes united in their lower part; seeds ovoid-oblong, each enclosed in a hyaline pericarp or utricle. About 25 species from South-East Asia and Australasia.

1. Flowerheads terminating erect scapes.
2. Bracts more than twice as long as flowers.
 3. Lower bract with a curved awn 5-10 mm long *C. polygyna* 6.
 3. Lower bract with a straight awn 10-35 mm long *C. aristata* 1.
2. Bracts less than twice as long as flowers.
4. Bracts glabrous.
 5. Spike with 4 flowers *C. glabra* 4.
 5. Spike with 6-8 flowers *C. drummondii* 2.
4. Bracts hairy.
 6. Bracts with awns distinctly exceeding the flowers *C. fascicularis* 3.
 6. Bracts with awns scarcely exceeding the flowers *C. strigosa* 7.
1. Flowerheads sessile among basal leaves *C. murrayi* 5.

1. *C. aristata* (R.Br.) Roem. & Schult., *Syst. Veg.* 1:44 (1817). **Pointed centrolepis.** Scapes 2-10 cm high, compressed; leaves often as long; spike broad; bracts brown, glabrous, both long-awned, the lower with a flat awn 10-35 mm long, or 3-8 times as long as the bract, the upper bract with a shorter awn; flowers usually 10-15 in each bract, each with 2-3 scales; carpels 3-6.

Occurs in all Australian States except N.T. Recorded in S.Aust. from the Eyre Pen., Northern and Southern Lofty, Kangaroo I. and S.E. regions, and (by Black, 1943) from Flinders Ranges.

Flowers Sept.-Dec.

Grows in damp places.

2. *C. drummondii* (Nees) Hieron., *Abh. Naturf. Ges. Halle* 12:98 (1873). Scapes capillary, 3-5 cm high; leaves much shorter, minutely papillose, spike lanceolate or oblong; bracts glabrous but minutely papillose, c. 4 mm long, shortly mucronate below the scarious summit, the upper one affixed 1 mm above the lower, the 2 not close together, as in most other species; flowers 6-8 in the spike, each with 1 or 2 unequal narrow scales; carpels 4-8; styles united in lower part.—*Desvauxia drummondii* Nees in Lehm., *Pl. Preiss.* 2:70 (1846).

Occurs in W.Aust. and collected in S.Aust. in 1920 on Woollana Station (Eastern region).

3. *C. fascicularis* Labill., *Nov. Holl. Pl. Sp.* 1:7 (1804). **Tufted centrolepis.** Scapes and leaves filiform, glabrous or sprinkled with hairs, the scapes 2.5-6 cm long, and longer than the leaves; bracts c. 3 mm long, ovate, erect, covered with long rigid hairs and terminating in glabrous awns about their own length; flowers 4-8 in each bract, each with a large scale and sometimes also a smaller one; carpels 2-4; styles almost free.

Occurs in all Australian States except W.Aust. and N.T. Recorded in S.Aust. from the Southern Lofty, Kangaroo I. and S.E. regions.

Flowers Nov.-Feb.

Grows in damp places.

4. *C. glabra* (F. Muell. ex Sond.) Hieron., *Abh. Naturf. Ges. Halle* 12:209 (1873). **Smooth centrolepis.** Scapes and leaves filiform, reddish, 1-4 cm long; bracts glabrous, erect, the lower one 3-4 mm long including the short awn, the upper bract narrower, unawned; flowers in spike 4, without scales; carpels 7-8, rarely 4-5; styles free.—*Desvauxia glabra* F. Muell. ex Sond., *Linnaea* 28:226 (1846/7).

Occurs in all Australian States except N.T. and Qld. Recorded in S.Aust. from the Kangaroo I. and S.E. regions.

Flowers Nov. (1 record).

In Vic. grows on temporarily damp sandy ground.

5. *C. murrayi* J. M. Black, *Trans. R. Soc. S. Aust.* 47:367 (1923). **Dwarf centrolepis.** Glabrous annual, 5-8 mm high; scape none; leaves green, subulate, 3-8 mm



Fig. 281—*Centrolepis aristata*.



Fig. 282—*Centrolepis glabra*.

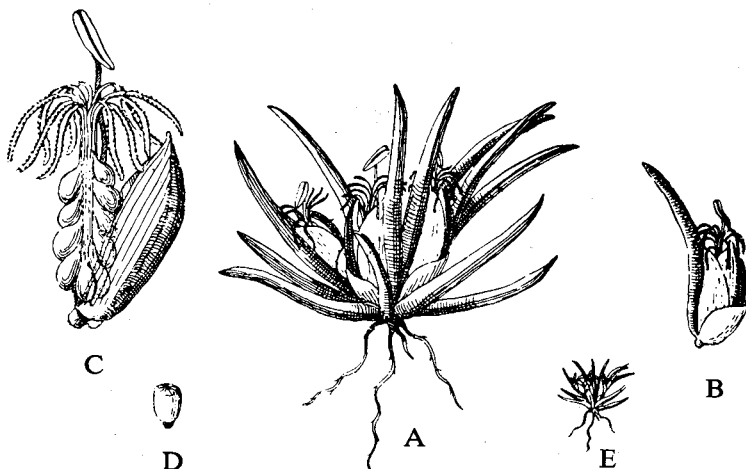


Fig. 283—*Centrolepis murrayi*. A, habit, x 4; B, the 2 floral bracts embraced at base by the broad sheath of an inner leaf, x 4; C, inner floral bract and flower, x 8; D, seed, x 10; E, habit, natural size.

long, the inner ones mostly reduced to the broad membranous sheath; flower solitary within the 2 sessile floral bracts (3-4 mm long), of which the lower one has an awn about as long as the sheathing part and the upper green-keeled one is unawned; scales absent; carpels 8-10; style free.

Only recorded from S.Aust. (Eyre Pen., Murray and S.E. regions).

Flowers Oct.-Nov.

Several similar species occur in W.Aust. and Vic. and the identity of this species may need checking.

6. *C. polygyna* (R.Br.) Hieron., *Abh. Naturf. Ges. Halle* 12:210 (1873). **Wiry centrolepis.** Scapes 1-3 cm high; leaves much shorter; spike narrow; floral bracts brown, glabrous, rigid, the lower tapering into an awn which is 5-10 mm long, usually curved and often twice as long as the bracts, the upper bract awnless; flower solitary, with 1 scale; carpels 5-25; styles united near base.—*Alepyrum polygynum* R.Br., *Prod. Fl. Nov. Holl.* 253 (1810).

Occurs in all Australian States. Recorded in S.Aust. from all regions except the Nullarbor, Gairdner-Torrens and Northern Lofty.

Flowers July-Nov.

Grows in damp places.



Fig. 284—*Centrolepis polygyna*. A, habit, natural size; B, gynoeceum and stamen.

7. *C. strigosa* (R.Br.) Roem. & Schult., *Syst. Veg.* 1:43 (1817). **Hairy centrolepis.** Scapes and leaves filiform; the scapes 4-5 cm long and usually much longer than the minutely hairy leaves; flowerhead ovoid; the hairy bracts somewhat spreading, c. 3 mm long, with points of 1-2 mm or scarcely any and only slightly or not exceeding the flowers; flowers 5-10 in each bract, each with 3 unequal fringed scales; carpels 5-6, styles free.—*Desvauxia strigosa* R.Br., *Prod. Fl. Nov. Holl.* 252 (1810).

Occurs in New Zealand and all Australian States except N.T. Recorded in S.Aust. from the Eyre Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers usually Sept.-Nov.

Close to *C. fascicularis*.

3. TRITHURIA Hook.f.

Fl. Tasm. 2:78 (1858).(Greek *treis*, three; *thyron*, a little door; alluding to the valves of the fruit.)

Small water-plants, with monoecious flowers in a terminal head, the female flowers (each of 1 stipitate ovary) exceeding in number the male flowers (each of 1 long filament and a linear 2-celled anther); ovary 1-celled, with 1 pendulous ovule; styles 3, rarely 2, simple or bisected; capsule triquetrous, opening from the base in 3 valves and 3 filiform nerves which form the angles. 4 species in Australia and New Zealand.

1. *T. submersa* Hook.f., *Fl. Tasm.* 2:78 (1858). **Trithuria.** Dwarf glabrous annual, 1-3 cm high, with filiform basal leaves and scapes, usually red, the leaves sometimes 5 cm long; flowers several, without perianth, closely packed in a terminal head, with 4 lanceolate 1-nerved bracts at base, 3-4 mm long, the flowers shorter than the bracts; styles 3 septate, often bifid; the female flowers in each head number about 10-25, and the male flowers, which occupy the centre, 2-4.

Occurs in all Australian States except N.T. and Qld. Recorded in S.Aust. from the Eyre Pen., Kangaroo I. and S.E. regions.

Flowers Oct.-Jan.

Grows in mud and around temporary pools.

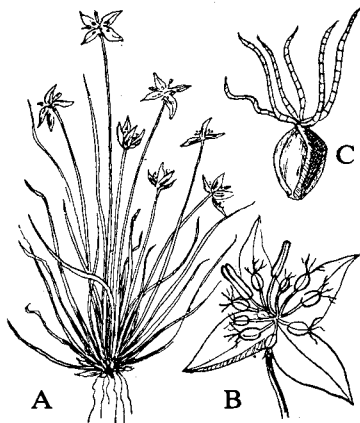


Fig. 285—*Trithuria submersa*. A, habit, natural size; B, the 4 bracts surrounding 9 female and 2 male flowers, x 6; C, female flower.

FAMILY 38—XYRIDACEAE

Mostly herbaceous, perennial marsh plants; leaves radical, distichous, sheathing. Flowers bisexual, each solitary within a broad imbricate rigid bract, and the whole forming a terminal head or spike; calyx irregular, of 1 broad segment enveloping the corolla, and 2 smaller lateral bract-like segments; corolla tubular below, 3-lobed above; perfect stamens 3, attached to the base of the corolla-lobes and usually alternating with 3 staminodia; ovary superior, imperfectly 3-celled, with numerous orthotropous ovules; styles 3-branched; placentas basal or parietal; capsule opening loculicidally in 3 valves and sometimes circumsciss near summit; seeds small, numerous, longitudinally ribbed. 2 genera with c. 250 species mainly in warm areas, especially America. (*Achlyphila* from Venezuela is monotypic).

1. XYRIS L.

Sp. Pl. 42 (1753).(Greek name for a species of *Iris*.)

Generic characters as for family. c. 250 species mainly in warm areas.



Fig. 286—*Xyris operculata*.

1. **X. operculata** Labill., *Nov.Holl.Pl.Sp.* 1:14 (1805). **Tall yellow-eye.** Perennial, with slender scapes, 30-50 cm high; leaves linear, with shining brown sheaths; flowerhead ovoid or globular, 8-12 mm long, the bracts broad and almost black; calyx-segments stiff, brown, boat-shaped, the broad anterior caducous one embracing the corolla, the 2 lateral ones with a rigid keel ciliate or fringed at summit, all 5-6 mm long and nearly as long as the flowering bracts; corolla much exceeding the calyx, its lobes conspicuous, yellow, ovate; capsule enclosed in the 2 persistent lateral calyx-segments, obtuse, 3-lobed, hardened and circumsciss near summit.

Occurs in all Australian States except W.Aust. and N.T. Recorded in S.Aust. from the Southern Lofty, Kangaroo I. and S.E. regions.

Flowers in summer.

FAMILY 39—ERIOCAULACEAE

Perennial herbs with basal grass-like leaves. Flowers very small, unisexual, crowded in a solitary terminal head on a simple scape; each flower within an imbricate bract, the outer rows mostly female and the inner male; perianth-segments 4-6, membranous, the outer ones (sepals) darker and differently shaped from the inner ones (petals); flower-parts 2 or 3; stamens usually 6; ovary 2-3-celled, with 1 pendulous ovule in each cell; capsule splitting loculicidally; ovule orthotropous; albumen mealy. 13 genera and over 1 000 species mainly from warm areas.

1. ERIOCAULON L.

Sp.Pl. 87 (1753).

(Greek *erion*, wool; *kaulos*, stem; alluding to the scapes of some species.)

Annuals or perennials, usually with leaves in radical tufts; scapes usually longer than the leaves; flowers not exceeding the small imbricate bracts of the head; stamens twice as many as the petals, which are marked near the summit by a small dark gland; anthers reniform, 2-celled. About 400 species mainly in the tropics and subtropics. The only genus in Australia.

1. **E. carsonii** F. Muell., *Proc.Linn.Soc.N.S.W.* 5:250 (1890). Scapes 3-8 cm high, leaves in radical tufts, lanceolate, flat, striate, 2-6 cm long, 2-8 mm broad in lower part, always shorter than scapes, heads small, globular, c. 4 mm diam., glabrous, the floral bracts pale, ovate, scarious, shining; female flowers within lower bracts and consisting of 2 boat-shaped keeled scarious sepals, 3 white nearly flat oblong petals with a dark gland near summit and a 3-celled ovary with a 2-branched style; male flowers of 2 narrower channelled sepals and 3 small hyaline petals at the summit of a short stalk, which also supports the 6 stamens; capsule globular, shining.—*E. submersum* Tate, *Trans.R.Soc.S.Aust.* 23:191 (1899), nom.illegit.; *E. tatei* Ruhland in Engl., *Pflanzenreich* 4, 30:117 (1903).

Occurs in N.S.W. (1 locality) and S.Aust. (northern Flinders Ranges region).

Flowers Aug., Oct.

Grows in shallow springs.

FAMILY 40.—COMMELINACEAE

Erect or creeping herbs; leaves parallel-veined, with sheathing bases. Flowers usually small, bisexual, axillary, in small spikes, racemes or panicles; sepals 3, imbricate; petals 3, coloured; stamens 6, but some often barren, the perfect or fertile ones having usually 2-celled anthers opening in slits; ovary superior, 2-3-celled; ovules orthotropous, attached to axile placentas; style simple; fruit a capsule. About 40 genera and c. 500 species, mainly in warm areas.

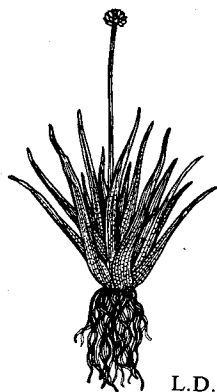


Fig. 287—*Eriocaulon carsonii*.

1. COMMELINA L.

Sp.Pl. 40 (1753).

(After Jan Commelin (1629-92) and Casper Commelin (1667-1731), Dutch botanists.)

Herbs; flowers few, on 1 or 2 peduncles enclosed in a rather large spathe; sepals and petals free, delicate; fertile stamens 3, 1 longer than the other 2; staminodes 3, or sometimes 2, in the back part of the flower, smaller, the barren anthers appearing like 4 small spreading valves; style, with a small capitate stigma; capsule 2-3-celled, loculicidal. Over 250 species mainly in warm areas.

1. *C. undulata* R.Br., *Prod.Fl.Nov.Holl.* 270 (1810). Glabrous plant, 30-50 cm high; stems rather stiff, branching, leafy; leaves distant, flat or channelled, broad-linear or linear-lanceolate, often undulate on margin, 5-12 cm long, 4-10 mm broad, with loose scarious striate sheaths 10-15 mm long, spathes spreading, ovate-acute, solitary, on a stipes 5-15 mm long rising from the upper leaf sheaths and opposite the leaf, 15-20 mm long and rather broader when spread open, the margins united near the base, thus forming a broad oblique funnel which shelters the flowers, the sides with 4-6 curved nerves meeting at the summit of the straight midnerve; peduncle solitary, stiff, rising from the base of the spathe, about 3-flowered, producing 1 or 2 capsules, the terminal flower usually exserted, the lowest flower male; petals obovate, pale-blue, longer than the sepals, one of the 3 fertile stamens with a long curved anther; capsule c. 6 mm long, 3-celled, opening in 3 stiff spreading valves, each cell containing 1 smooth oblong seed.

Occurs in N.T., Qld and S.Aust. (recorded by Black (1943) from the far north).



Fig. 288—*Commelina undulata*, x $\frac{1}{2}$.

FAMILY 41.—PONTEDERIACEAE

Floating or rooted aquatic; leaf-blade (of species in Australia) conspicuous, thick, well-emerged, with innumerable fine, semi-parallel nerves following the curvature of the blade from base to apex. Flowers large, bisexual, with 6 perianth-segments united below in a long or short tube; stamens 6 or fewer, inserted on the perianth; ovary superior, with a long filiform style and 1 or 3 cells. 6 genera and c. 30 species mainly in the tropics. (Aston (1973) *Aquatic plants of Australia*).

1. EICHHORNIA Kunth

Eichhornia, genus novum (Diss.) (1842).

(After J.A.F. Eichhorn, a Prussian Minister of Education.)

Floating or less often creeping aquatic herbs; perianth lobes 3-4 cm long; ovary 3-locular; ovules numerous. 7 species in America. (O. D. Evans (1966) *Contr.N.S.W.nam.Herb.*, *Flora.ser.* 30; Aston (1973) *Aquatic plants of Australia*).

*1. *E. crassipes* (Mart.) Solms in A. & C.DC., *Monogr.Phanerog.* 4:527 (1883). **Water hyacinth.** Scapes 3-8 cm high; leaves in radical tufts, lanceolate, flat, striate, 2-6 cm long, 2-8 mm broad in lower part, always shorter than scapes; heads small, globular, c. 4 mm diam., glabrous, the floral bracts pale, ovate, scarious, shining; female flowers within lower bracts and consisting of 2 boat-shaped keeled scarious sepals, 3 white nearly flat oblong petals with a dark gland near summit and a 3-celled ovary with a 2-branched style; male flowers of 2 narrower channelled sepals and 3 small hyaline petals at the summit of a short stalk, which also supports the 6 stamens; capsule globular, shining.—*E.speciosa* Kunth, *Enum.Pl.* 4:131 (1843).

Native to tropical America; naturalised at some time in all Australian States. Formerly established in quantity on the Murray River in S.Aust., but eradicated by 1954 and despite its continued presence up-stream, not again established in S.Aust.

FAMILY 42.—JUNCACEAE*

Leaves narrow, mostly radical, sometimes reduced to basal sheaths (cataphylls); inflorescence mainly cymose, the cymes sometimes contracted into clusters or expanded into panicles. Flowers small, usually bisexual, with or without bracteoles at base and often arranged in clusters; perianth glume-like, persistent, of 6 lobes or segments in 2 rows, spreading when in flower; stamens 3-6, attached at the base of the perianth; anthers 2-celled; ovary superior, 1- or 3-celled, each cell with 1 to numerous erect anatropous ovules attached to parietal or basal placentas; style 3-branched, capsule opening loculicidally by 3 valves; seeds small, with a small embryo within the mealy albumen (endosperm) near the micropyle and hilum, the testa sometimes produced at one or both ends of the seed into a short hyaline appendage or tail. About 9 genera and 400 species mainly in temperate regions. 2 genera in Australia.

- Leaves glabrous, cylindrical, channelled or flat, sometimes reduced to basal sheaths; capsule 3-celled, with numerous seeds JUNCUS 1.
 Leaves hairy, flat; capsule with 1 cell containing 3 seeds LUZULA 2.

1. JUNCUS L.

Sp.Pl. 325 (1753).

(Latin name for a rush.)

Plants mostly growing near water or in seasonally wet areas and the perennial species often with strong creeping rootstocks; cataphylls open (slit to base); leaves glabrous; each flower with or without 2 small hyaline bracteoles at base; small lanceolate scarious bracts at base of panicle branches, or the lowest (primary) bract longer than the panicle and sometimes appearing as a continuation of the stem; stamens 3-6; ovary with 3 parietal placentas often meeting in the centre and dividing the ovary more or less perfectly into 3 cells; seeds small, numerous, on parietal placentas, with a membranous testa often loose and transparent at the end. About 300 species, cosmopolitan. Many problems exist in the taxonomy of *Juncus* and Dr. L. A. S. Johnson and Karen Wilson, who are revising the genus for Australia, have found that there are a number of species to be described.

The key is almost entirely by L. A. S. Johnson and K. Wilson. In using the key it should be noted that stem diameters are taken at a point approximately half way from the base of the inflorescence, also that the measurements of the perianth apply to the longest segments as flattened out (that is to say they do not apply to the chord across curved segments which can be considerably shorter); the measurements of capsules, on the other hand, apply to the length of the central axis of the capsule at maturity but before dehiscence.

1. Leaves 0 or cylindrical (non-septate) and resembling the stems; primary bract apparently continuous with stem, inflorescence thus appearing lateral.
2. Leaf-blades developed.
 3. Perianth-segments half as long as capsule; inflorescence compact *J. acutus* 1.
 3. Perianth-segments as long as capsule; inflorescence expanded *J. kraussii* 15.
2. Leaf-blades reduced to basal sheaths.
 4. Stems with continuous pith.
 5. Upper portion of stems, inflorescence branches and outside of perianth scabridulous *J. radula* 21.

*Footnote—This treatment owes a great deal to Dr L. A. S. Johnson and Mrs K. L. Wilson (Royal Botanic Gardens and National Herbarium, Sydney) who revised my manuscript, making numerous improvements.

5. Stems, inflorescence branches and outside of perianth not scabridulous.
6. Perianth longer than capsule; cataphylls not shining; stamens 3 *J. effusus* 11.
6. Perianth shorter than capsule; cataphylls more or less shining; stamens 3-6.
7. Cataphylls dark reddish-brown, tight; stem striations 20-45; flowers mostly widely separated along the inflorescence branches *J. pauciflorus* 17.
7. Cataphylls golden to chestnut-brown at base, often more or less loose; stem striations 35-100; flowers not widely separated.
8. Perianth 1.6-2.5 mm long; capsule 1.8-2.7 mm long; stamens usually 3 *J. continuus* 10.
8. Perianth 2.6-3.5 mm long; capsule 2.8-3.5 mm long; stamens 6 *J. pallidus* 16.
4. Stems with interrupted pith.
9. Capsule longer than perianth.
10. Stem striations more than 75; cataphylls golden within, broad and loose; stems green *J. procerus* 20.
10. Stem striations 20-90; cataphylls opalescent and mostly pale within; stems green to glaucous.
11. Perianth 1.3-2.2 mm long; cataphylls dark reddish-brown to black below; stamens 3-4.
12. Capsule 2.0-2.5 mm long; stem striations 10-12 per mm; pith very open, consisting mainly of air-spaces *J. amabilis* 2.
12. Capsule 1.5-2.0 mm long; stem striations 6-9 per mm; pith ladder-like, air-spaces and partitions more or less equal *J. usitatus* 25.
11. Perianth 2.0-4.1 mm long; cataphylls pale to chestnut-brown below (or if reddish-brown then perianth more than 3 mm long); stamens 3-6.
13. Stem striations 20-35; longest cataphyll 4-10 cm .. *J. subsecundus* 24.
13. Stem striations 40-90; longest cataphyll 13-30 cm . *J. aridicola* 3.
9. Capsule shorter than perianth.
14. Capsule 1.7-2.3 mm long; longest cataphyll 15-30 cm .. *J. sarophorus* 22.
14. Capsule 2.3-3.5 mm long; longest cataphyll 4-19 cm.
15. Stem striations 20-35; cataphylls often pale, longest 4-10 cm *J. subsecundus* 24.
15. Stem striations 35-100; cataphylls chestnut- to dark-brown at base, longest 6-19 cm.
16. Perianth 2.0-3.0 mm long; stem striations 35-60, distinct *J. australis* 5.
16. Perianth 3.0-3.2 mm long; stem striations 50-120, very crowded *J. flavidus* 12.
1. Leaves flat or cylindrical and septate; inflorescence usually terminal.
17. Leaves hollow, cylindrical or laterally compressed, transversely septate.
18. Stems c.0.5 mm diam., terete, septa usually not obvious ... *J. bulbosus* 7.
18. Stems 1-5 mm diam., terete or compressed, septa usually obvious.

- 19. Perianth 2-2.5 mm long *J. subnodulosus* 23.
- 19. Perianth 2.5-4 mm long.
- 20. Leaves terete (when fresh) or compressed, with transverse septa only; stamens 6.
- 21. Flowers 4-10 per final cluster, dark-coloured; plant obviously rhizomatous *J. articulatus* 4.
- 21. Flowers usually 10-20 per final cluster, pale-coloured; plant shortly rhizomatous *J. holoschoenus* 13.
- 20. Leaves compressed, with longitudinal and incomplete transverse septa; stamens 3 *J. prismatocarpus* 19.
- 17. Leaves solid, dorsi-ventrally flattened, not septate.
- 22. Small annuals.
- 23. Stem-leaves absent; flowers ebracteolate, in a terminal cluster *J. capitatus* 9.
- 23. Stem-leaves present; flowers bracteolate, solitary or in small clusters *J. bufonius* 6.
- 22. Perennials.
- 24. Leaves flat; the leaf-base not auriculate; flowers ebracteolate.
- 25. Stamens 3 *J. planifolius* 18.
- 25. Stamens 6 *J. caespiticius* 8.
- 24. Leaves very narrow; the leaf-base auriculate; flowers bracteolate *J. homalocaulis* 14.

*1. *J. acutus* L., *Sp.Pl.* 325 (1753). **Sharp rush.** (Ill. Ross-Craig, *Drawings Brit.Pl.* 30 (1973)12). Perennial, stems arising from a rhizome, to 130 cm high, c. 4 mm diam., with continuous pith, rigid, cylindrical; leaves few, almost as long, stem-like, with pungent points, not septate; panicle compound, lateral, compact, with many spreading branches, the individual clusters more or less rounded, often c. 3 cm diam.; primary bract broad at the base, much exceeding the panicle; flowers reddish-brown; segments 2.5-4 mm long, acute, much shorter than the mucronate broadly ovoid brown capsule; stamens 6; seeds with loose testa and tailed, usually at both ends.

Native to Europe, Africa and the Americas. Naturalised in New Zealand, W.Aust., N.S.W., Vic. and S.Aust. (Flinders Ranges, Eyre Pen. and Southern Lofty regions).

Flowers throughout the year.

Occurs mainly in damp places along the coast, but also inland wet areas of high salinity.

2. *J. amabilis* E. Edgar, *New Zealand J. Bot.* 2:186, figs 7 & 21 (1964). Perennial; stems arising from a rhizome, greyish-green, easily compressed, 20-120 cm high and 1.0-2.3 mm diam., pith interrupted, with large air-spaces; stem striations 30-80; leaf-blades 0; leaf-sheaths dark; inflorescence a lateral more or less compact panicle; flowers more or less clustered on panicle branches, pale-coloured; perianth 1.7-2.2 mm long; stamens 3 (-4); capsule exceeding perianth.

Occurs in W.Aust., N.S.W., Vic., Tas. and S.Aust. (Belair, Southern Lofty region, and near Glencoe, S.E. region). Apparently introduced in New Zealand.

Flowers recorded in S.Aust. in Dec. and Feb.

Occurs in damp places.

3. *J. aridicola* L.A.S. Johnson, sp. nov. Perennial; stems arising from a rhizome, 60-100 cm high and 1.3-6 mm diam., usually more or less glaucous; pith interrupted; stem striations 40-90; leaf-blades 0; leaf-sheaths pale to medium-brown; inflorescence a lateral loose panicle; flowers more or less spaced out along the panicle branches, pale-coloured; perianth 2.0-2.8 mm long; stamens 3-6; capsule exceeding or equal to perianth.

Holotype: c. 20 miles [32 km] E. of Matakana (c. 1.5 km E. of crossroad to Lake Cargellico), N.S.W., *Johnson NSW 105140*, 16.iv 1970 (NSW).

Inter speciebus sectionis *Genuini* distinguenda: cataphyllis plerumque pallidibus basi roseis vel aureis vel nonnunquam brunneis, culmis plerumque plus minusve glaucis striis angustis 40-90 instructis, medulla interrupta, stomatibus superficialibus, inflorescentia diffusa vel varius subcompacta ramis saepe curvatis, tepalis pallide stramineis acutis marginibus latis membraneis 2.0-2.8 mm longis, staminibus 3-6, antheris 0.5-1.0 mm longis, capsula quam tepalis longiore vel eis aequantibus auribrunnea.

The epithet (Latin: inhabitant of dry places) refers to the climatically dry regions in which the species is found, although the plants require wet conditions for the early stages of growth.

The ending “-cola” should not be changed to terminate in “-us”.

Occurs in all Australian mainland States. Recorded in S.Aust. from the Flinders Ranges (Mambray Creek) and Murray regions.

Flowers Dec.-July.

Grows in seasonally wet places in climatically dry areas.

*4. *J. articulatus* L., *Sp. Pl.* 327 (1753). **Jointed rush.**

(Ill. Ross-Craig, *Drawings Brit. Pl.* 30 (1973) 19). Perennial, with creeping rootstock, 15-50 cm high; stems stiff, slender; leaves mostly on stem, the sheaths with 2 obtuse auricles at summit, or almost ligulate, the blades laterally compressed, c. 1 mm broad, hollow and distinctly and completely septate; flowers dark coloured, 2-10, rarely more, in globular clusters of 5-8 mm diam., forming a loose cymose panicle 3-15 cm long, much surpassing the small leafy bracts at its base; perianth-segments equal, 3 mm long, the outer ones acute, the inner subobtuse; stamens 6; capsule dark, shining, abruptly mucronate, longer than perianth; seeds ovoid, tailless.—*J. lampocarpus* Ehrh., *Calam.* 126 (1785/93).

Native to Eurasia and the Americas. Naturalised in New Zealand, W.Aust., N.S.W., Vic., Tas. and S.Aust. (Northern Lofty, Murray, Southern Lofty and S.E. regions).

Flowers throughout the year.

Occurs in wet places especially on acid soils.



Fig. 289—*Juncus articulatus*.

5. *J. australis* Hook. f., *Fl. Tasm.* 2:66 (1858). **Austral rush.** Stems from a shortly creeping rootstock, 60-120 cm high, usually 2-4 mm diam., firm, pith interrupted with large air-spaces, cylindrical; stem striations 35-60; stomata deeply sunken; leaf-blades 0; panicle compound, lateral, the clusters of flowers usually forming subglobose heads often c.3 cm diam; the erect primary bract much exceeding the panicle; flowers pale; segments 2.2-3 mm long, acute, the inner with stiff narrow wings, exceeding or equal to (rarely shorter than) the obtuse ovoid capsule which is pale above and darker below; stamens usually 3 or 4.

Occurs in New Zealand, N.S.W., Vic., Tas. and S.Aust. Recorded rather occasionally in S.Aust. in the Adelaide Hills (Southern Lofty region).

Flowers throughout the year.

Grows in wet or seasonally wet grassland often in shade. See note to *J. pauciflorus*.



Fig. 290—*Juncus bufonius*.

6. *J. bufonius* L., *Sp.Pl.* 328 (1753). **Toad rush.** (Ill. Ross-Craig, *Drawings Brit.Pl.* 30 (1973) 1). A slender annual, 2-30 cm tall; leaves flat, not septate, channelled, filiform, 2-3 on the stems, shorter than or somewhat longer than inflorescence; flowers typically pale and solitary along the spike-like branches of a panicle 1.5-12 cm long, but sometimes 2-6 in clusters and then often reddish-brown; leafy bracts usually shorter than panicle but sometimes longer; perianth-segments linear-lanceolate, the outer 3 6-7 mm long, the inner ones and oblong capsule shorter; seeds ovoid, smooth, without tails; stamens 3 or 6.—*J. plebeius* R. Br., *Prod. Fl. Nov. Holl.* 259 (1810).

Cosmopolitan, particularly in temperate areas including all Australian States except N.T. Recorded in S.Aust from the N.W., Gairdner-Torrens, Flinders Ranges, Eyre Pen., Yorke Pen., Northern Lofty, Southern Lofty, S.E. and Kangaroo I. regions.

Flowers throughout the year.

Common particularly in damp areas in the south of the State.

Black recognised var. *fasciculatus* (Bertol.) Koch. The species is variable in many parts of its range and there are also probably some closely similar but distinct species in the group, which is in need of further study on a world basis. Possibly introduced in Aust. or perhaps some forms native.

*7. *J. bulbosus* L., *Sp.Pl.* 327 (1753). (Ill. Ross-Craig, *Drawings Brit. Pl.* 30 (1973) 16). Perennial; stems slender, c.0.5 mm diam. 1-30 cm high, rooting at the lower nodes; leaves on stem and basal, the sheaths with 2 obtuse auricles at summit, shorter than the stems, terete, c.0.5 mm wide, hollow with several longitudinal tubes, the individual tubes transversely septate; flowers dark-coloured, usually 2-15 in clusters, forming a small, loose cymose panicle exceeding the small leafy bract at its base; inflorescence sometimes proliferating; perianth-segments usually equal, 2-3 mm long, obtuse (or outer ones acute); stamens 3 or 6; capsule dark-coloured, obtuse or retuse, longer than the perianth.

Native to Europe and North Africa. Naturalised in New Zealand, N.S.W., Vic., Tas. and S.Aust. (one record from Penola Pine Forest Reserve in the S.E. region).

8. *J. caespiticius* E. Meyer in Lehm., *Pl. Preiss.* 2:47 (1846). **Grassy rush.** Perennial; stems leafless, slender, 10-40 cm high; leaves radical, not hollow, concave above, tapering to fine points, c.2 mm broad; leaf-base without lobes; inflorescence a terminal cyme of up to 8 globular flower-heads; leafy bract usually longer than the inflorescence; flowers brown; perianth 2.5-3 mm long; capsule shorter than or equal to the perianth, obtuse, mucronate; stamens 6.

Occurs in New Zealand and all Australian States except Qld and N.T. Recorded in S.Aust. from the Flinders Ranges, Eyre Pen., Southern Lofty, Kangaroo I. and S.E. regions.

Flowers throughout the year.

Grows mainly in marshy places, often near the sea.

*9. *J. capitatus* Weig., *Obs. bot.* 28 (1772). **Capitate rush.** (Ill. Ross-Craig, *Drawings Brit.Pl.* 30 (1973) 23). Annual, with simple, filiform stems 2-8 cm high; leaves all radical, linear-channelled, solid; flowers brown, 3-10 in a terminal cluster, usually solitary and surpassed by a leafy bract, the lower flowers in the cluster spreading; outer perianth-segments with long curved points; stamens 3; capsule almost globular, shorter than perianth; seeds without tails.

Native to Eurasia, Africa and South America., but probably not North America, introduced in W.Aust., N.S.W., Vic., Tas. and S.Aust. (Northern Lofty, Eyre Pen., Southern Lofty, Kangaroo I. and S.E. regions).

Flowers throughout the year.

Grows mainly in damp or seasonally damp areas.

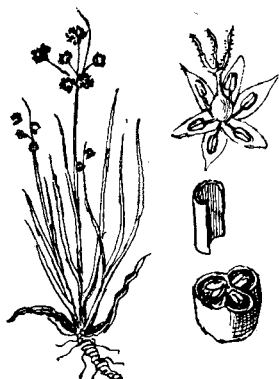


Fig. 291—*Juncus caespiticius*.



Fig. 292—*Juncus capitatus*.

10. *J. continuus* L. A. S. Johnson, sp. nov. Perennial; stems arising from a rhizome, 50-120 (-150) cm high and 1-4 mm diam., light green, pith continuous; stem striations 35-80; leaf-blades 0; leaf-sheaths more or less pale; inflorescence a lateral panicle; flowers scattered or clustered on panicle branches, pale coloured; perianth 1.6-2.5 mm long; stamens 3 (-6); capsule exceeding perianth.

Holotype: Sailors Bay, Northbridge, N.S.W. 50ft. [15 m], Johnson NSW 48976, 5.xii.1959 (NSW).

Inter speciebus sectionis *Genuini* distinguenda: cataphyllis basi aureis castaneisve, culmis 35-80 striis angustis instructis, medulla continua, stomatibus superficialibus, bractea primaria longiuscula (ad 38 cm), inflorescentia diffusa vel subaggregata, tepalis stramineis 1.6-2.5 mm longis acutis sed non acuminatis, staminibus 3 vel rarius 6, antheris 0.5-0.8 mm longis, capsula quam tepalis longiore (1.8-2.7 mm) auribrunnea.

The epithet refers to the uninterrupted pith.

Occurs in N.T., Qld, N.S.W., Vic. and S.Aust. (1 specimen only; National Park, Belair, Cleland 4.1942, AD). Introduced in New Zealand.

*11. *J. effusus* L., *Sp.Pl.* 326 (1753). *Soft rush*. (Ill. Ross-Craig, *Drawings Brit.Pl.* 30 (1973) 9). Perennial; stems arising from a rhizome, 30-150 cm high, 1.5-3.5 mm diam., bright to yellowish-green, soft, with continuous pith; stem striations fine, 30-55; leaf-blades 0; inflorescence a lateral lax or condensed and rounded panicle with ascending and deflexed branches; perianth 1.5-2.5 mm long, segments narrow, acute; capsule shorter than or equal to perianth, broadly ovoid, slightly retuse.

Widespread in Eurasia and North America, scattered in Africa and South America; introduced in New Zealand, N.S.W., Vic., Tas. and S.Aust. (2 records from the Southern Lofty region).

Flowers recorded in Jan. and March.

12. *J. flavidus* L. A. S. Johnson, sp. nov. Perennial; stems arising from a rhizome, 35-120 cm high and 1.0-4.5 mm diam., yellowish-green, stomata deeply sunken, pith interrupted; stem striations 50-120, very crowded; leaf-blades 0; leaf-sheaths dark at the base; inflorescence a lateral panicle; flowers clustered on panicle branches, pale coloured when young, becoming brightish yellow; perianth 3.0-3.3 mm long, segments acuminate; stamens 3-6; capsule shorter than or equalling perianth.

Holotype: Oil Tree Lagoon 1 mile [1.5 km] W. of Balldale, N.S.W., Johnson and Constable NSW 48566, 10.iii.1959 (NSW).

Inter speciebus sectionis *Genuini* distinguenda: cataphyllis laxi basi aureis vel porphyreis vel atroporphyreis, culmis flavido-viridibus striis angustis creberrimis, medulla interrupta, stomatibus in foveis profundis dispositis, inflorescentia diffusa vel plus minusve compacta, tepalis 3.0-3.2 mm longis, staminibus 3-6, antheris 0.9-1.1 mm longis, capsula tepala aequante vel breviora auribrunnea.

The epithet refers to the colour of the stems.

Occurs in W.Aust., Qld, N.S.W., Vic. and S.Aust. (Flinders Ranges, Eyre Pen., Northern Lofty, Yorke Pen. and S.E. regions). Introduced in New Zealand.

Flowers Nov.-May.

13. *J. holoschoenus* R. Br., *Prod.Fl.Nov.Holl.* 259 (1810). **Joint-leaf rush.** Perennial; shortly rhizomatous; stems usually less than 45 cm high and 1.5-3 mm diam.; leaves on stem and basal, the sheath with 2 obtuse auricles at summit, numerous, usually at least as long as the stems, terete or slightly compressed, 2-4 mm wide, hollow and distinctly and transversely septate; flowers light coloured, usually 10-20 in clusters, forming a loose cymose panicle much surpassing the small leafy bracts at its base, perianth-segments equal, 3-4 mm long, acuminate; stamens 6; capsule pale coloured, acute, equal to or longer than perianth.—*J. prismatocarpus* sensu J. M. Black, *Fl.S.Aust.* 183 (1943), partly.

Occurs in New Zealand and all Australian States except N.T. and Qld. Recorded in S.Aust. from the Flinders Ranges, Southern Lofty, Murray and S.E. regions.

Flowers mainly in summer.

Grows in damp grassland and along the edge of water.

Black's (1943) *J. prismatocarpus* was a mixture of this species (mainly) and of true *J. prismatocarpus*.



Fig. 293—*Juncus homalocaulis*.

14. *J. homalocaulis* F. Muell. ex Benth., *Fl.Aust.* 7:128 (1878). **Wiry rush.** Small slender perennial; stems c. 3-15 cm high, the base covered with the fibrous remains of old leaf-sheaths; leaves mostly basal, filiform, solid, dorsiventrally flattened, channelled above, shorter or longer than the stems, which are erect and simple; leaf-base auricles about as long as wide; leafy bracts 2, 1 usually much longer than the inflorescence, which is a few-flowered cyme; flowers 2-6 in clusters, divaricate, rarely solitary, subsessile, the clusters usually 1 in the central fork and 1 at the end of usually 2 short more or less recurved branches; perianth-segments acuminate, the outer c. 6 mm long, the inner one shorter and the oblong capsule shorter still; seeds ovoid-oblong, tailless.—*J. plebeius* sensu J. M. Black, *Fl.S.Aust.* 182 (1943).

Occurs in all Australian States except Tas. and N.T. Recorded in S.Aust. only in the S.E. region and apparently not very common.

Flowering mainly in summer.

Grows in wet grassland.

15. *J. kraussii* Hochst., *Flora* 28:342 (1845). **Sea rush.** Stems from a creeping root-stock, c. 1 m high, 2-4 mm diam., with continuous pith, rigid, cylindrical; leaves few, almost as long, stem-like, non-septate, with pungent points; panicle rather loose and interrupted or dense, 5-12 cm; sheath of the lower leafy bract very broad and loose; flowers dark brown, in small few-flowered clusters,

often much surpassed by the erect rigid primary bract; segments 3 mm long, acute, equalling the mucronate oblong-ovoid almost black shining capsule; stamens 6; seeds with loose testa and tailed, usually at both ends.—*J. maritimus* Lam., *Encycl.* 3:264 (1789) var. *australiensis* Buchen., *Bot. Jb.* 12:257 (1890).

J. kraussii has been included by most authors under the northern hemisphere *J. maritimus*. It occurs, in slightly different forms, in southern Africa and Australasia (New Zealand and all Australian States). Recorded in S.Aust. from the Lake Eyre, Flinders Ranges, Eyre Pen., Southern Lofty, Kangaroo I. and S.E. regions.

Flowers throughout the year but especially in summer.

Particularly plentiful in saline and brackish areas along the coast, and in similar places inland.

16. *J. pallidus* R. Br., *Prod.Fl.Nov.Holl.* 258 (1810). **Pale rush.** Stems stout, 50 cm to 2 m high, 3-8 mm diam., pale green, with continuous pith; stem striations fine, 50-100; leaves reduced to long broad basal sheaths, dark brown below, pale above; flowers straw-coloured, numerous, distinct in a rather loose or dense erect lateral panicle 6-16 cm long, with a long erect rigid acute primary bract; perianth 2-6-3-5 mm long, the segments all acute, exceeded by the ovoid capsule; stamens 6.

Occurs in New Zealand and all Australian States except Qld and N.T. Recorded in S.Aust. from the Northern and Southern Lofty, Kangaroo I. and S.E. regions.

Flowers mainly in summer.

Grows in seasonally damp places.

17. *J. pauciflorus* R.Br., *Prod.Fl.Nov.Holl.* 259 (1810). **Loose-flower rush.** Perennial; stems arising from a rhizome, slender, often arching, 25-100 cm high, 0.75-2.0 mm diam., bright green, smooth, with usually continuous pith; stem striations, fine, 20-45; leaves reduced to long dark brown basal sheaths; flowers often brownish, few, not clustered, in a very loose lateral panicle 3-8 cm long, with a long erect primary bract; perianth 2-3 mm long, segments narrow and acute, usually distinctly shorter than the capsule; stamens 6; capsule ovoid to oblong.

Occurs in New Zealand and all Australian States except Qld and N.T. Recorded in S.Aust. from the Murray, Southern Lofty, Kangaroo I. and S.E. regions. Records from Asia refer to the quite different species *J. setchuensis* Buchen.

Flowers mainly in summer.

Black (1943) confused this and related species which he referred to *J. pallidus*, *J. pauciflorus*, *J. polyanthemus* (sic) and *J. vaginatus*. Dr L. Johnson's revision of the group (Section *Genuini*) has not been published but all the species definitely known to occur in S.Aust. are treated here. Other species in this group recognised here are *J. amabilis*, *J. aridicola*, *J. australis*, *J. continuus*, *J. effusus*, *J. flavidus*, *J. pallidus*, *J. procerus*, *J. radula*, *J. sarophorus*, *J. subsecundus* and *J. usitatus*. *J. polyanthemus* is native in Qld and N.S.W.; a specimen of *J. vaginatus* from S.Aust. (no definite locality) at Kew may not actually be from this State. It occurs in Qld, N.S.W., Vic., Tas. and possibly W.Aust.

18. *J. planifolius* R.Br., *Prod.Fl.Nov.Holl.* 259 (1810). **Broad-leaf rush.** Perennial; stems leafless, slender, 10-30 cm high; leaves radical, glabrous, solid, flat, or slightly channelled, grass-like, 3-8 mm broad; leaf-base without lobes; flowers brown in globular clusters, 5-7 mm diam., on the branches or in the forks of a terminal umbel-like unequally branched cyme, sometimes

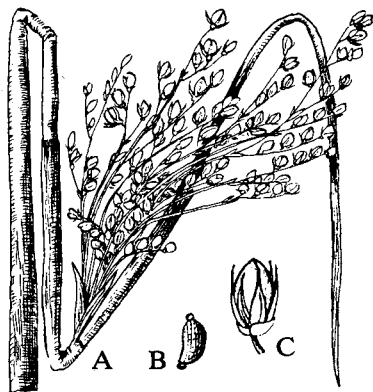


Fig. 294—*Juncus pallidus*. A, inflorescence, $\times \frac{1}{2}$; B, perianth surrounding nut; C, seed.

reduced to a single terminal cluster; perianth-segments only 1.5-2.5 mm long; capsule ovoid, as long as the perianth; stamens 3; seeds ovoid, without tails.

Occurs in South America, New Zealand and all Australian States except N.T. Recorded in S.Aust. from the Southern Lofty, Kangaroo I. and S.E. regions.

Flowers mainly in summer.

19. ***J. prismatocarpus*** R.Br., *Prod.Fl.Nov.Holl.* 259 (1810). **Branching rush.** Perennial; stems loosely tufted, rooting at the nodes, usually 30-60 cm high, 1-2.5 mm diam.; leaves on stem and basal, the sheaths with 2 obtuse auricles at summit, numerous, usually shorter than the stems, laterally compressed, 2-5 mm wide, hollow with several longitudinal tubes, the individual tubes transversely septate; flowers light coloured, usually 6-12 in clusters, forming a loose cymose panicle much exceeding the small leafy bract at its base; perianth-segments usually equal, 3-4 mm long, acuminate; stamens 3; capsule pale coloured, long acute, longer than the perianth.

Occurs in Asia, New Zealand and all Australian States except N.T. Recorded in S.Aust. from the Flinders Ranges (Wilpena), Southern Lofty, Murray and S.E. regions.

Flowers mainly in summer.

Grows in damp places.

Black (1943) confused this species with *J. holoschoenus*.

20. ***J. procerus*** E. Meyer, *Linnaea* 3:367 (1828). Perennial; stems arising from a rhizome, thick, soft, to 2 mm high, 3.5-8 mm diam., yellow green, with interrupted pith; stem striations fine, 80-160; leaves reduced to long broad brown basal sheaths; flowers brownish not clustered, in a moderately compact lateral panicle, with a long erect primary bract; perianth 2-3 mm long, acute, shorter than or equalling the capsule; stamens 3; capsule somewhat flattened apically.

Occurs in New Zealand, W.Aust., N.S.W., Vic., Tas. and S.Aust. (Penola to Mount Gambier in the S.E. region).

Flowers Oct.-Feb.

See notes under *J. pauciflorus*.

21. ***J. radula*** Buchen., *Krit. Verzeichn. Juncac.* 38 (1880). Perennial; distinctly scabridulous, especially on upper part of stems, panicle branches and outside of perianth; stems arising from a rhizome, usually 20-60 cm high and 0.5-2.3 mm diam., with continuous pith; stem striations 13-28; leaf-blades 0; leaf-sheaths usually pale; inflorescence a lateral loose panicle, flowers usually evenly spaced along the panicle branches, pale-coloured; perianth 3.0-4.5 mm long; stamens (3-) 6; capsule shorter than or equalling perianth.

Occurs in W.Aust., N.S.W., Vic. and S.Aust. (Eyre Pen., Northern Lofty and S.E. regions).

Flowers Oct.-March.

Seasonally wet places in climatically rather dry regions.

This species has been confused with *J. subsecundus* but is readily distinguishable by its finely scabrous parts and continuous pith.

22. ***J. sarophorus*** L. A. S. Johnson, *Contr.N.S.W. natn.Herb.* 3(4):242 (1963). Perennial; stems arising from a rhizome, usually 70-120 cm high and 1.5-4 mm diam., blue-green, with interrupted pith; stem striations 25-50; stomata sunken in shallow pits (only visible microscopically in section); leaf-blades 0; inflorescence a rather dense, fan-shaped lateral panicle; flowers pale-coloured; perianth-segments 2-2.5 mm long, acute; stamens usually 3; capsule slightly shorter than the perianth, ellipsoid.—*J. polyanthemus* sensu J. M. Black, *Fl.S.Aust.* 183 (1943), partly.

Occurs in New Zealand, N.S.W., Vic., Tas. and S.Aust. (Flinders Ranges, Southern Lofty and Murray regions).

Flowers mainly in summer.

The species belongs to Section *Genuini*, see note to *J. pauciflorus*. Johnson (1963) mentioned that it was often confused with *J. usitatus* from which it differs in the longer more acute perianth-segments which often exceed the capsule and in the more erect and tufted inflorescence. The only other described species with sunken stomata are *J. australis* and *J. flavidus*.

*23. *J. subnodulosus* Schrank, *Baiersche Fl.* 1:616 (1789). **Blunt-flowered rush** (in Britain). (I11. Ross-Craig, *Drawings Brit. Pl.* 30 (1973) 14.) Perennial; stems arising from a rhizome, rather soft, 50-120 cm high, bright green, hollow with several longitudinal tubes and incomplete transverse septa; leaves similar to the stems; inflorescence compound, of many heads of 3-12 flowers; flowers pale coloured at first, but darkening later; perianth 2-2.25 mm long, obtuse; stamens 6; capsule pale brown, broadly ovoid, acuminate. (Description from Clapham, Tutin & Warburg, *Fl. Brit. Isles* (1962) 990.)

Native to Europe, North Africa and North America. Possibly naturalised in S.Aust. (Southern Lofty region). A single collection from Myponga is the only Australian record for this species. It was recorded as occurring in a drained swamp, flowering in Jan. 1950. Also introduced in New Zealand.

24. *J. subsecundus* N. A. Wakefield, *Victorian Nat.* 73:211 (1957). **Finger rush**. Perennial; stems arising from a rhizome, 20-90 cm high and 0.5-2.3 mm diam., with interrupted pith; stem striations 20-35, rather coarse; leaf-blades 0; leaf-sheaths usually pale; inflorescence a lateral compact or loose cluster with usually one similar but smaller cluster terminating a bare elongated branch above it, flowers usually evenly spaced along the panicle branches, pale-coloured; perianth 2-4 mm long; stamens 3-6; capsule exceeding, equalling or shorter than perianth.—*J. vaginatus* sensu J. M. Black, *Fl.S.Aust.* 184 (1943), partly.

Occurs in W.Aust., Qld, N.S.W., Vic., Tas. and S.Aust. (Lake Eyre, Flinders Ranges, Eyre Pen., Northern Lofty, Murray, Southern Lofty and S.E. regions). Black's record for Kangaroo I. has not been substantiated. Introduced in New Zealand.

Flowers mainly in autumn and early summer.

Common in damp places associated with a wide range of communities; variable in perianth length, particularly long-flowered and robust forms occurring in the S.E.

Black's record of *J. radula* from Strzelecki Creek (Lake Eyre region) is referable to *J. radula* var. *laevior* which is a synonym of *J. subsecundus*.

25. *J. usitatus* L. A. S. Johnson, *Contr.N.S.W. natn. Herb.* 3(4):241(1963). Perennial; stems arising from a rhizome, usually 35-120 cm high and 0.75-2.0 mm diam., green, with interrupted pith; stem striations 25-40; leaf-blades 0; inflorescence a rather loose lateral panicle; flowers pale; perianth-segments 1.3-2 mm long, subacute; stamens 3; capsule much longer than perianth, ellipsoid.—*J. polyanthemos* sensu J. M. Black, *Fl.S.Aust.* 183 (1943), partly.

Occurs in New Zealand, New Caledonia, Qld, N.S.W., Vic., S.Aust. (Southern Lofty and Murray regions) and W.Aust. where it is probably introduced.

Flowers mainly in summer.

Grows in damp places. Very sporadic in S.Aust., the occurrences more or less isolated from the main area of the species in eastern Australia. It may be introduced in the State.

Belongs to Section *Genuini*; see note to *J. pauciflorus*. *J. polyanthemos*, with which this species has been previously confused, does not occur in S.Aust.

J. revolutus R. Br. This species was included by Black (1943) but no collection is known and it is unlikely to occur in South Australia.

Fig. 295—*Luzula* sp.2. *LUZULA* DC. in Lam. & DC.*Fl. Franc.* 1:198 (1805).

(Italian *luzziola*, the fire-fly; probably alluding to the shining and quivering character of the heads or clusters of flowers.)

Perennials, mostly growing near water; leaf-sheaths closed; the leaves usually hairy; each flower has usually 2 small hyaline bracteoles at base; small lanceolate scarious bracts at base of panicle branches; stamens usually 6; ovary with 3 basal ovules in 1 cell; seeds minute, numerous, on parietal placentas, with a membranous testa often loose and transparent at the end; capsule opening loculicidally in 3 valves. (Nordenskiöld, *Bot. Notis.* 122 (1969) 69-89; key after Edgar, *New Zealand J.Bot.* 13 (1975) 781-802.) About 80 species, cosmopolitan.

Black (1943) placed all S.Aust. species of *Luzula* in *L. campestris*. This species is now considered to be native only in the N. Hemisphere and not to occur in S.Aust.

1. Anthers (0.2)-0.4-0.5-(0.6) mm long.
 2. Mature capsule usually light creamy brown *L. flaccida* 3.
 2. Mature capsule reddish- or purple-brown *L. densiflora* 2.
1. Anthers more than 0.5 mm long, but some flowers with occasional smaller anthers.
 3. Tufts bulbous at base, slender; flowering stems c. 20-30 cm tall ... *L. meridionalis* 4.
 3. Tufts not bulbous at base, always robust if flowering stems more than 20 cm tall.
 4. Plants long-rhizomatous; inflorescence an oblong head with a few sessile lower clusters *L. australasica* 1.
 4. Plants tufted, rarely rhizomatous; inflorescence of several more or less pedunculate ovate heads or a single ovate cluster ... *L. flaccida* 3.
1. *L. australasica* Steud., *Synops.Pl.glumac.* 2:394 (1855). (Ill. Nordensk., *Bot.Notis.* 122 (1969) 77). Horizontal rhizomes; fruiting stem 15-40 cm high; leaves 3-7 mm wide, margins sparsely ciliate with long hairs, flat with an obtuse-callous apex; inflorescence erect, consisting of 1-4 sessile, small clusters, forming an elongated, sometimes almost conical inflorescence 1-2 (-3) cm long; flowers 2-3 mm long; perianth-segments equal in length, light to dark brown with a white transparent margin, equalling the capsule; fruit brown or yellowish-brown; style c. 0.2 mm; stigma c. 1 mm; seeds c. 1 mm long, dark brown with a large caruncle of c. 0.6 mm.

Occurs in N.S.W., Vic., Tas. and S.Aust. (Southern Lofty region).

Flowers Nov. (2 records).

Usually grows above 1 000 m above sea-level, often in peat bogs. Rare in S.Aust.

2. *L. densiflora* (Nordensk.) Edgar, *New Zealand J. Bot.* 13:786 (1975). (Ill. Nordensk., *Bot. Notis.* 122 (1969) 77.). Loosely tufted, with a bulbous or swollen base; fruiting stem 25-40 cm high; leaves 2-3 mm wide, margins thickly covered with white hairs; clusters of the inflorescence dense, 1 sessile, with or without several others dispersed on uneven rigid branches; 1-2 bracts ciliate along the whole margin; flowers 2.2-5 mm long; perianth dark with a narrow light margin; fruit brown to dark red-brown, equalling or exceeding the perianth; seeds c. 0.9 mm long, with a large white caruncle 0.4-0.5 mm.—*L. meridionalis* var. *densiflora* Nordensk., *Bot. Notis.* 122:76 (1969).

Occurs in W.Aust., N.S.W., Vic., Tas. and S.Aust. (Southern Lofty and S.E. regions).

Flowers July-Nov.

Grows in dry open forest or grassland.

3. *L. flaccida* (Buchen.) Edgar, *New Zealand J. Bot.* 13:786 (1975). (Ill. Nordensk., *Bot. Notis.* 122 (1969) 75.). Loosely tufted; fruiting stem 15-25 (-30) cm high; leaves 2-3 (-4) mm wide, sparsely ciliate, with thick callous obtuse tips; inflorescence umbelloid, clusters 1-6, rarely more, dispersed on flaccid branchlets, or occasionally reduced to 1 sessile cluster, flowers 2.0-2.5 mm long, yellowish to light brown; perianth with brown stripe, equalling or shorter than the yellowish to light brown or brown capsule; seeds c. 1.0 mm long, with a white caruncle 0.3-0.5 mm.—*L. campestris* var. *flaccida* Buchen., *Pflanzenr.* 25:92 (1906); *L. meridionalis* var. *flaccida* (Buchen.) Nordensk., *Bot. Notis.* 122:76 (1969).

Occurs in Qld, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Aug.-Nov.

Grows most frequently in damp situations.

4. *L. meridionalis* Nordensk., *Bot. Notis* 122:71 (1969). (Ill. Nordensk., *Bot. Notis* 122 (1969) 75.). Loosely tufted, with a bulbous base; fruiting stem 20-40 (-50) cm high; leaves 2-3 (-5) mm wide, with villose margins and with evenly narrowing but obtuse tips; inflorescence umbelloid, clusters 1-6 (-10) with a diameter of 6-8 (-10) mm; flowers c. 3 mm long, brown with light brown transparent margins; fruit brown to dark brown, equalling the perianth; seeds c. 0.9 mm; caruncle 0.3-0.4 mm, white or yellowish.

Occurs in W.Aust., N.S.W., Vic., Tas. and S.Aust. (Flinders Ranges, Eyre Pen., Northern Lofty, Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Aug.-Nov.

Grows in fairly dry open areas.

FAMILY. 43—LILIACEAE

Perennial herbs, with a rhizomatous, bulbous, tuberous, or fibrous rootstock; leaves basal or cauline. Flowers axillary, terminal or in racemose inflorescences or umbels, regular, bisexual or rarely dioecious; perianth coloured or sometimes scarious, with 6 segments free or united towards the base; stamens usually 6, inserted at the base of the perianth; anthers 2-celled, usually opening inwards; ovary superior, 3-celled, with 1 to numerous usually anatropous ovules in each cell, arranged on axile placentas, rarely 1-celled; styles 3, or united into 1; fruit a berry or capsule, the latter usually loculicidal; albumen fleshy or cartilaginous. Probably about 300 genera with over 4 000 species in most parts of the world, but poorly represented in South America. 30-40 genera in Australia. Contains many handsome garden plants, such as the lilies (*Lilium*), tulips (*Tulipa*), hyacinth (*Hyacinthus*), and *Agapanthus*.

There is wide disagreement on the definition of the Liliaceae. Black's (1943) arrangement is followed here although many of the genera could be placed elsewhere; for example *Allium* in the Alliaceae or Amaryllidaceae; *Calectasia* in the Calectasiaceae, and *Laxmannia*, *Lomandra* and *Xanthorrhoea* in the Xanthorrhoeaceae.

1. Flowers in umbels terminating long unbranched stems.
 2. Bracts at base of pedicels at least 3; rootstock slightly swollen and tuberous BURCHARDIA 8.
 2. Bracts at base of pedicels 1 or 2; rootstock a bulb.
 3. Perianth-segments shortly fused; seeds up to 12; no onion smell. NOTHOSCORDUM 17.
 3. Perianth-segments free; seeds up to 6; onion smell. . . ALLIUM 1.
1. Flowers racemose, axillary, solitary or, if clustered then not in an umbel terminating a long unbranched stem.
 4. Stems branched; leaves cauline, less than 4 cm long.
 5. Leaf-like structures arising in the axils of small scales. ASPARAGUS 5.

- 5. Leaves inserted on the stem, not in the axils of scales
 - 6. Flowers blue, solitary, terminal CALECTASIA 10.
 - 6. Flowers white, in small heads LAXMANNIA 14.
- 4. Stems simple or, if branched, the leaves either all basal or the largest leaves more than 5 cm long.
 - 7. Flowers sessile, bisexual in dense cylindrical spikes at least 30 cm long XANTHORRHOEA 23.
 - 7. Flowers pedicellate, if sessile then unisexual and spikes less than 30 cm long.
 - 8. Flowers unisexual; leaves hard and dry LOMANDRA 15.
 - 8. Flowers bisexual or, if unisexual, the leaves distinctly flaccid.
 - 9. Aerial stem simple; flower solitary, terminal ... IPHEION 13.
 - 9. Aerial stem simple or branched; flowers more than 1, axillary
 - 10. Aerial stem and inflorescence simple, flowers always 1 in the axil of each bract.
 - 11. Leaves not all basal (always present at flowering) ANGUILLARIA 3.
 - 11. Leaves all basal (not always present at flowering).
 - 12. Perianth-segments white or green and white, usually at least 2 cm long; filaments never bearded ORNITHOGALUM 18.
 - 12. Perianth-segments yellow or blue to violet, less than 2 cm long; filaments sometimes bearded.
 - 13. Flowers yellow; filaments usually bearded; no bulb BULBINE 7.
 - 13. Flowers (at least the upper) bluish; filaments not bearded; bulb.
 - 14. Perianth fused MUSCARI 16.
 - 14. Perianth free SCILLA 19.
 - 10. Aerial stem or inflorescence branched or, if simple, at least some bracts bearing more than 1 flower.
 - 15. Leaves succulent and persistent; flowers tubular, more than 3 cm long ALOE 2.
 - 15. Leaves firm or if slightly fleshy not persistent; flowers open, always less than 3 cm long.
 - 16. Fruit a berry; aerial shoot perennial, usually with cauline leaves; anthers dehiscent apically (sometimes splitting introrsely later) DIANELLA 12.
 - 16. Fruit a capsule; aerial shoot usually lasting only a few months (except *Stypandra*), with basal leaves; anther dehiscence introrse.
 - 17. Perianth twisted spirally after flowering.
 - 18. Filaments bearded TRICORYNE 22.
 - 18. Filaments glabrous.

- 19. Petals fringed THYSANOTUS 21.
- 19. Petals not fringed.
 - 20. Flowers racemose CAESIA 9.
 - 20. Flowers corymbose CHAMAESCILLA 11.
- 17. Perianth not twisted spirally after flowering.
 - 21. Anthers distinctly dorsifixed; leaves cylindrical ASPHODELUS 6.
 - 21. Anthers attached at or near the base; leaves flat.
 - 22. Filaments glabrous or if bearded the perianth 5-7 mm long; seeds angular ARTHROPODIUM 4.
 - 22. Filaments bearded; perianth 8-14 mm long; seeds flat STYPANDRA 20.

1. ALLIUM L.
Sp.Pl. 294 (1753).
 (Latin for garlic.)

Leaves basal, but in many species the closed ligulate sheaths clasp the lower part of the stem; bulb sometimes surrounded by basal bulbils; there are also in some species sessile floral bulbils replacing some or all of the flowers in the head; flowers pedicellate, in a terminal simple umbel, enclosed before flowering in a spathe consisting of 1 or 2 scarious bracts; perianth-segments 6, free or almost so, 1-nerved (the nerve usually green); stamens inserted at base of segments, the filaments all simple or those opposite the inner segments trifid, i.e. they are broadened and have 2 slender awn-like lateral points, one on each side of the shorter and broader central point which bears the anther; or in a few species there is only a short triangular tooth on each side of the broad base of the inner filament; anthers versatile; ovary more or less 3-celled; style undivided, short; capsule small, trigonous, with 1-2 black seeds in each cell. About 450 species all native to the northern hemisphere. (Clapham, Tutin and Warburg (1962) *Flora of the British Isles*.) Several are strongly onion-scented and are cultivated for the kitchen, such as:— the garlic (*A. sativum* L.), the leek (*A. porrum* L.) both with flat leaves; the onion (*A. cepa* L.), the shallot (*A. ascalonicum* L.), chives (*A. schoenoprasum* L.), all three with cylindrical hollow leaves.

- 1. Stems triquetrous; perianth 12-18 mm long *A. triquetrum* 7.
- 1. Stems cylindrical or flattish; perianth up to 10 mm long.
 - 2. Leaves cylindrical or nearly so, hollow inside.
 - 3. Filaments of the inner perianth-segments broad, trifid; bulb surrounded by many bulbils; flowers few in umbel, often replaced by a dense head of bulbils *A. vineale* 8.
 - 3. Filaments all simple and linear; bulb simple; flowers many in a loose umbel *A. paniculatum* 3.
 - 2. Leaves flattish, not hollow.
 - 4. Filaments all entire or the inner with 2 small teeth at the base.
 - 5. Perianth pink; bulbils usually present at base of pedicels *A. roseum* 4.
 - 5. Perianth white, bulbils not present at base of pedicels *A. neapolitanum* 2.
 - 4. Inner filaments divided at apex into 3 long points, the middle one bearing the anther.
 - 6. Umbel containing numerous bulbils *A. scorodoprasum* 6.
 - 6. Umbel without bulbils.
 - 7. Stamens shorter than perianth; flowers purple, in a dense umbel *A. rotundum* 5.
 - 7. Stamens longer than perianth; flowers pink, in a loose umbel *A. ampeloprasum* 1.

*1. **A. ampeloprasum** L., *Sp.Pl.* 295 (1753). **Wild leek**. Stem stout, solid, cylindrical, 60-100 cm high, leafy to middle; bulb surrounded by few or many bulbils; leaves broad-linear, flat, 1-3 cm broad, scabrous-tuberculate on edges and keel; spathe caducous, usually of 1 broad bract, long-pointed but shorter than the flowers, which are purplish, very numerous on long unequal slender pedicels (2-4 cm long), forming a rather dense globular umbel; perianth-segments acute, c. 5 mm long, usually tuberculate on back; stamens and style protruding, the 3 inner stamens with trifid filaments, whose lateral points are much longer than the central anther-bearing part; strong smell of onion.

Native to the Mediterranean region and naturalised (but only in the vicinity of cultivation) in S.Aust. (Yorke Pen. and Northern and Southern Lofty regions).

Flowers in summer.

Black's comment on its relationship has not been verified; he wrote (1943):— "The Leek (*A. porrum* L.) is considered to be a cultivated form of this species with smooth leaves and no basal bulbils. Our specimens, from deserted gardens or elsewhere near settlement, probably represent the cultivated Leek going back to the wild plant."

*2. **A. neapolitanum** Cyr., *Pl.Rar.Neap.* 1:13 (1788). **Naples onion**. Stem rather stout but hollow, plano-convex, 30-60 cm high, the flat side with 2 acute angles, the other side rounded; sheathed near the base by two leaves, whose blades are flat, broad-linear and to 12 mm broad; bulb small, brown, ovoid, sometimes with a few bulbils; spathe of 1 ovate acuminate bract shorter than flowers, which are pure white, about 25 in a spreading umbel; pedicels almost equal, 25-30 mm long; perianth-segments ovate, obtuse, 8-10 mm long; stamens enclosed, with all the filaments simple.

Native to the Mediterranean region and naturalised in Vic. and S.Aust. (Eyre Pen., Yorke Pen., Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Sept.-Dec.

Introduced as a garden plant, but now fairly widespread in settled areas.

*3. **A. paniculatum** L., *Syst.Nat.* 978 (1759). Stem hollow, 30-80 cm high, leafy to middle, with a simple ovoid bulb; leaf-blades almost terete, channelled, hollow; spathe of 2 bracts tapering into a long point much exceeding the flowers, which are pink or whitish, in a loose umbel; pedicels very unequal, 1-4 cm long; perianth-segments obtuse, 4-5 mm long and as long as stamens; filaments all simple; no onion smell.

Native to the Mediterranean region, naturalised in S.Aust in the Northern and Southern Lofty regions.

Flowers Nov.

*4. **A. roseum** L., *Sp.Pl.* 296 (1753), subsp. **bulbiferum** (DC.) E. F. Warb. in Clapham, Tutin & Warburg, *Fl.Brit.Isles* 1237 (1952). Perennial, to 80 cm high; stem cylindrical, pithy; bulb ovoid, 15 mm long, with a brown outer coat and numerous white bulbils; leaves 3-5, channelled above, 5-10 mm broad in lower part, tapering towards summit, stem-clasping near base; spathe of usually 3 ovate-acuminate bracts much shorter than the pink flowers, which number up to 20 on slender pedicels 2-3 cm long, often a few bulbils at base of umbel; perianth campanulate, about 12 mm long, with ovate-oblong segments; stamens enclosed, white, flat, dilated downwards.—*A. roseum* var. *bulbiferum* Desf. ex DC. in Lam. & DC., *Fl.Franc.* 221 (1805).

Native to the Mediterranean region. Naturalised in S.Aust. (Southern Lofty and Kangaroo I. regions).

Flowers mainly Oct.-Jan.

*5. **A. rotundum** L., *Sp.Pl.* 423 (1762). Stem 30-80 cm high, rigid, leafy to middle; leaf-blades grass-like, flat, 3-10 mm broad, scabrous-tuberculate on margins and keel; bulb ovoid,

surrounded by numerous black bulbils; spathe of 1 bract shorter than the numerous flowers, which are dark-purple, in a dense globular head, without bulbils; pedicels short, hidden, the lower ones shorter, reflexed; perianth-segments obtuse, 5-6 mm long; stamens enclosed, except sometimes the long lateral points of the trifold inner filaments.

Native to Europe. Recorded in S.Aust. from the Northern and Southern Lofty regions.
Flowers Oct.-Nov.

*6. *A. scorodoprasum* L., *Sp.Pl.*, 297 (1753). **Sand Leek.** (I11. Keble Martin (1965) *Conc.Brit.Fl.in Col.* 84). Stem 30-80 cm high, rigid, leafy to middle; leaf-blades grass-like, flat, 7-15 mm broad, scabrid on margins and keel; bulb ovoid, surrounded by numerous black bulbils; spathe 2-valved, shorter than the few flowers which are reddish-purple, in a loose head, with bulbils; pedicels exposed; perianth-segments 5-8 mm long; stamens enclosed; lateral lobes of filaments much longer than central lobe.

Native to Europe, from Britain to Syria. Naturalised in Vic. and possibly S.Aust., but only recorded from the Inman Valley (Southern Lofty region).

*7. *A. triquetrum* L., *Sp.Pl.* 300 (1753). **Three-cornered garlic.** Stem 20-40 cm high, with 3 acute angles; leaves 2-3, near base of stem, the sheaths flat or slightly channelled, weak, 5-10 mm broad, about as long as stem; bulb small, white, ovoid; spathe of 2 linear-lanceolate membranous bracts slightly shorter than flowers, which are white, 4-8, drooping in a loose umbel, on pedicels which are rarely longer than the flowers; perianth-segments oblong, acute, 12-14 mm long; stamens enclosed, all with simple filaments; stigma of 3 short recurved branches (in our other species the stigma is a minute terminal point); strong onion smell.

Native to Mediterranean region, naturalised in New Zealand, N.S.W., Vic. and S.Aust. (Eyre Pen., Southern Lofty, Kangaroo I. and S.E. regions).

Flowers usually Aug.-Nov.

A common weed.

*8. *A. vineale* L., *Sp.Pl.* 299 (1753). **Crow garlic.** Stem 30-80 cm high, almost filled with pith and sheathed up to middle; basal bulb surrounded by numerous bulbils; leaves almost terete, hollow, slightly channelled, c. 1.5 mm broad; flowers few, pale-pink or white, with numerous bulbils, in a dense head which often consists only of bulbils; spathe of 1 broad bract, which is abruptly contracted into a stiff green point longer or shorter than the head (in our specimens it is 10-25 mm long); pedicel much longer than perianth, which is 3-4 mm long; stamens slightly exceeding perianth, the inner filaments trifold, the lateral points exceeding the anther; plant with onion smell.

Native to the Mediterranean region and adjacent parts of Europe, naturalised in New Zealand, N.S.W., Vic. and S.Aust. (Northern and Southern Lofty and Kangaroo I. regions).

Flowers in summer.

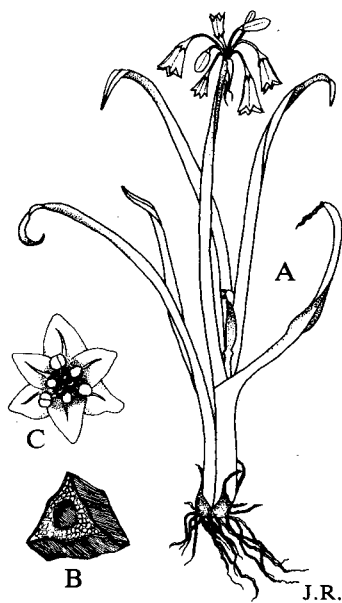


Fig. 296—*Allium triquetrum*. A, habit, $\times \frac{1}{2}$; B, section through stem; C, flower.

2. ALOE L.

Sp.Pl. 319 (1753).

(Greek name for a member of the genus possibly derived from an earlier Hebrew name referring to its bitter taste.)

Perennials; leaves usually in a rosette, either basal or terminating thick stems, succulent, sometimes spiny; inflorescence terminal or lateral, a raceme or panicle; flowers pedicellate; perianth usually yellow to red, tubular; the segments fused or free, each 1-3-nerved; stamens 6, the filaments narrow-linear, anthers linear to oblong, introrse; ovary 3-celled, with numerous ovules in each cell; style filiform with a small capitate stigma; fruit a loculicidal capsule; seeds triquetrous, grey or black. Nearly 300 species in Africa, Arabia and Madagascar. (Reynolds (1950) *Aloes of S.Afr.*).

Although no species is probably fully naturalised, there are 2 which do sometimes persist once introduced.

1. Stem to 2 m or more, branched; perianth slightly inflated at the base . . . *A. arborescens* 1.
1. Stemless; perianth with a subglobose swelling at the base *A. saponaria* 2.

*1. ***A. arborescens*** Miller, *Gard.Dict.* ed. 8 (1768). Plants 2-3 m high; leaves many in a dense rosette, usually 50-60 cm long, not spotted, margins spiny; inflorescence usually unbranched; flowers scarlet, c. 4 cm long.

Native to South Africa, planted, often as a hedge, in S.Aust. and persisting.

*2. ***A. saponaria*** (Ait.) Haw., *Trans.Linn.Soc.* 7:17 (1804), **Broad-leaved aloe**. Plants usually stemless, suckering freely; leaves in a dense rosette, up to 25-30 cm long, with dull white oblong spots on the upper surface, margins spiny; inflorescence a few-branched panicle; flowers scarlet to orange, c. 4 cm long.—*A. perfoliata* var. *saponaria* Ait., *Hort.Kew.* 1:467 (1789); *A. latifolia* Haw., *Syn.Pl.Succ.* 82 (1812).

Native to South Africa, planted in S.Aust. and persisting especially in the Southern Lofty region.



Fig. 297—*Aloe saponaria*.



Fig. 298—*Anguillaria dioica*.

3. ANGUILLARIA R. Br.

Prod.Fl.Nov.Holl. 273 (1810).

(After Luigi Anguillara, 1512-1570, Professor of Botany at Padua.)

Small herbs with bulbous rootstock; flowers often polygamous or dioecious, few, sessile, in a short terminal spike; perianth of 6 free spreading persistent segments; stamens 6, with small extrorse anthers; ovary 3-celled, with several ovules in each cell; capsule obtusely trigonous, ovoid or oblong, obtuse at summit, opening loculicidally in 3 thin brown valves; seeds globular. 3 Australian species.

This genus is being revised and may prove to be represented by as many as three species in S.Aust. It may prove to be synonymous with *Wurmbea*.

1. *A. dioica* R.Br., *Prod.Fl.Nov.Holl.* 273 (1810). **Early Nancy.** (Ill. Burbidge & Gray, *Fl.A.C.T.* (1967) 103). Stems simple, 5-20 cm high; leaves 2-3, with a broad stem-clasping base and tapering upwards; perianth-segments usually white, with a lilac gland, which is sometimes bifid, below the middle of the segment; all 3 styles distinct; capsule 6-10 mm long.—*Wurmbea dioica* (R.Br.) F. Muell., *Fragm. Phyt.Aust.* 10:119 (1877). (Plate 1).

Occurs in all Australian States. Recorded in S.Aust. from most parts.

Flowers in spring.

4. ARTHROPODIUM R. Br.

Prod.Fl.Nov.Holl. 276 (1810).(Greek *arthron*, a joint; *podion*, a little foot; alluding to the jointed pedicels.)

Leaves narrow, basal, grass-like; flowers in loose racemes on pedicels articulate above the middle; perianth of 6 free spreading segments, not twisted after flowering, 3-nerved along the centre, the inner ones broader, undulate on the edge and sometimes shortly fringed; stamens 6, the filaments densely bearded with clavate hairs in the upper part or each anther with 2 small papillose appendages at base; anthers linear or oblong; ovary 3-celled, with several ovules in each cell; capsule 3-valved; style undivided; seeds black, globose or angular. About 10 species in New Guinea, New Zealand, New Caledonia and mainly Australia.

As proposed by Payens (*Nova Guinea* 8 (1957) 388-91), *Dichopogon* is treated as a synonym.

1. Flowers solitary (if a few flowers in pairs tuber subsessile).

2. Perianth 4-5 mm long; anthers without appendages *A. minus* 3.

2. Perianth 9-12 mm long; anthers with appendages *A. strictum* 4.

1. Flowers 2 or more in the axil of at least some bracts; tubers at ends of roots.

3. Perianth 6-7 mm long; anthers without appendages *A. milleflorum* 2.

3. Perianth 10-12 mm long; anthers with appendages *A. fimbriatum* 1.

1. *A. fimbriatum* R. Br., *Prod.Fl.Nov.Holl.* 276 (1810). **Nodding chocolate lily.** Long fibrous roots ending in fusiform tubers; stem stiff, erect, often unbranched, usually 40-80 cm high; leaves to 8 (-30) cm long and 1-2 (-5) mm broad, linear; inflorescence forming a loose raceme or panicle with fairly short bracts at the base of each branch; flowers usually 2-4 in the axil of each bract, drooping, blue or violet, rarely white, scented, 10-12 mm long; anthers dark-purple, the 2 appendages much shorter, yellow; pedicels lengthening but remaining reflexed under the ovoid capsule, 8-15 mm long; seeds black, 3-4 closely packed in each cell.—*Dichopogon fimbriatus* (R.Br.) Macbride, *Contr. Gray Herb.* n.s. 56:2 (1918).

Occurs in all Australian States except N.T. and Tas. Recorded in S.Aust. from the Flinders Ranges, Eyre Pen., Yorke Pen., Northern and Southern Lofty, Murray and Kangaroo I. regions.

Flowers Oct.-Feb.

2. *A. milleflorum* (DC.) Macbride, *Contr.Gray Herb.* 56:2 (1918). **Pale vanilla-lily.** Fibrous roots ending in tubers distant from the stock; stem erect, usually branched, 20-50 cm high;

flowers numerous, white or purplish, spreading or drooping, 2-3 together on capillary pedicels 8-15 mm long, with a small scarious bract at base; panicle 10-25 cm long, its branches long or short, more or less spreading; perianth-segments 6-7 mm long without appendages; anther as long as the bearded part of the filament and shorter than the whole filament.—*Anthericum milleflorum* DC. in Red. *Liliacees* 1: t. 58 (1804); *Anthericum paniculatum* Andr., *Bot.Rep.* t. 395 (1804); *Arthropodium paniculatum* (Andr.) R. Br., *Prod.Fl.Nov.Holl.* 276 (1810).

Occurs in New Caledonia, Qld, N.S.W., Vic., Tas. and S.Aust. (S.E. region).

Flowers Nov.-Dec.

3. *A. minus* R. Br., *Prod.Fl.Nov.Holl.* 276 (1810). **Small vanilla-lily.** Tubers oblong, close to the rootstock; stem slender, erect, less than 30 cm high; leaves to 10 (-20) cm long and 2-3 (-5) mm broad, linear or sublinear; inflorescence a raceme or 1-(rarely few-) branched, panicle often with large leaf-like bracts below the branches; flowers usually solitary (less often paired) in the axil of each bract, drooping, purple, scented, 4-5 mm long on slender pedicels 6-10 mm long; filament nearly twice as long as the anther, bearded in upper part, anther without appendages; capsule erect.

Occurs in all Australian States except W.Aust. and N.T. Recorded in S.Aust. from the Flinders Ranges, Eyre Pen., Yorke Pen., Eastern, Southern Lofty and S.E. regions.

Flowers Sept.-Oct.

Specimens from the northern part of its range in S.Aust. are larger, more branched and more often with paired flowers than in the S.E.



Fig. 299—*Arthropodium strictum*.

4. *A. strictum* R. Br., *Prod.Fl.Nov.Holl.* 276 (1810).

Chocolate lily. Long fibrous roots ending in fusiform tubers; stem stiff, erect, 20-100 cm high; leaves 20-35 cm long, 3-12 mm broad, linear-lanceolate; inflorescence 20-60 cm long, forming a loose panicle, with long leafy bracts at base of each branch and a lanceolate bract at base of each pedicel, or reduced to a simple raceme; flowers solitary, drooping, blue or violet, rarely white, scented, 10-12 mm long; anthers dark-purple, the 2 appendages much shorter, yellow; pedicels lengthening and erect-spreading under the ovoid erect capsule, 7-8 mm long; seeds black, 3-4 closely packed in each cell.—*Dichopogon strictus* (R. Br.) J. G. Bak., *J.Linn.Soc. (Bot.)* 15:319 (1876).

Occurs in all Australian States. Recorded in S.Aust. from the N.W., Flinders Ranges, Northern Lofty, Murray, Yorke Pen., Southern Lofty, Kangaroo I. and S.E. regions.

Flowers mainly Sept.-Dec.

5. ASPARAGUS L.

Sp.Pl. 313 (1753).

(Greco-Latin *asparagus* or *aspharagós*, name of the plant; probably of Persian origin.)

Branching perennials, of which the real leaves are solitary, small, distant and scale-like, bearing in their axils short barren branches (cladodes) which may be clustered and subulate or solitary and leaf-like; flowers bisexual, polygamous, or dioecious, axillary, small; perianth campanulate, the 6 segments free or slightly connected at base, spreading at summit; stamens 6, with anthers opening inwards in slits; ovary 3-celled, with a simple style and small 3-lobed stigma; berry globular, with few black seeds. Possibly over 200 species in Africa and Eurasia; 1 species native to Australia.

1. Cladode solitary, broad and leaf-like *A. asparagoides* 1.
1. Cladodes clustered; terete or linear, less than 1 mm broad.
 2. Stems weak and often climbing; cladodes regularly ternate except at the base of branches where paired *A. crispus* 2.
 2. Stems rigidly erect; cladodes in clusters of 3-6 *A. officinalis* 3.

*1. *A. asparagoides* (L.) Wight, *Cent.Dict.* 2:845 (1909). *Smilax asparagus*. Tall climber often to 1-2 m; roots bearing tubers; cladodes solitary, ovate, acute, glossy green, 2-3 cm long, with many longitudinal nerves; flowers single or twin, bisexual, greenish-white; on peduncles jointed near summit, drooping; berry 7-10 mm diam., finally dark red—*Medeola asparagoides* L., *Sp.Pl.* 339 (1753); *Dracaena medeoloides* L.f., *Suppl.* 203 (1781); *Asparagus medeoloides* (L.f.) Thunb., *Prod. Pl.Cap.* 66 (1794).

Native to South Africa, introduced to Australia as a garden plant and naturalised in Vic. and S.Aust. (Flinders Ranges, Eyre Pen., Northern Lofty, Yorke Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions).

Flowers Aug.-Sept.

*2. *A. crispus* Lam., *Encycl.* 1:295 (1783). Weakly straggling or climbing to 1 m; roots bearing distant tubers; cladodes ternate (paired at base of branches), flat or angled, 3-9 mm long, less than 1 mm broad, with 1 vein; flowers single, bisexual, whitish with a green or brown stripe; on peduncles jointed near summit; berry 8-15 mm long, ovoid, pale coloured.

Native to South Africa, introduced to Australia as a garden plant and naturalised in S.Aust. (Yorke Pen. and Southern Lofty regions).

Flowers approx. Aug.

*3. *A. officinalis* L., *Sp.Pl.* 313 (1753). **Edible asparagus**. Stems to 1 m or more; roots thick but without tubers; cladodes very fine, in clusters of 3-6; flowers solitary or twin, dioecious, greenish-white, on peduncles jointed towards the middle, drooping; berry red, 6-9 mm diam.

Native to Europe and western Asia. Cultivated in Australia and naturalised in New Zealand, N.S.W., Vic. and S.Aust. (Southern Lofty, Murray and S.E. regions).

Flowers summer.

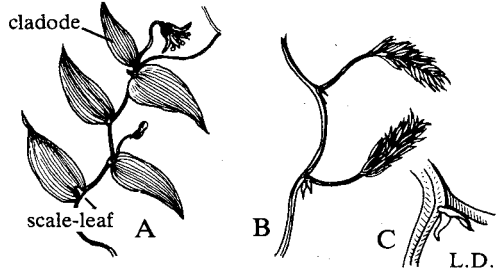


Fig. 300—*Asparagus*. A, *A. asparagoides*, branch, $\times \frac{1}{2}$; B, *A. crispus*, portion of shoot, $\times \frac{1}{2}$; C, *A. crispus*, softly spinous scale-leaf at base of branch.

6. ASPHODELUS L.

Sp.Pl. 309 (1753).

(Greek *asphodelos*, some liliaceous plant.)

Rootstock scarcely swollen; leaves all basal; perianth-segments, 6, almost free, spreading, equal, oblong, 1-nerved; stamens 6, with filaments dilated and covering the ovary and with versatile introrse anthers; ovary 3-celled, with 2 ovules in each cell; style undivided, with a small 3-lobed stigma; capsule coriaceous, with 1-2 angular seeds in each cell. About 12 species in the Mediterranean region and Asia.

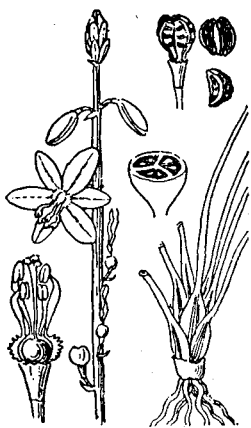


Fig. 301—*Asphodelus fistulosus*.

*1. *A. fistulosus* L., *Sp.Pl.* 309 (1753). **Wild onion** or **onion weed**. Roots long, fibrous; stem hollow, usually branching above, 20-60 cm high, stiff; leaves long, cylindrical, striate, hollow; buds pink, flowers white, in long racemes; pedicels jointed, with a bract at base; perianth-segments with a brown, central nerve; anthers orange; capsule containing 3-6 black, triangular, wrinkled seeds, the valves notched at top, wrinkled transversely.

Native through Mediterranean region to northern India; naturalised in New Zealand and all mainland Australian States. Recorded in S.Aust. from the Flinders Ranges, Eastern, Eyre Pen., Northern Lofty, Murray, Yorke Pen., Southern Lofty, Kangaroo I. and S.E. regions.

Flowers Aug.-Oct.

Common weed especially of disturbed areas such as roadsides.

7. *BULBINE* Willd.

Enum.Hort.Berol. 372 (1809)

(Greek *bolbos*, a bulb.)

Perennial herbs, with succulent radical leaves and simple racemes of yellow flowers, the pedicels solitary and articulate immediately below the flower; perianth-segments 6, equal, free or almost so, yellow, with 1 green longitudinal nerve, more or less twisted and deciduous after flowering; stamens 6, 3 or all the filaments bearded above the middle or immediately under the anther with a dense golden tuft of clavate hairs; ovary 3-celled, with 2-several superposed ovules in each cell, the style undivided; capsule almost globular, opening loculicidally in 3 valves; seeds black, trigonous, opaque, often rugose, but some of the ovules usually abortive.—*Bulbinopsis* Borzi, *Boll.Orto Bot.Palermo* 1:20 (1897). About 60 species, mainly in Africa; 3 in Australia. Baijnath (*Brunonia* 1: 117-120; 1978) considers that the Australian species, formerly separated as *Bulbinopsis*, should be retained in *Bulbine*.)

- | | |
|--|--------------------------|
| 1. Perianth-segments 10-15 mm long; rootstock tuberous | <i>B. bulbosa</i> 2. |
| 1. Perianth-segments 4-6 mm long; rootstock not tuberous. | |
| 2. Seeds winged; capsules 4-5-8 mm long | <i>B. alata</i> 1. |
| 2. Seeds not winged; capsules 2-5 mm long | <i>B. semibarbata</i> 3. |

1. *B. alata* Baijnath, *Brunonia* 1:117 (1978). Base of plant without a tuber; leaves linear, channelled, 5-20 cm long; stems simple, erect or flexuose towards the apex, to 30 cm high; raceme to 17 cm long; pedicels erect, lengthening after flowering, each with a scarious broadly ovate bract at base; perianth-segments 4-6 mm long; filaments all hairy or almost beardless; ovary with 2 ovules in each cell; capsule obovoid, 4-5-8 mm long; seeds with a narrow pale membranous wing surrounding margin of outer face, 3-5 mm long.—*B. semibarbata* var. *depilata* J. M. Black, *Trans.R.Soc.S.Aust.* 56:39 (1932); *Bulbinopsis semibarbata* var. *depilata* (J. M. Black) Hj. Eichl., *Suppl.* 83 (1965).

Occurs in ?W.Aust., N.T., Qld, N.S.W. and S.Aust. (N.W., Lake Eyre, Gairdner-Torrens, Flinders Ranges and Eastern regions).

Flowers Aug.-Oct.

The synonyms cited are not mentioned by Baijnath but there is little doubt that they do belong here.

2. *B. bulbosa* (R.Br.) Haw., *Rev.Pl.Succ.* 33 (1821). **Bulbine lily**. A bulb-shaped tuber immediately under the rootstock; leaves broad-linear, channelled, to 30 cm long; stems (or scapes) simple, erect, 20-50 cm high; raceme 8-20 cm long; pedicels erect, lengthening after flowering, each with a scarious bract at base; perianth-segments 10-15 mm long; filaments equal,

all with a circle of clavate hairs below the anther; ovary with 4-5 ovules in each cell; capsule c. 6 mm diam.; seeds 3 mm long.—*Anthericum bulbosum* R.Br., *Prod.Fl.Nov.Holl.* 275 (1810); *Bulbinopsis bulbosa* (R.Br.) Borzi, *Boll.Ort.Bot.Palermo* 1:21 (1897).

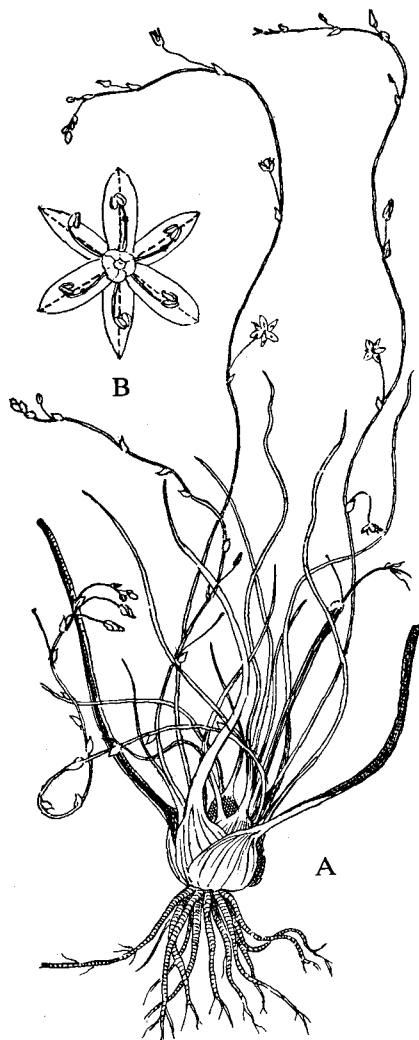


Fig. 302—*Bulbine alata* A, habit, x $\frac{1}{2}$;
B, flower, x 4.



Fig. 303—*Bulbine bulbosa*.

Occurs in all Australian States except W.Aust. and N.T. Recorded in S.Aust. from the Flinders Ranges, Eyre Pen., Northern Lofty, Yorke Pen., Southern Lofty and S.E. regions.

Flowers Aug.-Oct.

Grows in grassland.

3. *B. semibarbata* (R.Br.) Haw., *Rev. Pl.Succ.* 33 (1921). **Leek lily.** Base of plant without a tuber; leaves linear, channelled, 5-20 cm long; stems simple, erect, to 30 cm high; raceme to 20 cm long; pedicels erect, lengthening after flowering, each with a scarious narrowly to broadly ovate bract at base; perianth-segments 4-6 mm long; 3 outer filaments short and glabrous, the 3 inner longer or subequal and bearded; ovary with 2 ovules in each cell; capsule subglobose, 2-5 mm long; seeds angled or narrowly keeled on the margin surrounding the face, to 3 mm long.—*Anthericum semibarbatum* R.Br., *Prod.Fl.Nov.Holl.* 275 (1810); *Bulbinopsis semibarbata* (R.Br.) Borzi, *Boll.Orto Bot.Palermo* 1:21 (1897).

Occurs in W.Aust., N.S.W., Vic., Tas. and S.Aust. (Flinders Ranges, Eastern, Eyre Pen., Yorke Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions).

Flowers Sept.-Nov.

To the north, this species grades to some extent into *B. alata* and capsule size and bract shape characters break down. However, the seed appears to remain reliable.

8. BURCHARDIA R.Br.

Prod.Fl.Nov.Holl. 272 (1810).

(After J. H. Burckhard, 1676-1738, a German botanist.)

Fig. 304—*Burchardia umbellata*.

Rootstock short; inflorescence an umbel; perianth-segments 6, free, spreading, caducous; stamens 6, with extrorse anthers; ovary 3-celled, with numerous ovules in each cell; style cleft into 3 recurved branches, capsule triquetrous, opening septicidally at summit in 3 valves; seeds many, angular. 3 Australian species.

1. *B. umbellata* R.Br., *Prod.Fl.Nov. Holl.* 273 (1810). **Milkmaids.** Stems erect, 15-50 cm high; leaves linear, stem-clasping, 1 or 2 long ones at the base and 1 or 2 shorter ones on the stem; flowers several in a terminal umbel; perianth white; filaments gradually swollen below the anther; capsule ovoid-oblong, 10-15 mm long.—*Reya umbellata* (R.Br.) Kuntze, *Rev.Gen.Pl.* 2:845 (1891). (Plate 2).

Occurs in all Australian States except N.T. Recorded in S.Aust. from the Eyre Pen., Southern Lofty, Kangaroo I. and S.E. regions.

Flowers July-Oct.

Grows in grassland and open woodland.

9. CAESIA R.Br.

Prod.Fl.Nov.Holl. 277 (1810).

(After Federico Cesi, Italian naturalist, 1585-1630, who is said to have been the first to discover the spores of ferns and whose name was Latinised as *Caesius*.)

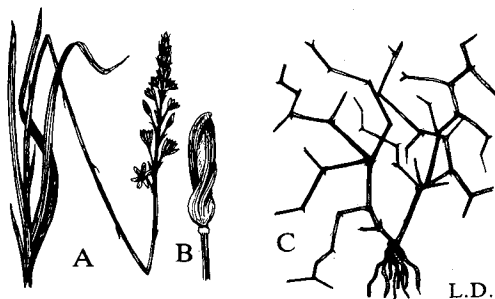


Fig. 305—*Caesia*. A, *C. vittata*, habit, $\times \frac{1}{10}$; B, *C. vittata*, old flower, $\times 2$; C, *C. lateriflora*, habit, $\times \frac{1}{10}$.

Stemless herbs (inflorescence sometimes mistakable for a vegetative shoot); roots tuberous; leaves basal, but sometimes withering early, grass-like or rigid and pointed; inflorescence a panicle, rarely a simple raceme; flowers 1 or few in clusters along the panicle branches; perianth-segments blue, yellowish-green or white, almost free, similar, twisting after flowering, not fringed; anthers 6; ovary with 1 or 2 ovules in each locule; fruit a capsule or nutlet; seeds black, carunculate. About 12 species in Australia, Africa and New Guinea.

1. Inflorescence divaricately branched; leaves absent at flowering *C. lateriflora* 1.
1. Inflorescence simple or the branches ascending; leaves present at flowering.
2. Flowers 4-6 mm long; upper bracts 1-2 mm long *C. parviflora* 2.
2. Flowers 6-10 mm long; upper bracts 3-5 mm long *C. vittata* 3.

1. ***C. lateriflora*** R.Br., *Prod.Fl.Nov.Holl.* 277 (1810). **Sand lily**. Inflorescence divaricate, with numerous branches; leaves long, linear, rigid, going over into small scarious acuminate bracts; flowers 3-4 along the branchlets, shortly pedicellate and subtended by minute bracts; perianth drooping, 5-6 mm long, with, pink or yellowish colouring; ovules 2 in each cell; capsule or nutlet often 1-seeded, but sometimes 3-5-seeded, more or less dehiscent; seeds oblong, 2 mm long, minutely tuberculate.—*Corynotheca lateriflora* (R.Br.) F. Muell. ex Benth., *Fl.Aust.* 7:49 (1878).

Occurs in all Australian mainland States. Recorded in S.Aust., from the Lake Eyre and Nullarbor regions and from Lake Bonney (Murray region).

Flowers Sept.-Nov.

The affinities of this species with *C. dichotoma* F. Muell. (= *Corynotheca micrantha* (Lindl.) Macbride) require investigation. Black (1943) reported *C. dichotoma* from W.Aust., close to the S.Aust. border but it has not been found in S.Aust.

2. ***C. parviflora*** R. Br., *Prod.Fl.Nov.Holl.* 277 (1810). **Pale grass-lily**. Leaves grass-like; linear or narrowly lanceolate; inflorescence an erect raceme or few-branched panicle with ascending branches; flowers several in the axil of each of the scattered bracts; perianth 4-6 mm long, pale lavender-blue to whitish; ovules 2 in each cell; capsule usually 1-seeded, 3-lobed, dehiscent.

Occurs in all Australian States except N.T. Recorded in S.Aust. from the Southern Lofty and S.E. regions.

Flowers Sept.-Dec.

The differences between this species and *C. vittata* are, judging by material from S.Aust., rather slight. Further work is undoubtedly needed on these species.

3. ***C. vittata*** R.Br., *Prod.Fl.Nov.Holl.* 277 (1810). **Blue grass-lily**. Leaves grass-like, linear or narrowly lanceolate; inflorescence often a simple raceme, sometimes a few-branched panicle with ascending branches; flowers several in the axil of each of the more or less crowded bracts; perianth 7-10 mm long, lilac-blue to deep blue; ovules 2 in each cell; capsule usually 1-seeded, dehiscent.

Occurs in all Australian States except N.T. Recorded in S.Aust. from the Flinders Ranges, Eyre Pen., Northern Lofty, Murray, Yorke Pen., Southern Lofty, ?Kangaroo I. and S.E. regions. The only Kangaroo I. specimen seen is somewhat intermediate between this species and *C. parviflora*.

Flowers Aug.-Oct.

10. CALECTASIA R.Br.

Prod.Fl.Nov.Holl. 263 (1810).

(Greek *kalos*, beautiful; *ektasis*, development; alluding to the blue spreading perianth-lobes.)

Stem branched, stiff, covered by the sheaths of small leaves with short subulate blades; perianth persistent, rather stiff, funnel-shaped, the 6 lanceolate lobes radiating from the tube; stamens 6, attached to the base of the lobes, the filaments short, the anthers erect, linear, opening in 2 terminal pores; ovary shortly stalked, 1-celled, with 3 erect ovules; style undivided; fruit indehiscent, 1-seeded. Endemic to W.Aust., S.Aust. and Vic.; monotypic. (Anway, *Aust.J.Bot.* 17 (1969) 147-159).

This genus is sometimes placed in the Xanthorrhoeaceae or in the Calectasiaceae.



Fig. 306—*Calectasia cyanea* var. *intermedia*.

1. *C. cyanea* R.Br., *Prod.Fl.Nov.Holl.* 263 (1810) var. *intermedia* (Sond.) Anway, *Aust.J.Bot.* 17:158 (1969). **Blue tinsel-lily.** More or less pubescent shrub, 30-50 cm high; leaves erect, crowded, almost pungent, very short; flowers solitary at the end of the short branches, blue or purple, with a metallic sheen, the narrow tube 7-12 mm long, the rigid spreading lobes 10-15 mm long; anthers yellow.—*C. intermedia* Sond., *Linnaea* 28:222 (1856). (Plate 3).

Occurs in Vic. and S.Aust. (S.E. region).

Flowers Sept.-Oct.

Apparently rare in sandy heaths.

11. CHAMAESCILLA F. Muell. ex Benth.

Fl.Aust. 7:48 (1878).

(Greek *chamai*, dwarf; *skilla*, the squill or sea onion, a liliaceous plant of the Mediterranean region.)

Leaves basal, grass-like, channelled; roots tuberous; perianth-segments 6, equal, almost free, spreading, 3-nerved, spirally twisting after flowering, finally deciduous; stamens 6, hypogynous, with filiform filaments; ovary 3-

celled, with numerous ovules in each cell; style undivided; capsule with 3 laterally compressed lobes, acute on the dorsal edges, truncate at summit; seeds few in each cell, flat, black, glossy. Endemic to Australia, with 2 species.

1. *C. corymbosa* (R.Br.) F. Muell. ex Benth., *Fl.Aust.* 7:48 (1878). **Blue stars.** Stem erect, 10-15 cm high, bearing near the summit a loose corymb of 2-many bright-blue flowers; perianth-segments 6, 8-10 mm long.—*Caesia corymbosa* R.Br., *Prod.Fl.Nov.Holl.* 277 (1810). (Plate 4).

Occurs in all Australian States except N.T. and Qld. Recorded in S.Aust. from the Eyre Pen., Yorke Pen., Southern Lofty, Kangaroo I. and S.E. regions.

Flowers Aug.-Oct.



Fig. 307—*Dianella laevis*.

12. DIANELLA Lam.

Encycl. 2:276 (1786).

(Diminutive of Diana, the goddess of hunting.)

Perennials, with rigid stems and long distichous mostly basal leaves, with long sheaths; rootstock with fibrous roots; flowers pedicellate, paniculate; perianth blue, persistent, of 6 free segments, each with 4-5 parallel nerves; stamens 6, filaments thickened near the anthers, which are introrse, and opening in terminal pores which are often continued in downward slits; ovary 3-celled, with several ovules in each cell; style slender with a capitate stigma; fruit a globular or ovoid bluish berry; seeds black, shining. 20-30 species from Asia and Australia.

1. Anthers light-yellow, leaf-blade flat, dorsi-ventral throughout its length . . .

D. laevis 1.

1. Anthers nearly black; leaf-blade with revolute margins, bilaterally compressed towards base . . .

D. revoluta 2.

1. **D. laevis** R.Br., *Prod.Fl.Nov.Holl.* 280 (1810). **Pale flax-lily**. Leaves all radical, 15-60 cm long, 6-10 mm broad, often more or less glaucous, flat or folded, scarcely recurved on the margins, the sheath open to the base, dorsi-ventrally flattened throughout; anthers light-yellow, much longer than the swollen orange summit of the filament.

Occurs in all Australian States except N.T. Recorded in S.Aust. from the Flinders Ranges, Northern Lofty, Eyre Pen., Southern Lofty, Murray and S.E. regions.

Flowers Sept.-Jan.

2. **D. revoluta** R. Br., *Prod.Fl.Nov.Holl.* 280 (1810). **Black-anther flax-lily**. Stems rigid, to 1 m high or more; leaves radical and cauline, to 1 m long, 4-8 mm broad, the rigid blades with revolute margins covering the midrib; the sheaths flat, keeled or bilaterally compressed at summit; panicle large and loose; anthers almost black, 3 or more times as long as the swollen orange summit of the filament.

Occurs in all Australian States except N.T. Recorded in S.Aust. from the N.W., Flinders Ranges, Eyre Pen., Yorke Pen., Northern and Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers Sept.-Jan.

Very common and widespread especially in wetter areas.

The taxonomy of this species requires investigation in view of its range in habitats and morphology.

13. *IPHEION* C.S. Rafin.

Fl.Tellur. 2:12 (1836).

(Derivation not known.)

Rootstock a bulb; leaves basal; flowers pedicellate, in a terminal simple umbel or solitary, enclosed before flowering in a spathe of 2 scarious bracts; perianth-segments 6, united to near the middle, 1-nerved (the nerve usually dark coloured); stamens inserted in the perianth-tube, the filaments all simple; anthers versatile; scarcely exserted from tube; ovary 3-celled; style filiform, capitate; capsule small, trigonous. About 25 species in the Americas.

*1. **I. uniflorum** (Grah.) C. S. Rafin., *Fl. Tellur.* 2:12 (1836). **Spring star-flower**. Bulb 10-15 mm diam., with a few lateral bulbils; leaves linear, usually to 25 cm long and 8 mm broad; flowers solitary on an unbranched scape usually less than 20 cm high; spathe-bracts narrow, to 2 cm long; pedicels slightly exceeding spathes; flower blue, c. 25 mm long, the perianth fused to form a tube for about half its length, the lobes spreading; capsule oblong, c. 15 mm long.—*Milla uniflora* Grah., *Edinb.N.Phil.Journ.* 1833:174 (1833).

Native to the Argentine; grown as a garden ornamental in Australia, more or less naturalised in Vic. and S.Aust. (Eyre Pen., Yorke Pen. and Southern Lofty regions).

Flowers Aug.-Sept.

14. *LAXMANNIA* R.Br.

Prod.Fl.Nov.Holl. 285 (1810)

(Probably after the botanist Erik Laxman, 1737-1796.)

Perennials, with fibrous roots; leaves narrow, with scarious often woolly sheaths; flowers in heads surrounded by bracts; perianth of 6 free segments, persistent but not twisted, 1-nerved; stamens 6, with small uniform anthers; ovary 3-celled, with 2-4 ovules in each cell; style undivided, with a somewhat dilated stigma; capsule 3-valved, with a few black seeds. Endemic to Australia, with c. 8 species described mainly from W.Aust.

1. *L. sessiliflora* Decne., *Nouv. Ann. Mus. Hist. Nat., Paris* 3:500 (1834). **Dwarf wire-lily.** Small perennial, with wiry slender usually branched stems, 3-8 cm high; leaves subulate, 1-3 cm long, mostly in tufts, with scarious sheaths ciliate or woolly on the margins; flowers few, sessile in axillary heads, which are shorter than the subtending leaves, the heads sessile or on short recurved penduncles and surrounded by an involucre of small scarious bracts, the inner bracts white and woolly at base; perianth-segments 6, 4 mm long, the 3 inner white and ovate; capsule globular, enclosed in the persistent perianth; seeds black, granular.—*Bartlingia sessiliflora* (Decne.) F. Muell., *Pap. Roy. Soc. Tasm.* 1877:116 (1878).

Occurs in all Australian States except N.T. and Qld. Recorded in S.Aust. from the Southern Lofty, Kangaroo I. and S.E. regions.

Flowers Sept.-Dec.

15. LOMANDRA Labill.

Nov. Holl. Pl. Sp. 1:92 (1805).

(Greek *lōma*, margin; *andros*, a male; alluding to the circular margin of the anthers in some species.)

Perennials, with narrow hard linear leaves, almost all basal and usually much longer than the inflorescence, the sheathing bases often split into silky filaments; flowers small, dioecious; male perianth of 6 free or partly united segments; stamens 6; female perianth of 6 segments which are faintly 1-nerved; ovary 3-celled, with 1 ovule in each cell; style 3-cleft nearly to the base, the short stigmatic branches recurved; fruit a hard subglobular capsule, opening loculicidally in 3 valves. Some species are popularly called "Iron-grass".—*Xerotes* R.Br., *Prod. Fl. Nov. Holl.* 259 (1810). (A. T. Lee, *Contr. N.S.W. natn. Herb. Fl. ser.* 34 (1966) 16.) About 40 species in Australia, and 1 each in New Caledonia and New Guinea.

- | | |
|---|---------------------------|
| 1. Inflorescence (male and female) a rigid whorled panicle of clustered flowers. | |
| 2. Male flowers pedicellate; female flowers sessile; capsule transversely wrinkled | <i>L. multiflora</i> 10. |
| 2. Male and female flowers sessile (however, see note to <i>L. multiflora</i>); capsule smooth. | |
| 3. Bracts short, obtuse | <i>L. dura</i> 2. |
| 3. Bracts with long acute points | <i>L. longifolia</i> 8. |
| 1. Inflorescence (male and female) a raceme, spike or of one or more heads; if a panicle, the branches not whorled and flowers usually 1 per bract. | |
| 4. Inflorescence (male and female) a large head or cylindrical spike; flowers embedded in the wool-like fibres of the bracteoles | <i>L. leucocephala</i> 7. |
| 4. Inflorescence a panicle, raceme or spike; bracteoles not embedding the flowers in wool-like fibres. | |
| 5. Flowers (male and female) in clusters or globular heads. | |
| 6. Leaves narrow and long; bracts entire | <i>L. glauca</i> 5. |
| 6. Leaves reduced to sheathing bases; pungent barren stems leaf-like, bracts fringed | <i>L. juncea</i> 6. |
| 5. Flowers scattered (1 per bract). | |
| 7. Flowers sessile or subsessile. | |
| 8. Perianth-segments all suborbicular, obtuse; leaves c. 1-3 mm broad | <i>L. sororia</i> 11. |
| 8. Female perianth-segments acute; outer male segments lanceolate, acuminate; inner male segments ovate, abruptly narrowed to obtuse tips; leaves filiform, usually 0.5-1 mm diam | <i>L. fibrata</i> 4. |

- 7. Flowers on pedicels at least 1 mm long.
 - 9. Male flowers 3-6 mm long; female flowers c. 7 mm long. *L. effusa* 3.
 - 9. Male flowers 1.5-2.5 mm long; female flowers 3-5 mm long.
 - 10. Branches of male inflorescence 3-7 cm long; leaves filiform, terete, plano-convex or channelled, with brown or black shiny basal sheaths. *L. micrantha* 9.
 - 10. Branches of male inflorescence 1-2 cm long; leaves often flat, with pale not shiny sheaths. *L. densiflora* 1.

1. *L. densiflora* J. M. Black, *Trans. R. Soc. S. Aust.* 66:248 (1942). Leaves 20-60 cm long, rigid, smooth, terete and narrowly or broadly channelled or flat, 1-6 mm broad often on the same plant, the basal sheaths becoming fibrous; male flowers greenish, thin, in a dense panicle 3-5 cm long, with spike-like obtuse erect-spreading alternate branches 1-2 cm long, covered with crowded pedicellate flowers, segments free, spreading, the outer 2.5 mm long, membranous, acuminate, the inner thicker, almost orbicular, 2 mm long; pedicel slender, 1.5 mm long, with a linear hyaline bract longer than it; lower part of rhachis and the stem flat, 3-4 mm broad, rigid, smooth (not papillose); female flowers in a contracted but not dense panicle 2-4 cm long, the branches short, erect-spreading; perianth stiff, c. 4 mm long, campanulate, umbilicate at base, erect, spreading or drooping, on pedicels 2-3 mm long, with a linear hyaline bract about as long; rhachis and stem rigid, smooth; capsule ovoid or almost globular, smooth, c. 6 mm long, truncate at summit, sometimes slightly curved, the perianth-segments spreading below its base.

Endemic to S.Aust. (Flinders Ranges, Northern Lofty, Yorke Pen., Southern Lofty and Murray regions).

Flowers Aug.-Nov.

2. *L. dura* (F. Muell.) Ewart, *Proc. R. Soc. Vic.* 28:219 (1916). Leaves 30-50 cm long, 3-5 mm broad, rigid, flattish, glaucous; flowers of both sexes sessile, or the male with pedicels to 2 mm long, clustered along the branches of a rigid whorled panicle 10-20 cm long, with small white lanceolate bracts at base; male perianth c. 3 mm long, the outer segments thin, brownish, oblong, about as long as the 3 inner ones, which are thick, yellow and united in a tube in the lower half, the thickened filaments attached within the tube; all the segments obtuse; female segments all free, obtuse, c. 3 mm long, capsule globular, smooth, c. 5 mm diam.,—*Xerotes dura* F. Muell., *J. Trans. Vic. Inst.* 42 (1855); *L. multiflora* sensu J. M. Black, *Fl. S. Aust.* 188 (1943).

Occurs in N.S.W. and S.Aust. (Flinders Ranges, Northern Lofty, Yorke Pen., Southern Lofty and Murray regions).

Flowers Aug.-Nov.

See note under *L. multiflora* whose separation from *L. dura* appears to require further study.

3. *L. effusa* (Lindl.) Ewart, *Proc. R. Soc. Vic.* 28:219 (1916). **Scented mat-rush.** Leaves 10-80 cm long, very rigid, c. 2 mm broad, 2-toothed at summit; flowers scented, white or pale-pink, scattered along the branches of a slender spreading panicle 5-10 cm long; male perianths 3-6 mm long, the segments equal, lanceolate, free, spreading, thin and flaccid, on slender pedicels, 3-7 mm long, with conspicuous white lanceolate bracts as long as or longer than pedicel; female

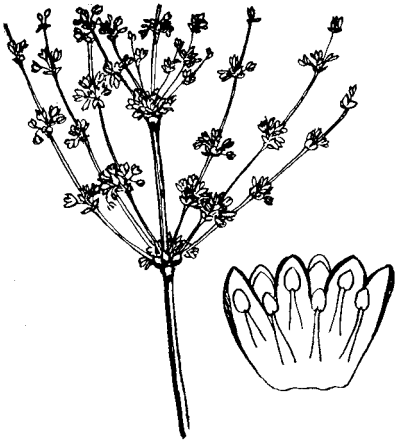


Fig. 308—*Lomandra dura*.

flowers similar, but on shorter pedicels and the segments becoming stiffer; capsule ovoid, brown, 7-9 mm long, the valves striate lengthwise.—*Xerotes effusa* Lindl. in T. L. Mitchell, *Three Exped. Int. eastern Austral.* 2:101 (1838).

Occurs in all Australian mainland States except N.T. Recorded in S.Aust. from the Flinders Ranges, Northern Lofty, Eyre Pen., Yorke Pen., Southern Lofty, Murray and S.E. regions.

Flowers May-Oct.

4. *L. fibrata* J. M. Black, *Fl.S.Aust.* 189 (1943). Basal leaf sheaths brown, often fibrous; leaves filiform, 20-50 cm long, 0.5-1 mm broad, acute, plano-convex and minutely but distinctly scabrous on margins; stem 5-10 cm long, including the dense narrow spicate or racemose panicle, 2-3 cm long, with a few short erect few-flowered branches near base; rhachis of the inflorescence rigid, angular; flowers erect, sessile or subsessile, sometimes drooping on very short curved pedicels, solitary, with a narrow white bract about as long; perianth-segments free, the outer ones c. 3 mm long, green, membranous, lanceolate, acuminate with inflexed tips, the inner ones shorter, ovate, abruptly narrowed into obtuse tips, fleshy, yellow; female flowers campanulate (the male ones globular in shape), the perianth-segments all acute, c. 3 mm long; capsule ovoid or almost globular, smooth, c. 6 mm long, truncate at summit, sometimes slightly curved, with a short stipes enclosed within the narrowed base of perianth.

Endemic to S.Aust, restricted to the Southern Lofty region, but fairly common.

Flowers Sept.-Nov.

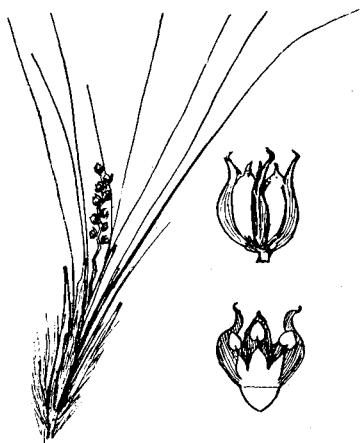


Fig. 309—*Lomandra fibrata*.

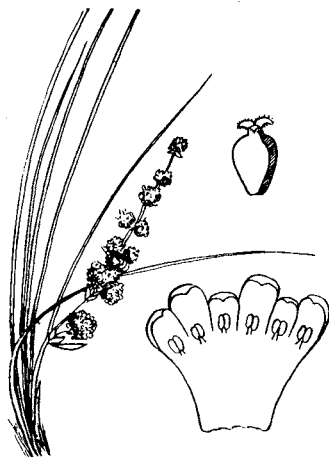


Fig. 310—*Lomandra glauca*.

5. *L. glauca* (R.Br.) Ewart, *Proc. R.Soc.Vic.* 28:219 (1916). **Pale mat-rush.** Basal sheaths becoming fibrous; leaves filiform, 5-50 cm long, 1-2 mm broad, scabrous, male flowers sessile in globular clusters, forming a short interrupted or almost continuous spike or panicle, 2-7 cm long; perianth funnel-shaped, scented, 2-4 mm long, lobed above the middle, with 3 broad obtuse usually golden bracts, or the 3 united in one 3-lobed bract, surrounding the tube; perianth-lobes equal, obtuse, greenish-yellow, the tube purplish, the stamens inserted on the lobes; female flowers in a rather large globular or oblong head near base of plant and terminating the short thick rigid stem or scape; segments free, 5-6 mm long, oblong, pale-yellow, stiff, the white scarious bracts as long as the flower; capsule slightly exceeding perianth, transversely wrinkled.—*Xerotes glauca* R. Br., *Prod.Fl.Nov.Holl.* 260 (1810).

Occurs in all Australian States except N.T. and Qld.

Subsp. **collina** (R.Br.) A. T. Lee, *Contr.N.S.W.natn.Herb.* 4:257 (1972). Leaf-apex acuminate or long-acute; male inflorescence usually branched.—*Xerotes collina* R.Br., *Prod.Fl.Nov.Holl.* 260 (1810); *L. collina* (R.Br.) Ewart, *Proc.R.Soc.Vic.* 28:220 (1916).

Occurs in W.Aust., N.S.W., Vic. and S.Aust. (Nullarbor, Eyre Pen., Yorke Pen., Northern and Southern Lofty, Murray and S.E. regions).

Flowers Aug.-Oct.

Subsp. **nana** A. T. Lee, *Contr.N.S.W. natn.Herb.* 4:252 (1972). Leaf-apex obtuse to truncate; male inflorescence unbranched.

Occurs in Vic., Tas. and S.Aust. (Southern Lofty, Murray and S.E. regions).

Flowers Oct.-Dec.

6. **L. juncea** (F. Muell.) Ewart, *Proc.R.Soc.Vic.* 28:220 (1916). **Desert mat-rush.** Rootstock creeping; leaves reduced to brown sheathing bases, but the terete rigid pungent-pointed barren stems, 20-50 cm long, have the appearance of leaves; flowering stems much shorter, not branched, with 3-7 globular heads of flowers enclosing the stem, and usually distant from each other; male flowers shortly pedicellate, each with 2 fringed bracts at base; perianth 5 mm long, funnel-shaped, the outer segments scarious, free, concave, about as long as the 3 inner, which are united in a tube in the lower part; stamens inserted at the base of the 3 white obtuse lobes; female heads globular, 1 or 2 on stem; capsule almost globular, acuminate, smooth, c. 6 mm diam.—*Xerotes juncea* F. Muell., *J.Trans.Vict.Inst.* 135 (1855).

Occurs in Vic. and S.Aust. (Eyre Pen., Northern and Southern Lofty, Murray and S.E. regions).

Flowers Aug.-Oct.



Fig. 311—*Lomandra juncea*.



Fig. 312—*Lomandra leucocephala*. A, inflorescence, $\times \frac{1}{2}$; B, capsule.

7. **L. leucocephala** (R.Br.) Ewart, *Proc.R.Soc.Vic.* 28:220 (1916), subsp. **robusta** A. T. Lee, *Contr.N.S.W.natn.Herb.* 3:161 (1962). **Woolly mat-rush.** Leaves rigid, 30-80 cm long, 1.5-2 mm (rarely 3-4 mm) broad, flat or somewhat channelled; flowers sessile in dense ovoid heads or thick cylindrical spikes, 1.5-5 cm long and 1-2 cm thick, enclosing the straight rigid unbranched stem, approximate or distant, sometimes only a terminal cylindrical spike, 5-11 cm long; bract shorter or longer than the flower which it subtends; bracteoles numerous, deeply fringed and golden-tipped, usually divided into fibres as long as the flowers and giving the head of spikes a white-woolly appearance; male perianth c. 8 mm long, the 3 outer segments concave, hyaline, lanceolate, much shorter than the inner ones, free except close to the narrow base of the 3 inner

segments, which are funnel-shaped, white, tubular in the lower half, the lobes obtuse; 3 stamens attached to the lobes, the 3 others at base of lobes; female perianth similar; capsule ovoid or obovoid, acuminate, 6-7 mm long, white, smooth, almost hidden in the wool.—*Xerotes leucocephala* R.Br., *Prod.Fl.Nov.Holl.* 260 (1810), partly.

Occurs in all Australian mainland States except W.Aust. Recorded in S.Aust. from the Lake Eyre, Nullarbor, Gairdner-Torrens, Eyre Pen., Northern Lofty, Yorke Pen., Southern Lofty, Murray and S.E. regions.

Flowers principally April-Aug.

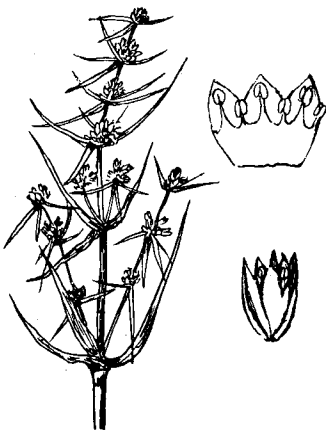


Fig. 313—*Lomandra longifolia*.

8. *L. longifolia* Labill., *Nov.Holl.Pl.Sp.* 1:92 (1805).

Spiny-headed mat-rush. Leaves mostly radical, c. 50 cm long, 4-8 mm broad, usually 2-toothed at summit; flowers sessile in clusters along the whorled erect branches of a rigid panicle 12-30 cm long, the clusters subtended and usually much exceeded by long rigid lanceolate bracts, the bracteoles surrounding the flowers small and white; male perianth 3-4 mm long, the 3 outer segments thin, free, about as long as the inner ones, which are thicker, yellow and united in a tube in the lower part; broad filaments inserted in the tube; capsule ovoid, 6 mm long, smooth.

Occurs in all Australian States except W.Aust. and N.T. Recorded in S.Aust. from the Southern Lofty and S.E. regions.

Flowers Oct.-Dec.

9. *L. micrantha* (Endl.) Ewart, *Proc.R.Soc.Vic.* 28:219

(1916). **Small-flower mat-rush.** Leaves filiform or terete, 20-80 cm long, hard and stiff, smooth, plano-convex or slightly channelled, 1-2.5 mm broad, with brown or black basal sheaths; male flowers spreading or drooping, on pedicels 1.5-3 mm long, with an ovate acuminate bract about as long as the pedicel, forming a loose panicle 10-20

cm long, with slender spreading branches 3-7 cm long, bearing flowers 3-8 mm apart, solitary or 2-3 close together; perianth-segments 2-2.5 mm long, free, rather thin, all equal, ovate-obtuse, spreading, splashed with short dark-purple streaks, finally becoming pale; anthers white, rhachis of panicle terete or often angled, minutely tuberculate; female flowers similar, but the panicle usually narrower and shorter, with few or many branches in lower part, or rarely reduced to a raceme, the long upper part racemose, the perianth becoming rigid and brown, 3-4 mm long, campanulate, umbilicate at base, the outer segments sometimes appearing subacute, the pedicels curved, 1-4 mm long, the flowers solitary or 2-4 close together; capsule globular or ovoid, c. 5 mm long, smooth, greenish, with the spreading segments at its base; seeds compressed-oblong, 3-4 mm long.—*Xerotes micrantha* Endl. in Lehmann, *Pl.Preiss.* 2:49 (1846).

Occurs in all Australian mainland States except N.T. and Qld. Recorded in S.Aust. from the Northern Lofty, Eyre Pen., Yorke Pen., Southern Lofty, Murray and S.E. regions.

Flowers May-Dec.

10. *L. multiflora* (R.Br.) Britten in Banks & Soland., *Ill.Aust.Pl.Cook's Voy.* 3:95 (1905).

Many-flower mat-rush. Leaves rigid, 30-60 cm long, 2-4 mm broad; flowers in clusters along the erect spreading branches of a rigid panicle 12-30 cm long, the males on pedicels 2-4 mm long, with small obovate white bracts and bracteoles at base; male perianth 3-4 mm long, the obtuse equal

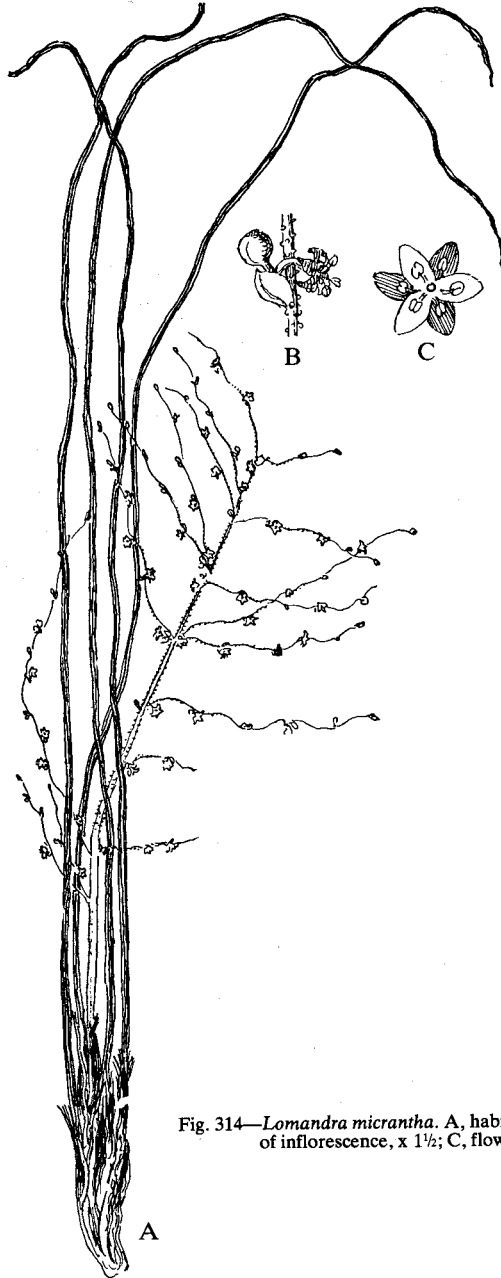


Fig. 314—*Lomandra micrantha*. A, habit, x $\frac{1}{2}$; B, portion of inflorescence, x $1\frac{1}{2}$; C, flower, x 3.

Fig. 315—*Lomandra sororia*.

segments united only near base, the inner ones thicker and yellowish; female flowers sessile; capsule globular-trigonous, finally black, 6 mm diam., transversely wrinkled.—*Xerotes multiflora* R.Br., *Prod.Fl.Nov.Holl.* 262 (1810); *X. brownii* F. Muell., *Fragm.Phyt.Aust.* 8:206 (1874), nom. illegit.

Occurs in all mainland Australian States except ?S.Aust. All Black's specimens were reidentified by Lee as a pedicellate form of *L. dura*.

Lee (1966) suggested that there "was a lack of complete discontinuity between *L. dura* and *L. multiflora* in Victoria and South Australia". The presence of *L. multiflora* in S.Aust. requires further investigation, and no specimen identified as *L. multiflora* from S.Aust. has been seen. However, Lee did consider that *L. multiflora* occurs in S.Aust.

11. *L. sororia* (F. Muell. ex Benth.) Ewart, *Proc.R.Soc.Vic.* 28:219 (1916). **Small mat-rush.** Leaves 4-40 cm long, filiform, minutely scabrous, flexible, c. 1 mm broad, or stiffer, more openly channelled and

1.5-3 mm broad; male flowers erect, sessile, solitary, or 2-4 close together, globular, in rather dense or slightly interrupted spikes, the whole forming a narrow panicle 2-5 cm long, the lower branches suberect, few-flowered, 5-15 mm long; bracts shorter than flowers or sometimes longer than the lower flowers, or the inflorescence reduced to a simple narrow spike 1-3 cm long; male perianth-segments free, the 3 outer ones thin, c. 2 mm long, purplish-brown, ovate-oblong, rather shorter than the 3 inner, which are almost orbicular, fleshy, bright-yellow; female flowers similar and sessile, but fewer in spike; capsule globular, smooth, 5-6 mm diam. subtended at base by the perianth-segments.—*Xerotes sororia* F. Muell. ex Benth., *Fl.Aust.* 7:100 (1878); *L. caespitosa* sensu J. M. Black, *Fl.S.Aust.* 189 (1943).

Occurs in W.Aust., Vic. and S.Aust. (Northern and Southern Lofty and S.E. regions).

Flowers Oct.-Nov.

On a specimen from Echunga (Southern Lofty region) Lee noted (3/10/61) "This is the only specimen of *L. caespitosa* that I have seen from S. Australia and though rather depauperate, it does seem to be that species, agreeing with W. Australian specimens of *L. caespitosa* in its short, close, straw-coloured inflorescence, the non-membranous bracts, larger, less-serrate leaves, and firmer-textured perianth with no trace of purple (this texture sometimes seen in female flowers of *L. sororia*, but this is male)."

16. *MUSCARI* Mill.

Gard.Dict. ed. 4 (1754).

(Latin *muscus*, on account of the musky smell of *M. moschatum*, an Asiatic species.)

Bulbous perennial herbs with radical, linear-channelled leaves and flowers in terminal racemes, the uppermost barren; perianth urn-shaped, entire except for the 6 small, spreading-recurved teeth; stamens enclosed in the perianth and inserted in the middle of the tube; ovary 3-celled, with 2 ovules in each cell; style short, undivided; capsule 3-angled, with compressed valves, each cell containing 1-2 black seeds. (Stuart, *R.H.S. Lily Year Book* 29 (1965) 125-138). About 60 species from Europe, North Africa and Western Asia.

1. Mature fertile flowers bluish; inflorescence less than 15 cm high *M. armeniacum* 1.

1. Mature fertile flowers brownish; inflorescence more than 30 cm high *M. comosum* 2.

*1. *M. armeniacum* Bak., *Gdnrs'Chron.* 1:798 (1878). **Grape hyacinth.** Leaves 4-8, 10-30 cm long, channelled below, 3-8 mm broad; flowers sky-blue to purplish-blue, scented, in a dense

oblong raceme 1.5-4 cm long, obovoid-urceolate; lobes white, recurved; neuter flowers up to 10.—*M. conicum* Bak., *Gdnrs' Chron.* 1:799 (1878); *M. neglectum* sensu J. M. Black, *Fl. S. Aust.* 198 (1943).

Native to S.E. Europe; cultivated and sometimes an escape or naturalised in Vic. and S.Aust. (Southern Lofty region).

Flowers Aug.-Sept.

*2. *M. comosum* (L.) Mill., *Gdnrs' Dict.* ed. 8 (1768). **Tufted grape hyacinth.** Leaves 3-6, 5-50 cm long, channelled, 5-20 mm broad; fertile flowers brownish, in a lax raceme 9-40 cm long, oblong-urceolate; lobes cream or greenish-white; neuter flowers violet or purplish, forming a terminal conspicuous head.—*Hyacinthus comosus* L., *Sp. Pl.* 318 (1753); *Leopoldia comosa* (L.) Parl., *Giorn. Bot. Ital.* 2(2):160 (1847).

Native to Europe, Asia and North Africa. Cultivated and occasionally naturalised in S.Aust. (Southern Lofty region).

Flowers Sept.-Nov.

Recent authors disagree on whether or not to separate *Leopoldia* Parl. (*Fl. Palerm.* 1 (1845) 435) from *Muscari*.

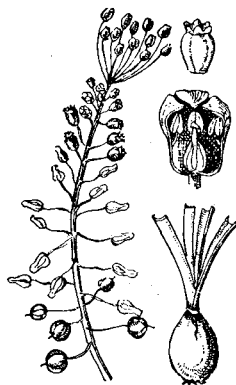


Fig. 316—*Muscari comosum*.

17. NOTHOSCORDUM Kunth

Enum. Pl. 4:457 (1843).

(Greek *nothos*, false; *skordon*, garlic.)

Leaves basal; bulb surrounded by basal bulbils; flowers pedicellate, in a terminal simple umbel, enclosed before flowering in a spathe consisting of 1 or 2 scarious bracts; perianth-segments 6, fused to form a short tube at the base, 1-nerved; stamens inserted at base of segments, the filaments all simple; anthers versatile; ovary 3-celled; style undivided, short; capsule small, trigonous, with 4-12 black seeds in each cell.

About 35 species, native to America. Does not have the onion-scent characteristic of *Allium* to which it is closely related.

*1. *N. inodorum* (Ait.) Nicholson, *Ill. Dict. Gard.* 2:457 (1885). **Fragrant false-garlic, wild onion.** Stem cylindrical, 15-50 cm high; bulb globose, 2-3 cm diam., surrounded by numerous bulbils; leaves basal, linear, 4-10 mm broad; spathe of 2 connate bracts c. 1 cm long; flowers white or very faintly pinkish, 8-20, on pedicels 1-3 cm long; perianth-segments broadly oblanceolate-oblong, obtuse, 10-15 mm long.—*Allium inodorum* Ait., *Hort. Kew.* 1:427 (1789); *A. fragrans* Vent., *Jard. Cels.* 26 (1804); *N. fragrans* (Vent.) Kunth, *Enum. Pl.* 4:461 (1843).

Native to America; Widely naturalised, including Qld, N.S.W., Vic. and S.Aust. (Yorke Pen., Southern Lofty and S.E. regions).

Flowers in summer.

Spreads by means of the underground bulbils and can be a very persistent weed of cultivation.

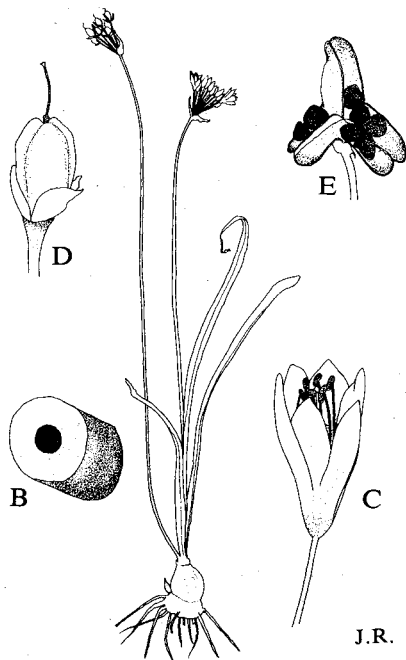


Fig. 317—*Nothoscordum inodorum*. A, habit, x $\frac{1}{4}$; B, section of stem; C, flower, x 2; D, young fruit; E, dehiscent fruit, x 2.

18. ORNITHOGALUM L.

Sp.Pl. 306 (1753).(Greek *ornithos*, a bird; and *gala*, milk; application of the ancient Greek name unknown.)

Rootstock a bulb; leaves all basal, flat, channelled, linear or lanceolate; flowers white or greenish, in a raceme terminating the leafless stem or scape, which is 20-60 cm high; each pedicel with a conspicuous bract at base; perianth persistent, the 6 segments free or almost so, oblong or lanceolate, flat, equal; stamens 6, the filaments flat, the 3 opposite the inner segments sometimes abruptly dilated into a membranous base; anthers versatile; style short, undivided; ovary 3-celled, with many ovules in each cell; capsule ovoid, angular, with several black subglobular seeds. (Clapham, Tutin and Warburg (1962) *Flora of the British Isles*.) About 150 species in Europe, Asia and Africa.

1. Perianth-segments more than 2 cm long.
 2. Flowers 6-15; all filaments linear-lanceolate *O. arabicum* 1.
 2. Flowers 20-70; alternate filaments square towards the base *O. thyrsoides* 3.
1. Perianth-segments less than 2 cm long.
 3. Inflorescence corymbose, 5-15-flowered *O. umbellatum* 4.
 3. Inflorescence narrow and elongate, more than 20-flowered *O. pyrenaicum* 2.

*1. *O. arabicum* L., *Sp.Pl.* 307 (1753). Bulb ovoid, 2.5-4 cm broad; leaves to 2.5 cm broad; flowers about 6-15 in a short loose corymbose raceme; lower pedicels c. 2.5 cm long, the bracts nearly as long; perianth-segments white, 20-25 mm long, broad-oblong, some of them often 3-toothed at summit; all filaments linear-lanceolate; ovary blackish-green, shining.

Native to the Mediterranean region. Cultivated in Australia and naturalised in S.Aust. (Eyre Pen., Yorke Pen., Southern Lofty and S.E. regions).

Flowers Oct-Dec.

*2. *O. pyrenaicum* L., *Sp.Pl.* 306 (1753). Bulb ovoid, c. 5 cm diam; leaves 3-12 mm broad; flowers more than 20 in an elongate raceme; pedicels 1-2 cm long, the bracts shorter; perianth-segments greenish-white with a deeper band, 6-10 mm long; filaments lanceolate, acuminate.

Native to Europe, Africa and Western Asia; introduced to Australia and possibly naturalised near Nuriootpa (Northern Lofty regions).

Flowers Nov. (one record).

*3. *O. thyrsoides* Jacq., *Hort.Bot.Vind.* 3:17 (1776). **Chinckerin-chee**. Bulb globular or depressed-globular, 4-5 cm broad; leaves succulent, 2-6 cm broad; raceme usually at first conical, with broad base, 20-70-flowered, dense, afterwards lengthening to 20 cm or more; lower pedicels 2-5 cm long, the bracts shorter; perianth-segments 18-24 mm long, oblong, pure white, with usually a greenish-brown blotch at base; 3 filaments linear-lanceolate, the 3 others with a broad square base; ovary greenish or pale.

Native to South Africa. Cultivated in Australia and escapes or is naturalised in Vic. and S.Aust. (Eyre Pen., Southern Lofty and Kangaroo I. regions).

Flowers Oct.-Feb.

*4. *O. umbellatum* L., *Sp.Pl.* 307 (1753). **Star of Bethlehem**. Bulb c. 2.5 cm diam., with numerous bulbils; leaves c. 6 mm broad; inflorescence a corymbose raceme, 5-15-flowered; lower pedicels to 10 cm long; perianth-segments 1.5-2 cm long, oblanceolate-oblong or linear-oblong, white with a green band; filaments lanceolate, acuminate.

Native to Europe; grown as a garden ornamental in Australia occurring as an escape in Vic. and naturalised in S.Aust. (Northern Lofty, Yorke Pen., Southern Lofty and Murray regions).

Flowers Sept.-Oct.

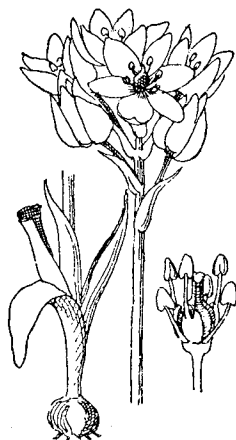


Fig. 318—*Ornithogalum thyrsoides*.

19. SCILLA L.

Sp.Pl. 308 (1753).(Greek *skilla*, the sea-onion.)

Rootstock a bulb; leaves all basal, flat, channelled, linear or lanceolate; flowers usually bluish, in a raceme terminating the leafless stem or scape, which is 20-100 cm high; each pedicel with a bract at base; perianth persistent, the 6 segments free, flat, equal; stamens 6, the filaments filiform, connate at base; anthers versatile; style filiform, undivided; ovary 3-celled, with several to many ovules in each cell; capsule ellipsoid, with several black angled or subglandular seeds. Probably c. 50 species in Europe, Africa and Asia.

1. Bracts less than 5 mm long; inflorescence lax, cylindrical *S. hyacinthoides* 1.

1. Bracts more than 2 cm long; inflorescence subcorymbose at first *S. peruviana* 2.

*1. *S. hyacinthoides* L., *Syst.Nat.* ed. 12:243 (1767). Leaves 10-12, spreading, 30-50 cm long, 12-30 mm broad; inflorescence to 1 m high, lax, sub-cylindrical, 50-150-flowered; pedicels more or less spreading, to 4 cm long; bracts less than 5 mm long; perianth-segments; bluish-lilac, c. 5 mm long.

Native to the Mediterranean region; cultivated in Australia and occasionally naturalised in S.Aust. (Southern Lofty, Kangaroo I. and S.E. regions).

Flowers in spring.

*2. *S. peruviana* L., *Sp.Pl.* 309 (1753). **Cuban lily.** Leaves many, erect-spreading, 30-60 cm long, 4-6 cm broad; inflorescence to 50 cm high, dense, subcorymbose at first, 50-100-flowered; pedicels erect to erect-spreading, to 5 cm long; bracts 25-50 mm long; perianth-segments violet-blue, c. 12 mm long.

Native to the Mediterranean region; cultivated in Australia and occasionally naturalised in S.Aust. (Southern Lofty and S.E. region).

Flowers Aug.-Oct.

The references to America in both the Latin and English names resulted from an early error.

20. STYPANDRA R.Br.

Prod.Fl.Nov.Holl. 278 (1810).

(Greek *stypē*, tow; *andros*, a man; alluding to the woolly stamens.)

Perennials, with fibrous roots and blue or less often yellow to white flowers; perianth deciduous but not twisted, of 6 free spreading 5-nerved segments; all the 6 filaments with a dense woolly beard under the anther; ovary 3-celled, with several ovules in each cell; style undivided; capsule 3-valved; seeds smooth, ovoid, black. Four Australian species.

1. Leaves basal, to 40 cm long *S. caespitosa* 1.

1. Leaves distichous along stem, to 20 cm long *S. glauca* 2.

1. *S. caespitosa* R.Br., *Prod.Fl.Nov.Holl.* 279 (1810). **Tufted blue-lily.** Plant tufted; stem 30-60 cm high, not woody; leaves basal, bilateral towards base, with a linear dorsi-ventral blade, 20-40 cm long; flowers erect, in clusters terminating an open few-flowered panicle; pedicels slender, straight, to 5 cm or more long; perianth white, yellow or blue, c. 1 cm long.

Occurs in Qld, N.S.W., Vic., Tas. and S.Aust. (S.E. region, near Glencoe and Millicent).

Flowers Oct.-Nov.



Fig. 319—*Stypandra*. A, *S. glauca*; B, *S. caespitosa*.

2. *S. glauca* R.Br., *Prod.Fl.Nov.Holl.* 279 (1810). **Nodding blue-lily.** Rootstock creeping; stem 30-100 cm high, woody at base, hidden by the sheaths of the distichous leaves, which are linear-lanceolate, 10-20 cm long, folded or flat; flowers drooping, in slender terminal dichotomous cymes leafy at base; pedicels filiform, curved, 12-20 mm long; perianth bright-blue, c. 14 mm long; capsule oblong, 8-12 mm long; seeds 2.5 mm long, not shining.

Occurs in New Caledonia, W.Aust., Qld, N.S.W., Vic. and S.Aust. (known only from a few localities in the central Eyre Pen. region).

Flowers Aug.-Oct.

21. THYSANOTUS R.Br.

Prod.Fl.Nov.Holl. 282 (1810).

(Greek *thysanōtos*, fringed: alluding to the three inner perianth-segments.)

(Prepared by N. H. Brittan.)

Perennials, some leafless and others with radical leaves and usually blue or mauve flowers, occasionally white; perianth of six free segments, 3-5-nerved along centre, the three inner broader and almost always fimbriate on the edge, the segments persisting after flowering, the outer ones enclosing the inner ones and the former remaining non-twisted; stamens 6 (3 in some Western Australian species) attached to the receptacle and arranged somewhat zygomorphically; ovary 3-celled with 2-many superposed ovules in each cell; style filiform, undivided; capsule globular to somewhat cylindrical, 3-valved with black arillate seeds, the aril often yellow-orange coloured. About 51 Australian species, 2 extending to Papua New Guinea and another also in Papua New Guinea but extending to Thailand, mainland China, Hong Kong and the Philippines.

1. Stems twining or prostrate *T. patersonii* 6.
1. Stems not twining, erect.
2. Roots tuberous, leaves present, sometimes marcescent before flowering, inflorescence produced annually, branched or unbranched.
3. Inflorescence unbranched or with 1-2 (occasionally 4) simple branches, ascending; umbels all terminal or terminal and sessile.
4. Ovules six.
5. Umbels one terminal and others sessile at intervals on scape or branches; flowers blue; leaves glabrous; tubers elongated, distant from stock *T. baueri* 1.
5. Umbels terminal only; flowers mauve, leaves and scape with minute tubercles; tubers close (occasionally distant) to stock *T. tenellus* 7.
4. Ovules more than six (Port Lincoln) *T. nudicaulis* 5.
3. Inflorescence a panicle (umbels all terminal or pedunculate).
6. Branches thin, flexible, ascending; leaves usually present at flowering; tubers close to stock (S.E. region) *T. tuberosus* 8.
6. Branches stiff, patent; leaves usually absent at flowering; tubers distant from stock (N.W., Lake Eyre and Gairdner-Torrens regions) *T. exiliflorus* 2.
2. Roots non-tuberous, produced from rhizome; leaves normally absent or marcescent before flowering stems ridged, glabrous hirsute or tuberculate on ridges; flowers produced on perennial vegetative stems.
7. Stem branching zigzag (Kangaroo I.) *T. fractiflexus* 3.
7. Stem branching monopodial or pseudodichotomous.

8. Stem glabrous, may be hirsute at extreme base; branching monopodial; habit more or less erect *T. juncifolius* 4.
 8. Stem more or less minutely tuberculate; branching monopodial or pseudodichotomous habit spreading (Eyre Pen.)... *T. wangariensis* 9.

1. ***T. baueri*** R. Br., *Prod. Fl. Nov. Holl.* 283 (1810). **Mallee fringe-lily.** (Ill. Leigh & Mulham (1965) *Pastoral Plants of the Riverina Plain* 36—this plate is incorrectly identified in the text as *T. tuberosus*). Tubers rather distant from the rootstock; leaves narrow-linear, much shorter than the inflorescence, withering early and leaving the oblong, white, membranous sheaths; inflorescences 15-30 cm tall, simple or branched once or twice towards the upper part; flowers in several sessile 2-5-flowered umbels; perianth-segments 8-10, rarely to 15 mm long, blue; stamens 6, three outer anthers yellow, straight, hardly twisted, 3-5 mm long; three inner anthers purple, curved, twisted, 6-5 mm long; pedicels rather shorter than perianth, erect in flower and fruit; capsule c. 4 mm diam.

Occurs in W.Aust., N.S.W., Vic. and S.Aust. (Nullarbor, Flinders Ranges, Gairdner-Torrens, Eastern, Eyre Pen., Northern Lofty, Southern Lofty, Murray and S.E. regions).

Flowers Oct.-Jan.

2. ***T. exiliflorus*** F. Muell., *Trans. R. Soc. S. Aust.* 4:112 (1882). Perennial, small rootstock c. 5 mm diam., with many fibrous roots becoming expanded into fusiform tubers c. 4-5 cm long at a distance from the stock (c. 6-10 cm); leaves withering before flowering and represented by dried bases surrounding the inflorescence scape; inflorescence c. 19 cm tall, scape terete to slightly striate, branches patent, lower branches tending to branch again dichotomously; umbels terminal, 1-2-flowered, pedicels c. 5 mm long; perianth-segments c. 7-8 mm long, inner series with relatively short (1-1.5 mm long) fimbriae; stamens 6, anthers straight, equal, 2-5-3 mm long; capsule spherical.

Occurs in W.Aust., N.T. and S.Aust. (N.W., Lake Eyre and Gairdner-Torrens regions).

Flowers Sept.

3. ***T. fractiflexus*** N. H. Brittan, *Trans. R. Soc. S. Aust.* 95:109 (1971). (Ill. loc. cit., fig. 1.) Perennial, with more or less horizontal rhizome c. 8-10 mm diam., with stiff roots without tubers; radical leaves produced with new shoots, usually absent at flowering time; stems to 30 cm tall, rigid, terete, ridged, with short stiff hairs on the ridges, branching monopodial with short internodes c. 8-10 mm, giving a distinctive zig-zag appearance, older stems straight with internodes c. 5 cm long, some sterile bracts in upper part of stem; umbels terminal, 2-3-flowered, 1-2 outer bracts similar to stem bracts, usually with hirsute veins, inner bracts c. 2-5 mm long, mostly membranous, with 1-3 dark veins; pedicels 7 mm long; outer perianth-segments 10-11 mm long, narrow-lanceolate, 2-2.5 mm wide, usually with 5 distinct veins on back, inner perianth-segments more or less circular including fimbriae; stamens 3 long (c. 6 mm) and 3 short (c. 4 mm); capsule cylindrical.

Endemic to Kangaroo I.

Flowers Oct.-Dec.

4. ***T. juncifolius*** (Salisb.) Willis & Court, *Muelleria* 1:45 (1956). **Rush fringe-lily.** (Ill. Clyne & others (1976) *Australian Wildflowers* 14.) Perennial, with small (c. 1 cm diam. and 2-3 cm long) rhizome, with few, fine fibrous roots; leaves all radical, 0-3, 6-8 cm long, more or less terete; stems 25-62 cm tall, leafless, striate, shortly hirsute near the base, becoming glabrous above, occasionally entirely glabrous; bracts at nodes



Fig. 320—*Thysanotus juncifolius*.

appressed, c. 5 mm long towards base, decreasing above to c. 2.5 mm long; stems ascending, branching monopodially, occasionally 2-3 branches together, branches not usually again branched; branches terminating in umbels, rarely further sessile umbels below the terminal one; umbels 1-5-flowered, enclosed within bracts similar to the cauline bracts, c. 2 mm long; inner bracts membranous, one or two veined, veins dark coloured; pedicels 6-11.5 mm long, elongating in fruit; remaining erect; perianth-segments 10-14 mm long, outer series oblong, membranous edged, mucronate; inner series 4-6 mm wide, fimbriate; stamens 6; anthers 3 long (6-9 mm), 3 short (3-4 mm); capsule cylindrical, 4.5-6 x 2.5-3 mm; seeds black with yellowish aril.—*Chlamysporum juncifolium* Salisb., *Parad. Lond.* f. 103 (1805-8); *T. dichotomus* non (Labill.) R. Br., sensu J. M. Black, *Fl. S.Aust.* 192 (1943).

Occurs in Qld, N.S.W., Vic. and S.Aust. (Eyre Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions).

Flowers Oct.-Jan.

5. *T. nudicaulis* N. H. Brittan, *J.R.Soc. W.A.* 54:81 (1971). (Ill.loc.cit., figs. 4 and 5). Perennial herb, rhizome small and more or less erect; roots swollen into tubers, ellipsoid, 2-6 cm long, 5-6 mm diam. at some 3-8 cm from the stock; leaves 1-2, more or less withering before flowering, terete to slightly angled, glabrous to scabridulous, 12-30 cm long, enclosed within 1-4 membranous bracts 4-5 cm long, 3 mm broad; inflorescence a single scape with single terminal umbel, in luxuriant specimens becoming paniculate; inflorescence 12-50 cm tall, scape terete; in paniculate specimens, peduncles 5-20 mm (occasionally 30 mm) long; umbels 1-4-flowered, bracts 3-5 mm long, outer bracts broadly ovate-triangular with narrow membranous margins, inner bracts membranous with dark veins; pedicels erect in flower and fruit, 7-10 mm long, elongating in fruit up to 20 mm; perianth-segments 13-17 mm long; outer three narrow-linear; inner three elliptical, fimbriate; stamens 6; anthers 3 long (7.5-10 mm), 3 short (3-4 mm); ovary 3 locular with 10-17 ovules per locule; capsule cylindrical, 7 mm x 3 mm; seeds black, flattened, 30-50 per capsule.

Occurs in W.Aust. and collected in S.Aust., in 1874 and 1973 near Port Lincoln (Eyre Pen. region).

Flowers Dec.-Jan.



Fig. 321—*Thysanotus patersonii*.

6. *T. patersonii* R.Br., *Prod.Fl.Nov.Holl.* 284 (1810), subsp. *patersonii*. **Twining fringe-lily**. (Ill. Williamson, *Victorian Nat.* 45:figure 1, 93 (1928); Clyne & others (1976) *Australian Wildflowers* 176.) Perennial herb, with tuberous roots consisting of a group of ellipsoid tubers, sessile or shortly pedicellate from a small rootstock; leaves produced infrequently, 1-2, radical, linear, terete, 10-20 cm tall; stems usually one, occasionally two, produced annually, terete and hirsute at the base, becoming quadrangular and glabrous above; stem twining around vegetation, or in the absence of such support trailing along the ground; branches usually many, each unbranched to several times dichotomously branched, finally each branch terminating in a single flower; bracts 2, 1-2 mm long, opposed; pedicel 1-5 mm long; perianth-segments 6-11 mm long, the length of the fimbriae on the three inner variable, occasionally absent; stamens 6; anthers more or less all the same length, dehiscent by full length longitudinal slits; capsule more or less globular, usually completely filling the persistent perianth parts.

Occurs in the temperate parts of all States, including Tas. where it is the sole representative of the genus. Recorded in S.Aust. from all regions south of 30°S, except the Eastern region. A new subspecies to be described by Brittan is restricted to W.Aust. and its forthcoming publication will result in the creation of subsp. *patersonii*.

Flowers Aug.-Nov.

7. *T. tenellus* Endl. in Lehm., *Pl. Preiss.* 2:37 (1846). Perennial; roots clustered, becoming swollen into tubers some distance from the stock; leaves usually several (5-27), 10-28 cm long, channelled, expanding into membranous wings at the base, ridged on ventral surface, ridges and margins usually with tuberculate hairs; inflorescence 7-44 cm tall, scape terete, ridged, with tuberculate hairs on the ridges, branched above; branches bearing terminal umbels, 1-4-flowered, bracts 4-5 mm long, acute apices tend to be recurved; pedicels 8-17 mm long, erect in flower, recurved downward in fruit; perianth-segments 6.5-13 mm long; stamens 6, anthers equal to subequal, 2.5-4.5 mm long, dehiscing by full length slits; capsule globular to subcylindrical; seeds black with yellow aril.—*T. exasperatus* F. Muell., *Fragm. Phyt. Aust.* 1:22 (1858).

Occurs in W.Aust. and S.Aust. (Flinders Ranges, northern Eyre Pen. and Yorke Pen. regions).

Flowers Sept.-Oct.

8. *T. tuberosus* R. Br., *Prod. Fl. Nov. Holl.* 282 (1810). **Common** (in Vic.) **Fringe-lily**. (Ill. Clyne & others (1976). *Australian Wildflowers* 51.) Perennial, with clustered roots expanding into tubers c. 1-2 cm long, 3.5-5 cm from stock; leaves all radical, c. 5-15, c. 20-30 cm tall, usually shorter than the inflorescence but occasionally longer; leaves linear, glabrous, almost terete towards apex, becoming channelled below with narrow membranous wings at the base; inflorescence 20-60 cm tall, paniculate with a terete, glabrous scape; the amount of branching is variable from c. 3 simple branches to a twice or thrice paniculate inflorescence; umbels all terminal, 1-5-flowered (occasionally up to 8); pedicels 6-22 mm long, erect in flower and fruit; perianth-segments 7-19 mm long; stamens 6, anthers varying from almost all equal to 3 long and 3 short; the short anthers range in length from 1.5-6 mm and the long anthers from 3-11.5 mm at the lower end of these ranges the anthers tend to be straight and orientated more or less parallel to the perianth-segments, at the upper end the anthers tend to be erect and the longer 3 to be curved; capsule cylindrical c. 5 x 2.5 mm. (Plate 5).

Occurs in Qld, N.S.W., Vic. and S.Aust. (S.E. region near Millicent and Mt Gambier).

Flowers Jan.

9. *T. wangariensis* N. H. Brittan, *Trans. R. Soc. S. Aust.* 102:55 (1978). Perennial, with small (5-10 mm diam.) rhizome with stiff, fibrous, non-tuberos roots; plant leafless at maturity; leaves 5-7 cm long, ciliate margined, only produced at the base of new aerial shoots; stems several per rhizome, erect, 20-30 cm tall, monopodially or pseudodichotomously branched, with 2-3 branches from some nodes, probably the result of new branches produced in successive years; stems terete, ridged, multiple ridges near base, 4-5 in upper parts, with tuberculate hairs on the ridges; umbels terminal, 1-5-flowered, bracts 2-several, 1.5-2 mm long, broadly deltoid; pedicels 8-10 mm long, erect in flower and fruit, articulated just above the level of the apices of the bracts; perianth-segments 11-12.5 mm long, outer three linear, 3 mm wide, 4-5-nerved; inner three, elliptical, 4 mm wide, fimbriate, fimbriae 3-3.5 mm long; stamens 6, anthers dehiscing by terminal pore; outer three anthers straight, twisted, 3 mm long; inner three anthers, curved, twisted, 6-7 mm long; filaments 2.5 mm long; ovary sessile, 3-locular, 2 ovules per locules; capsule cylindrical, 5-6 x 3-4 mm; seeds black with yellow aril.

Endemic to S.Aust.; Eyre Pen. region (Wangary and other localities to the N. and N.W. of Port Lincoln).

Flowers Nov.-Dec.

22. TRICORYNE R.Br.

Prod.Fl.Nov.Holl. 278 (1810).(Greek *treis*, three; *korynē*, club; referring to the fruit.)

Leaves few, grass-like, withering early or all reduced to narrow scarious scales at base of branches; flowers shortly pedicellate in terminal clusters; perianth of 6 almost free spreading 3-nerved segments, spirally twisted after flowering; stamens 6, hypogynous, the filaments filiform, with a dense golden beard of erect clavate hairs attached above middle of filament; ovary 3-lobed and 3-celled, with 2 erect ovules in each cell; style undivided; fruit divided to the base into 3 (or by abortion fewer) 1-seeded nutlets; seed black. 7 species from Australia and Papua New Guinea.

Fig. 322—*Tricoryne elatior*.

1. *T. elatior* R. Br., *Prod.Fl.Nov.Holl.* 278 (1810). **Yellow rush-lily.** Stems erect, slender, wiry, 10-40 cm long, branched; umbels 2-6-flowered, with short scarious bracts at base of flowers; perianth 6-8 mm long, the segments oblong, yellow above, greenish below, the beard on the filament golden.—*T. tenella* R.Br., *Prod.Fl.Nov.Holl.* 278 (1810).

Occurs in all Australian States. Recorded in S.Aust. from the Eyre Pen., Northern Lofty, Yorke Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers especially Oct.-Feb.

23. XANTHORRHEA Sm.

Trans.Linn.Soc. 4:219 (1798).

(Greek *xanthos*, yellow; *rheō*, I flow; alluding to the resin ("gum") that flows from the stem.)

Erect perennials, with a thick, woody stem or trunk, conspicuous or not rising above the ground; leaves long, rigid, brittle, pungent-pointed, in a dense tuft at the top of the stem; scape or peduncle solitary, erect, simple, bearing a dense cylindrical spike of many flowers, each flower surrounded by numerous bracts and bracteoles; perianth persistent, of 6 free segments, subequal, obscurely 3-5-nerved, the 3 outer scarious below green towards summit, concave, the 3 inner ones white, with short rounded laminae; stamens 6, more or less exserted; ovary 3-celled, with few ovules in each cell, tapering into an undivided style; capsule conical, hard, shining, 3-valved, protruding from the spike; seeds dull-black, flat. A purely Australian genus of slow-growing long-lived plants. The stem, marked on the outside by the bases of the fallen leaves, doubtless lengthens with age, but in some species it is very short or may appear wanting. In all species, however, the stem is not apparent during the first few years and the leaves lie flat on the ground. Bush fires appear to stimulate the subsequent flowering, and also to lead to branching of the stem in such species as *X. quadrangulata* and *X. tateana*. The existence of some species is threatened by the fact that it is necessary to destroy the stem in order to obtain the commercially valuable resin. "Scape" here means the naked part of the scape below the flowering spike. **Grass-tree, yacca, blackboy.** About 15 Australian species.

1. Leaves less than 2 mm broad, quadrangular.
2. Scape 75-150 cm long; flowering spike 70-100 cm long; capsule 15-20 mm long (Southern Lofty to Flinders Ranges) *X. quadrangulata* 3.
2. Scape c. 30 cm long; flowering spike c. 170 cm long; capsule 25 mm or more long (N.W.) *X. thornstonii* 6.
1. Leaves 3-10 mm broad, flattish or triquetrous.
3. Leaves 3-5 mm broad (S.E.)

4. Leaves 30-60 cm long; scape up to 5 mm diam. *X. minor* 2.
 4. Leaves usually more than 80 cm long; scape more than 1 cm diam. *X. australis* 1.
 3. Leaves 6-10 mm broad (Eyre Pen., Yorke Pen., Southern Lofty, Kangaroo I. and S.E.).
 5. Stem absent or very short; perianth-segments c. 10 mm long ... *X. semiplana* 4.
 5. Stem 1-4 m high; perianth-segments c. 12 mm long *X. tateana* 5.

1. *X. australis* R. Br., *Prod.Fl.Nov.Holl.* 288 (1810), subsp. ***australis***. **Austral grass-tree**. Stemless or with a stem to 3 m high; leaves flat on one side or angular on both sides, up to 5 mm broad, usually more than 80 cm long; scape 40 cm to 1.5 m long, 1-3 cm diam., usually but not always longer than the spike, which varies from 50 cm to 1.25 m in length, 3-4.5 cm diam., outer perianth-segments and bracts acuminate; stamens twice as long as the perianth, which is 8-12 mm long; capsule finally obtuse, 15-17 mm long.

Occurs in N.S.W., Vic., Tas. and S.Aust. (S.E. region. where widespread).

Flowers Sept.-April.

See note to *X. minor*.

2. *X. minor*, R. Br., *Prod.Fl.Nov.Holl.* 288 (1810). **Small grass-tree**. Stemless, leaves flat to slightly concave on one side and angular on the other, up to 4 mm broad, 30-60 cm long; scape 25-50 cm long, 2-5 mm diam., bracts short-acute to intermediate; capsule obtuse.

Occurs in N.S.W., Vic., Tas. and Aust. (S.E., probably rare).

Flowers probably as for *X. australis*.

Black (1943) included this species under *X. australis*. Although it is now recognised in S.Aust., the separation of these species is not satisfactory and Lee (*Contrib.N.S.W.natn. Herb.Fl.ser.* 34 (1966) 7) has drawn attention to intergradants between these species.

3. *X. quadrangulata* F. Muell., *Fragm. Phyt.Aust.* 4:111 (1864). Stem of old plants 1.5-3 m high; young plants stemless; leaves 30-100 cm long, 2 mm broad, quadrangular or sometimes almost rhomboid in transverse section; scape 75-150 cm long, 2.5 cm diam.; spike 70-100 cm long, rarely quite short (5-10 cm long), 3-6 cm diam.; perianth-segments c. 10 mm long; capsule sharply acuminate, 15-20 mm long.

Endemic to S.Aust. (Flinders Ranges, Northern Lofty, Southern Lofty, Murray and S.E. regions).

Flowers mainly March-May and Aug.-Sept.

4. *X. semiplana* F. Muell., *Fragm.Phyt.Aust.* 4:111 (1864). Stemless or with a very short stem; leaves 1-2 m long, 8-10 mm broad; flat on 1 side with a raised midrib, angular on the other, so as to be subtriquetrous in section; scape and spike usually about the same length, c. 1.5-2.5 m long; scape 3-4 cm, and the spike 5-6 cm diam.; capsule sharply acuminate; perianth-segments oblong, c. 10 mm long.

Endemic to S.Aust. (?Eyre Pen., Yorke Pen., Southern Lofty and S.E. regions).

Flowers July-Dec.

5. *X. tateana* F. Muell., *Zeitschr.Oesterr.Apoth.Ver.*

23:294 (1883). Stem 1-4 m high, often branched; leaves 1-2 m long, 8-10 mm broad; flat on one side with a raised midrib and angular on the other so as to be subtriquetrous in section, or slightly angular on both sides; spike stout and usually somewhat longer than the scape, c. 2-4 m long, 5-6

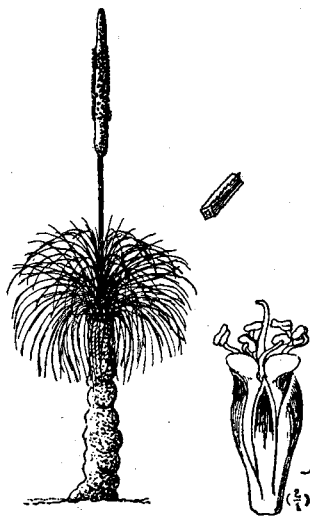


Fig. 323—*Xanthorrhoea quadrangulata*.

cm diam.; scape 3-4 cm diam.; leaf-sheaths 1-2 cm broad, flattish, golden or rich-brown; perianth c. 12 mm long.

Endemic to S.Aust. Reported from the Eyre Pen. (Marble Range), Southern Lofty (near Tunkalilla) and Kangaroo I. regions.

Flowers Oct.-Nov.

As mentioned by Black (1943) there is little difference between this species and *X. semiplana* and their taxonomy and distribution require further investigation.

6. *X. thornstonii* Tate, *Rep. Horn Exped.* 3:191 (1896). Stems to 3 m high; leaves to 1.5 m long, to 2 mm diam., quadrangular in transverse section; scape c. 30 cm long and much shorter than the spike which is to 2 m or more long, perianth-segments c. 10 mm long; capsule 25 mm or more long, the valves broad-lanceolate, abruptly narrowed into a long somewhat pungent-pointed tip.

Occurs in W.Aust., N.T. and S.Aust. (Musgrave and Mann Ranges of the N.W. region).

FAMILY 44.—AMARYLLIDACEAE

Perennial, usually bulbous herbs. Leaves radical, more or less linear. Inflorescence an umbel, sometimes reduced to a single flower, with 2 or more spathes. Flowers regular or irregular, bisexual; perianth coloured, with 6 free or united segments arranged in 2 rows, sometimes bearing a corona; stamens 6, inserted on or at the base of the perianth; anthers 2-celled, opening inwards; ovary inferior 1- or 3-celled, with usually numerous anatropous ovules in each cell, arranged on axile placentas; style capitate or 3-lobed. Fruit a berry or capsule. At least 80 genera with 1 000 species, but considerably more if the broad view of the family is taken and several other families combined in the Amaryllidaceae.

1. Corona absent.

2. Flowers irregular, 5-12 cm long CRINUM 2.

2. Flowers regular, to 15 mm long LEUCOJUM 3.

1. Corona present.

3. Corona formed from expanded filaments CALOSTEMMA 1.

3. Corona separate from the filaments NARCISSUS 4.

1. CALOSTEMMA R. Br.

Prod.Fl.Nov.Holl. 298 (1810).

(Greek *kalos*, beautiful; *stemma*, crown; alluding to the corona derived from the filaments.)

Bulbous herbs; leaves basal, grass-like, quickly withering; flowers in an umbel at the summit of the leafless scape and surrounded by 2 or 3 linear membranous bracts; perianth deciduous with a short slender tube, and a funnel-shaped deeply 6-lobed limb; stamens 6, inserted at the summit of the tube, the filaments winged and the wings united so as to form a tubular toothed corona; anthers basifixed; ovary 1-celled with 2-3 collateral and parietal ovules; style undivided, filiform, about as long as perianth; capsule depressed-globular, deciduous, hard, indehiscent, with a smooth thin pericarp and extruding 2-3 embryos, 4 Australian species.

The ovary usually contains 2 ovules, of which 1 aborts and the other grows until it fills the cavity of the ripe capsule, which has a membranous purplish-brown longitudinally 6-nerved pericarp. Two to three embryos protrude by small holes through the thin coat of the capsule; after the capsule has fallen to the ground and its albumen has been absorbed by the embryos, the latter develop into new plants. A similar method of reproduction in this genus and also in *Crinum* and *Amaryllis* was noted by Robert Brown and the content of the capsule was called by him a "bulbiform seed."

1. Flowers yellow, 20-25 mm long *C. luteum* 1.

1. Flowers purple or pink, 15-18 mm long *C. purpureum* 2.

1. *C. luteum* Sims, *Curtis's Bot.Mag.* 46:t.2101 (1819). Bulb globular, to 6 cm diam., covered with thin brown tunics; leaves linear, developing to some length after the flowering and 4-8 mm broad; scape cylindrical, 14-45 cm high; flowers 8-20 in the umbel, yellow, on pedicels to 25 mm

long, the whole perianth 20-25 mm long, of which the tube occupies about half; bracts 3, 2-3 cm long, longer than pedicels; capsule c. 1 cm diam.

Occurs in Qld, N.S.W. and S.Aust. (occasional in the Lake Eyre, Gairdner-Torrens, Flinders Ranges and Murray regions.)

Flowers recorded in April, May and Sept.

2. *C. purpureum* R.Br., *Prod.Fl.Nov.Holl.* 298 (1810). **Garland lily.** Bulb globular, usually 2-4 cm diam., covered with thin brown tunics; leaves linear, developing to some length after the flowering and 4-8 mm broad; scape cylindrical, 14-50 cm high; flowers 8-20 in the umbel, usually reddish-purple, sometimes pink, on pedicels to 3 cm long, the whole perianth 15-18 mm long, of which the tube occupies up to half, bracts 3; purplish, striate, usually 2-3 cm long, about as long as pedicels; capsule to 1 cm diam.

Occurs in N.S.W., Vic. and S.Aust. (Flinders Ranges, Northern Lofty, Murray, Yorke Pen. and Southern Lofty regions.) A specimen from the Everard Ranges (N.W. region) resembles this species in colour, but in size and shape of flower resembles *C. luteum*. It would be a unique collection for *C. purpureum* which is not otherwise known from within 600 km of this locality.

Flowers usually Jan.-April.



Fig. 324—*Calostemma purpureum*.

2. CRINUM L.

Sp.Pl. 291 (1753).

(Greek *krinon*, a lily.)

Tall bulbous herbs, with long, broad-linear basal leaves; flowers large, usually white, sessile or pedicellate in an umbel which is at first enclosed in a spathe of 2 broad membranous bracts at the summit of a stout leafless scape; perianth deciduous, with a slender tube and 6 nearly equal lobes; stamens 6 inserted at the base of the lobes, the anthers versatile, linear; style filiform, long; stigma capitate; ovary 3-celled, with several ovules superposed in 2 rows sunk in the axile placentas; capsule opening irregularly, with 2 or 3 seeds. At least 100 species in the warmer parts of the world; about 10 species endemic to Australia; some garden ornamentals.

1. *C. flaccidum* Herb., *Curtis's Bot.Mag.* 47:t.2121 (1820). **Murray lily.** Bulb ovoid, 7-10 cm diam.; leaves long, flat, 1-3 cm broad; scape stout, compressed, to 60 cm high, with 4-15 white rarely yellowish strongly scented flowers in the umbel; spathe-bracts papery, oblong, often unequal, broad at base, 7-12 cm long; pedicels 1-4 cm long; perianth-tube 5-12 cm long, the lobes 5-7.5 cm long by 1.5-2 cm broad; filaments nearly as long as lobes; anthers yellow, 1-1.5 cm long, often arched.

Occurs in all mainland Australian States except N.T. Recorded in S.Aust. from the Lake Eyre, Gairdner-Torrens, Flinders Ranges, Eastern, Eyre Pen. and Murray regions.

Flowers Feb.-June.

C. luteolum H. P. Traub & L. S. Hannibal, *Pl.Life* 21:96 (1965). This name was published for a yellow form from the Flinders Ranges region. In 1966 the same authors (*Pl.Life* 22:46-47) published an amplified description and the following characters for distinguishing the two species

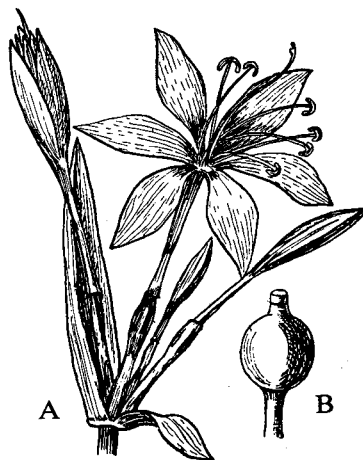


Fig. 325—*Crinum flaccidum*. A, inflorescence, x $\frac{1}{5}$; B, capsule.

they recognised: "In *C. luteolum* the leaves are evergreen, larger, and the entire leaf withers with maturity; in its native habitat it flowers usually in late winter to spring; the flowers are light primrose yellow with relatively heavier substance; the lower three stamens are shorter and grouped together, the upper three somewhat wider apart. There are other differences." There is no doubt that this form is very different from plants from some other areas, for example the Murray River. However, few of these characters can be determined from dried specimens and available data suggests that intermediate forms may make it unsatisfactory to distinguish these species. Plants which may show some characters of *C. luteolum* have been collected in the Lake Eyre and Gairdner-Torrens regions.

3. LEUCOJUM L.

Sp.Pl. 289 (1753).

(Greek *leukoion*, a name for a member of this genus.)

Bulbous herbs; leaves basal, linear; flowers nodding, in a one or few-flowered umbel at the summit of the leafless scape and subtended by one or two large bracts; perianth campanulate, regular, free or very shortly united; corona absent; stamens 6, inserted at the base of the perianth, anthers basifixed; ovary 3-celled, with axile placentas, style filiform, simple. 12 species in Europe and North Africa.

*1. *L. aestivum* L., *Syst.Nat.* ed. 10:975 (1759). **Snowflake**. Bulb ovoid, c. 2.5 cm diam., leaves 30-50 cm long, 10-15 mm broad; scape to 60 cm high; spathe 1, 4-5 cm long; flowers usually 3-7 in a one-sided umbel; perianth-segments 14-18 mm long, white tipped with green; capsule pyriform.

Native to Europe and the Mediterranean region. Grown as a garden ornamental in Australia and naturalised in S.Aust. (Southern Lofty region).

Flowers July-Sept.

4. NARCISSUS L.

Sp.Pl. 289 (1753).

(Greek *narkē*, to grow numb; alluding to narcotic properties; according to Greek mythology the plant first grew where Narcissus died.)

Bulbous herbs; leaves basal, linear to terete; flowers erect to spreading in a 1- to several-flowered umbel at the summit of the leafless scape and subtended by a single large bract; perianth usually spreading, regular, fused to form a tube at the base; corona trumpet-like or ring-shaped, arising from perianth outside the filaments; stamens 6, inserted in the tube; anthers basifixed or versatile; ovary 3-celled with axile placentas; style filiform, simple or 3-lobed. About 60 species in Europe, Western Asia and North Africa. Many species and cultivars are grown as garden ornamentals.

*1. *N. tazetta* L., *Sp.Pl.* 290 (1753). **Polyanthus narcissus**. Plants usually 30-50 cm high; leaves 8-15 mm broad; linear; flowers 3-18 in an umbel, usually white with a white or yellow corona, 2-4 cm diam., scented, shorter than the tube; corona less than half as long as the perianth-segments.

Native to the Mediterranean region. Several forms and cultivars derived from this species are grown as garden ornamentals and it is probably the principal element in the various naturalised *Narcissus* populations in S.Aust. (Southern Lofty and Kangaroo I. regions).

Flowers June-Aug.

FAMILY 45.—HYPOXIDACEAE

Perennial herbs with a tuberous rhizome or corm. Leaves mostly radical, often hairy (not in S. Aust.). Inflorescence various but not a true umbel and without a spathe; flowers regular, bisexual; perianth coloured, with 6 free or united segments arranged in 2 rows; stamens 6, inserted at the base of the perianth, 2-celled, opening inwards; ovary inferior, 3-celled, with

usually numerous ovules in each cell, arranged on axile placentas; style short or the three styles separate. Fruit a capsule or berry. 7 genera with c. 120 species in the Americas, Africa, East Asia and Australia.

J. M. Black (1943) and other authors included *Hypoxis* in the Amaryllidaceae.

1. HYPOXIS L.

Syst.Nat. ed. 10:986 (1759).

(Greek *hypoxis*, somewhat acid, but said to have been applied by Linnaeus in the sense of "acute beneath", because the capsule is contracted at the base.)

Rootstock a corm or corm-like, covered and crowned with coarse stiff fibres; leaves long, grass-like, radical, but the sheaths clasping the base of the filiform stem or scape; flowers solitary at the summit of stems or branches; perianth persistent, divided to the inferior ovary into 6 spreading segments; stamens normally 6; ovary 3-celled, with many ovules in each cell; style short, with 3 erect linear stigmas; the segments and stamens sometimes 4 instead of 6, and the cells and stigmas 2 instead of 3; capsule with a thin pericarp, fused at summit with the base of the permanent perianth and circumsciss at this point (a little below the summit), the remainder of the capsule then splitting into 3 valves; seeds globular. About 100 species in America, Africa, East Asia and Australia.

- | | |
|---|-----------------------|
| 1. Scape with 1 bract 1.5-4 cm long | <i>H. glabella</i> 1. |
| 1. Scape with 2 bracts to 6 mm long | <i>H. hookeri</i> 2. |



Fig. 326—*Hypoxis glabella*,
x 1/2.



Fig. 327—*Hypoxis hookeri*,
x 1/2.

1. ***H. glabella*** R.Br., *Prod.Fl.Nov.Holl.* 289 (1810). **Yellow star.** Glabrous plant, the slender stem 5-20 cm long, with 1 linear erect leafy sheathing bract 1.5-4 cm long, affixed rather below middle of stem; leaves linear, channelled, 1-2 mm broad, usually longer than stem; corm globular, 8-12 mm diam.; flower usually 1, terminal; segments 6-18 mm long, bright-yellow inside, green outside; anthers c. 5 mm long and very shortly lobed at base; capsule oblong, 6-8 mm long.

Occurs in all Australian States except N.T. Recorded in S.Aust. from the Eyre Pen., Southern Lofty and S.E. regions.

Flowers July-Sept.

2. ***H. hookeri*** Geerinck, *Bull.Jard.Bot.Nat.Belg.* 39:79 (1969). **Tiny star.** A small glabrous plant, the stems 2-10 cm long, with 2 slender membranous opposite deciduous bracts, 4-6 mm

long, below middle of stem; leaves filiform; flower 1, terminal, or sometimes 1 or 2 others, each terminating a long branch rising from the bracts, and the whole inflorescence then forming a sort of loose raceme; segments 4-8 mm long, bright-yellow inside, green outside; 3 inner anthers usually longer than the 3 outer anthers; capsule globular or ovoid, 4-5 mm long.—*H. pusilla* Hook.f., *Fl. Tasm.* 2:36 (1858), nom. illegit.

Occurs in New Zealand, N.S.W., Vic., Tas. and S.Aust. (Flinders Ranges, Eyre Pen., Northern Lofty, Yorke Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions).

Flowers July-Sept.

FAMILY 46.—AGAVACEAE

Rhizomatous perennials. Leaves often radical, often thick and fleshy, sometimes prickly. Inflorescence a raceme or panicle; flowers usually regular and bisexual; perianth petaloid, with 6 united segments arranged in 2 rows; stamens 6, inserted on or at the base of the perianth; anthers 2-celled, dorsifixed or basifixed; ovary inferior, 3-celled, with numerous anatropous ovules in each cell, arranged on axile placentas; style shortly 3-branched; fruit a capsule. 20 genera with nearly 300 species in warm parts of the world. Often included in the Amaryllidaceae.

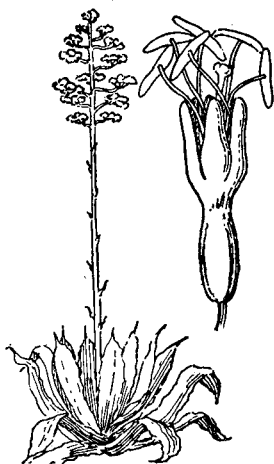


Fig. 328—*Agave americana*.

1. AGAVE L.

Sp. Pl. 323 (1753).

(Greek *agavos*, admirable.)

Stem short; leaves crowded, often very fleshy and prickly; inflorescence a large panicle; flowers bisexual; perianth united below to form a tube, shorter than the stamens; style filiform. About 300 species in the Americas.

*1. *A. americana* L., *Sp. Pl.* 323 (1753). **Century plant, American aloe.** Leaves in a basal rosette, thick, rigid, prickly, 1-2 m long; when flowering occurs, usually after long intervals, the stem grows in a very short time to a height of 7-10 m, and bears a candelabra-like terminal panicle of yellowish flowers; anthers and stamens much longer than the perianth.

Probably native to Mexico and grown in the country particularly in the early days, as a hedge; naturalised in N.S.W., Vic. and S.Aust., (Southern Lofty and probably other regions).

Flowers late summer.

FAMILY 47.—IRIDACEAE

Perennial herbs with a rhizomatous or cormaceous rootstock; leaves either radical or vertically flattened and arranged in 2 rows on each side of the stem and overlapping at base (equitant). Flowers either fairly permanent, sessile and solitary in a spathe consisting of 2 bracts, or quick-fading, pedicellate and several together in a spathe consisting of 1-2 outer and as many inner bracts as there are flowers (the inner spathe bracts usually 2-nerved and 2-toothed), regular or irregular, bisexual; perianth usually coloured and herbaceous, with 6 segments, free or united; stamens 3, inserted at the base of the perianth or in the tube, opposite the outer segments, and the cells of the erect anthers opening outwards; style 1, often with 3 branches, sometimes broad and petal-like; ovary 3-celled, with several or numerous anatropous ovules on axile placentas in each cell; fruit a capsule, opening loculicidally in 3 valves; seeds globular or nearly so, with a small embryo and hard albumen. (When all the anthers are arranged on one side of the style in the open flower, the stamens are termed *unilateral*; when surrounding the style they are *equilateral*.) About 60 genera with 800 species in most parts of the world, but especially in the old

world. (E. P. Phillips, *Genera of S.Afr. Flowering Plants* (1951); and D. Geerinck, *Bull.Jard.Bot.Nat.Belg.* 44 (1974) 29-60 for a revision of all Australian species).

1. Flowers 1 in each spathe.
 2. Style-branches bifid.
 3. Perianth to 2 cm long, the tube much shorter than the segments. ROMULEA 16.
 3. Perianth 2.5 cm or more long, the tube often longer than the segments.
 4. Inflorescence a vertical 2-sided spike WATSONIA 20.
 4. Inflorescence a horizontal secund spike FREESIA 6.
 2. Style-branches entire or minutely tricuspidate or style simple.
 5. Spathe-valves lacerate.
 6. Perianth irregular; segments shorter than the tube SYNNOTIA 18.
 6. Perianth more or less regular; segments longer than the tube SPARAXIS 17.
 5. Spathe-valves entire or emarginate.
 7. Perianth tube abruptly dilated.
 8. Perianth-lobes unequal, the upper lobe much the longest and concave or hooded CHASMANTHE 2.
 8. Perianth-lobes subequal, the upper lobe slightly longer than the others. HOMOGLOSSUM 10.
 7. Perianth-tube cylindrical or funnel-shaped.
 9. Stamens equilateral.
 10. Spathe-valves emarginate IXIA 12.
 10. Spathe-valves acuminate DIERAMA 4.
 9. Stamens unilateral.
 11. Leaves plicate, strongly ribbed BABIANA 1.
 11. Leaves not plicate.
 12. Spathe-valves green, herbaceous. GLADIOLUS 7.
 12. Spathe-valves brown, membranous.
 13. Flowers bright orange CROCOSMIA 3.
 13. Flowers pale with conspicuously marked veins TRITONIA 19.
 1. Flowers 2 or more in each spathe.
 14. Style-branches opposite anthers.
 15. Style-branches petaloid; ending in 2 erect crests or lobes, exceeding the stamens and stigmatic at base.
 16. Perianth-segments united in a short or long tube, the inner lobes large and erect; leaves sword-shaped IRIS 11.
 16. Perianth of free segments, the inner ones narrower or shorter and spreading; leaves few, linear.
 17. Flower separated by a stalk from the ovary within the spathes GYNANDRIRIS 8.
 17. Flowers more or less sessile on the ovary which may be exerted beyond the spathes. MORAEA 13.
 15. Style-branches small, not crested or exceeding the stamens, stigmatic at summit.
 18. Perianth-lobes crisped, purple marked FERRARIA 5.
 18. Perianth-lobes not crisped, pink, orange or yellow HOMERIA 9.
 14. Style-branches alternate with anthers.
 19. Style-branches filiform; filaments free; perianth-lobes equal, spreading ORTHROSANTHUS 14.
 19. Style-branches obovate; filaments united in tube; 3 inner perianth-lobes small and erect. PATERSONIA 15.

1. *BABIANA* Ker

Curtis's Bot.Mag. t.576 (1802).

(So called from the Dutch name of the baboon (*babiaan*), because the corms are eaten by baboons.)

Corm fibrous; stems, leaves and spathes hairy; leaves flat, sword-shaped or broad-linear, tapering towards base, strongly ribbed, equitant towards base of stem; flowers solitary within each spathe; perianth-tube straight, funnel-shaped upwards, with a 6-lobed limb; filaments free, the anthers basifixed; style long, the 3 branches short, simple, flattened towards summit; capsule ovoid, coriaceous, 3-valved. (Lewis (1959) *Jl S.Afr.Bot.* Supp.3.). About 60 species in South Africa and 1 in Socotra.

*1. *B. stricta* (Ait.) Ker *Curtis's Bot.Mag.* t.621 (1802). Stem wiry, pubescent, 15-40 cm high; corm with reddish-brown fibrous tunic; leaves c. 6, spreading or almost erect, softly pubescent or almost villous, not reaching the inflorescence, 6-15 mm broad; spathe-bracts coriaceous, greenish, multistriate, 12-18 mm long, the outer one entire and obtuse at summit, the inner one deeply 2-toothed; flowers 2-9, in a loose spike; perianth lilac to red and purple, c. 35 mm long, the tube c. 13 mm long; of which the slender cylindrical part occupies c. 10 mm, the lobes obovate-cuneate, equal, spreading, c. 22 mm long; anthers purple, c. 5 mm long; ovary hairy; style-branches shortly spatulate.—*Gladiolus strictus* Ait., *Hort.Kew.* 63(1789).

Native to South Africa, cultivated as a garden ornamental in Australia, naturalised in S.Aust. (Southern Lofty region).

Flowers Sept.-Oct.

2. *CHASMANTHE* N.E. Br.

Trans.R.Soc.S.Afr. 20:272 (1932).

(Greek *chasme*, gaping; *anthos*, flower; referring to the flower shape.)

Corm slightly flattened, fibrous; lower leaves equitant, sword-shaped or narrowly sword-shaped; spike 2-rowed; flowers solitary within each spathe; strongly irregular; perianth-tube long, very slender towards base, bent above where it becomes broader; lobes unequal; filaments free; anthers versatile; style slender, the 3 filiform branches undivided. 7 African species.

*1. *C. floribunda* (Salisb.) N.E. Br., *Trans. R.Soc.S.Afr.* 20:274 (1932). **African corn flag** or **mad-flower**. Tall, branching perennial, growing from a depressed corm with a fibrous tunic; leaves sword-shaped, equitant, 2.5 cm broad or more; flowers red and yellow, in a distichous spike; spathe-bracts small, oblong, acute; perianth 5-7 cm long, curved; tube longer than the segments, which are narrow, unequal, the upper one the longest; capsule subglobular, beaked, with 2-4 orange-coloured seeds to each valve.—*Antholyza floribunda* Salisb., *Trans.Hort.Soc. London* 1:324 (1812); *Antholyza aethiopica* sensu J. M. Black, *Fl.S.Aust.* 1:202 (1943).

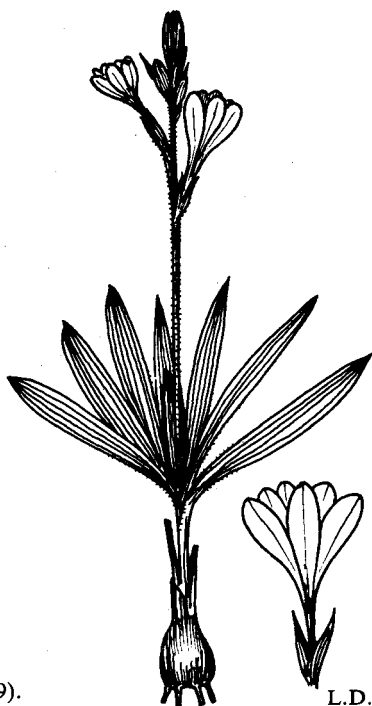


Fig. 329—*Babiana stricta*.



Fig. 330—*Chasmanthe floribunda*.

Native to South Africa, cultivated as a garden ornamental in Australia and naturalised in S.Aust. (Eyre Pen., Northern and Southern Lofty and S.E. regions).

Flowers July-Oct.

3. CROCOSMIA Planch.

Fl.des Serres, Ser. 1,7:161 (1851/2).

(Greek *krokos*, saffron; *osmē*, smell; because of the smell when dried flowers are soaked in water.)

Corm globose; lower leaves equitant, sword-shaped to linear, acuminate; panicle branches 1-sided; flowers solitary within each scarious pointed spathe, regular; perianth-tube long, very slender, slightly curved; lobes equal; filaments free, unilateral; anthers versatile; style filiform, the 3 branches dilated at their tips. 6 African species.

*1. **C. crocosmiflora** (Nicholson) N.E. Br., *Trans.R.Soc.S.Afr.* 20:264 (1932). **Montbretia**. Leaves long, flat, sword-shaped, lower to 80 cm long, panicle loose, many-flowered, c. 20-30 cm long, with zig-zag branches; flowers sessile in axil of 2 short red bracts, bright orange-red, 3-3.5 cm long, the tube and oblong segments about equal; anthers exserted, 8 mm long.—*Tritonia crocosmiflora* Nicholson *Ill.Dict.Gard.* 4:94 (1887).

A garden hybrid between *C. aurea* Planch. and *Tritonia pottsii* Benth., both South African species. Naturalised in Vic. and S.Aust. (Murray and Southern Lofty regions).

Flowers Jan.-April.

4. DIERAMA C. Koch

Index Sem.Hort.Berol. App. 10 (1854).

(Greek *dierama*, funnel; alluding to the perianth-tube.)

Corm fibrous; leaves grass-like, linear, equitant; inflorescence a panicle; flowers often pendulous, solitary within each membranous acuminate spathe, regular; perianth-tube short or long, expanding to the throat; lobes subequal; filaments short, equilateral; style 3-branched, the branches clavate. About 25 species in Africa.

*1. **D. pulcherrimum** Bak., *J.Linn.Soc.(Bot.)* 16:99 (1877). **Harebell**. Corm large; leaves numerous, grass-like, the lower to 60 cm or more long, to 1 cm broad; inflorescence to 150 (-200) cm tall, on a slender glabrous wire-like stem, spathes acuminate, 25-30 mm long, drooping; flowers bright pink or red, bell-shaped, to 4 cm long, lobes recurved; anthers much longer than filaments.

Native to South Africa; cultivated as a garden ornamental in Australia and occasionally naturalised in S.Aust. (S.E. region).

Flowers Oct.-Nov.

5. FERRARIA L.

Sp.Pl. ed. 2:1353 (1763).

(After Giovanni-Batista Ferrari, 1584-1655, Italian botanist.)

Corm tuber-like; lower stem-leaves equitant, long, linear, the upper ones broader; flowers strongly "bad-scented", very fugitive, few or several in stalked spathes; perianth-tube very short, campanulate, the 6 lobes or segments subequal, spreading, wavy on margin; filaments united in tube, the anthers small, basifixed; style short within the staminal tube, the branches opposite the stamens, 2-lobed, the lobes ciliate or fringed with many short hairs. 2 African species.

*1. *F. undulata* L., *Sp.Pl.* ed. 2, 2:1353 (1763).

Black flag. Stem stout, erect, rising from a depressed corm; leaves long, glaucous, broad-linear, loosely equitant, and passing gradually into oval floral bracts with narrow white edges; spathe 2-3-flowered, swollen, striate, 4-6 cm long; flowers pedicellate; perianth 4-5 cm across, divided almost to the base into 6 shortly clawed, spreading purple-blotched segments, greenish and wavy on the edge; anthers small, oblong, with parallel cells.

Native to South Africa. Cultivated as a garden ornamental in Australia and occasionally naturalised in Vic. and S.Aust. (Eyre Pen., Southern Lofty, Murray and Kangaroo I. regions).

Flowers Sept.-Nov.



Fig. 331—*Ferraria undulata*.

6. FREESIA Klatt

Linnaea 34:672 (1866).

(F. H. T. Freese, d. 1876, a pupil of C. F. Ecklon, who proposed the name.)

Corm smooth or fibrous; leaves laterally flattened, equitant; stem simple or branched; the fertile portion usually horizontal; flowers regular, sessile, solitary within each scarious blunt spathe; all on the upper side of the spikes; perianth-tube narrow at base and expanding to the mouth; lobes equal or the two whorls dissimilar; filaments unilateral; anthers versatile; style-branches 3, bifid. About 20 species in Africa.

*1. *F. refracta* (Jacq.) Klatt, *Linnaea* 34:673 (1866). **Common freesia.** Corm smooth; leaves 10-25 cm long, 5-10 mm broad; inflorescence 1-or few-branched, to 30 cm high, the fertile portion bent horizontal; flowers 3-8, creamy-white with yellow in the throat, the tube 15-35 mm long, the lobes equal, 10-15 mm long; filaments attached in tube; anthers c. 6 mm long; style as long as perianth; the ultimate style-branches 2-3 mm long.—*Gladiolus refractus* Jacq., *Icon.Pl.Rar.* 2(4):t.241 (1789).

Native to South Africa; cultivated as a garden ornamental in Australia and naturalised in Vic. and S.Aust. (Eyre Pen., Yorke Pen., Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Aug.-Oct.

7. GLADIOLUS L.

Sp.Pl. 36 (1753).

(Latin *gladiolus*, a small sword and also the Roman name of the plant, so-called from the sword-shaped leaves of several species.)

Corm with a brown fibrous tunic; stem leafy; the leaves usually sword-shaped and equitant; flowers solitary in a loose unilateral or distichous spike, the spathes large, herbaceous, lanceolate; perianth-tube funnel-shaped, usually long and more or less curved, the lobes unequal or almost equal; stamens bent, the filaments free, the anthers basifixed; style-branches undivided, linear-cuneate. About 300 species in Europe, Western Asia and Africa.

Cultivated *Gladiolus* species are sometimes of hybrid origin and the naturalised plants do not always conform exactly with descriptions of wild species.

1. Basal leaf 1, less than 5 mm broad. *G. tristis* 4.
1. Basal leaves 2 or more, at least 8 mm broad.
 2. Perianth-segments long acuminate *G. undulatus* 5.
 2. Perianth-segments acute.
 3. Perianth-tube approximately twice as long as lobes *G. angustus* 1.
 3. Perianth-tube approximately as long as lobes.
 4. Perianth white, pale pink or yellow, with 3 dark reddish markings on lower lobes; anthers much shorter than filaments. *G. carneus* 3.
 4. Perianth crimson-purple; anthers at least as long as filaments. *G. byzantinus* 2.

*1. *G. angustus* L., *Sp.Pl.* 37 (1753). Corm to 1.5 cm diam.; stem usually simple, usually 25-50 cm high; leaves 3-5, the lowest blade 15-75 cm long, c. 8-10 mm broad; spike with 1-10 flowers; spathes usually 3-4 cm long; perianth-tube long and slender, to 7 cm long, more or less straight; lobes white, yellow or pale pink, the 3 lower lobes with a conspicuous reddish mark near the middle, obtuse or acute, not distinctly long-clawed, the upper three 2.5-3.5 cm long; filaments approx. twice as long as anthers, c. 2 cm long.

Native to South Africa; cultivated as a garden ornamental in Australia and naturalised in S.Aust. (Southern Lofty region).

Flowers Oct.-Nov.

*2. *G. byzantinus* Miller, *Gard.Dict.*, ed. 8 (1768). Corm c. 1.5 cm diam.; stem simple, usually less than 1 m high; leaves 2-4, the lowest blade to 30 cm long and 3 cm broad; spike with 6-10 (-20) flowers, incompletely 1-sided; spathe to 8 cm long; perianth-tube short and curved, to 2 cm long; lobes crimson-purple, acute, long-clawed, 2.5-3 cm long; filaments as long as or shorter than the anthers, c. 1 cm long.—*G. illyricus* sensu Hj. Eichl., *Suppl.* 86 (1965).

Native to the Mediterranean region; cultivated as a garden ornamental in Australia, and naturalised in S.Aust. (Southern Lofty and Kangaroo I. regions).

Flowers Oct.-Nov.

Although S.Aust. material has been authoritatively identified and published keys confirm the identification, our specimens are more robust and more-flowered than in descriptions of European plants.

*3. *G. carneus* Delaroche, *Pl.Nov.Descrip.* 3:t.4 (1766). Corm 2-3 cm diam.; stem simple, 35-50 (-100) cm high; leaves 3-5, the lowest blade to 50 cm long and 2 cm broad; spike with usually 3-5 flowers; spathes c. 4-5 cm long; perianth-tube 2-4 cm long, curved; lobes white or pale pink with or without red blotches on the lower lobes or throat, subacute, not distinctly clawed, about as long as tube or shorter; anthers 8 mm long, much shorter than filaments.—*G. blandus* Ait., *Hort.Kew* 1:64 (1789).

Native to South Africa, cultivated as a garden ornamental in Australia and naturalised in S.Aust. (Southern Lofty region; Waterfall Gully).

Flowers Oct.-Dec.

Not collected since 1908.

*4. *G. tristis* L., *Sp.Pl.* ed. 2:53 (1762). Corm 1-3 cm diam.; stem simple, usually 40-50 cm high; leaves 2-4, the lowest blade narrow-linear, stiff, with prominent midrib and veins, 30-60 cm long, 1.5-4 mm broad, spike with 1-3 flowers, 1-sided; spathes 3-5 cm long; perianth-tube 5-6 cm long, curved, funnel-shaped in upper part; lobes greenish-yellow with purple stripes running into the tube; not distinctly

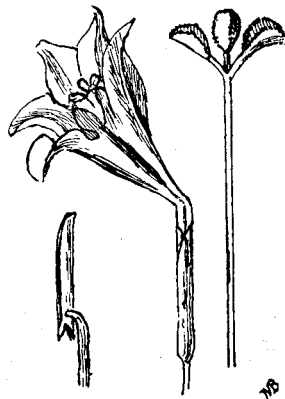


Fig. 332—*Gladiolus tristis*.

clawed, 2-3 cm long; anthers 12-14 mm long, shorter than filaments.—*Acidanthera platypetala* sensu J. M. Black, *Fl.S.Aust.* 205 (1943); *G. longicollis* sensu Hj. Eichl., *Suppl.* 86 (1965).

Native to South Africa; cultivated as a garden ornamental in Australia and naturalised in Vic. and S.Aust. (Eyre Pen., Southern Lofty and Kangaroo I. regions).

Flowers Aug.-Oct.

Strongly scented at night.

*5. *G. undulatus* L., *Mant.* 1:27 (1767). Corm 1-5.3 cm diam.; stem simple, 60-80 cm high; leaves 3-5, the lowest blade linear, rigid, ribbed, 25-75 cm long, 8-14 mm broad; spike with 3-8 flowers, loose, unilateral; spathes 4-7 cm long; perianth-tube very slender below, normally funnel-shaped above, 6-8 cm long, slightly curved; lobes white with a greenish tinge on the lower half, lanceolate with wavy margins and long slender points, c. 4 cm long; anthers much shorter than filaments, c. 7 mm long.—*G. cuspidatus* Jacq., *Icon.Pl.Rar.* 2:t.257 (1795).

Native to South Africa; cultivated as a garden ornamental in Australia and naturalised in N.S.W., Vic. and S.Aust. (Eyre Pen., Northern and Southern Lofty and Murray regions).

Flowers Dec.-Feb.



Fig. 333—*Gladiolus undulatus*.



Fig. 334—*Gynandriris setifolia*.

8. GYNANDRIRIS Parl.

Nuov.Gen.Sp. 49 (1854).

(From Greek *gynandros*, hermaphrodite; *Iris*, the related flower.)

Corm fibrous; leaves few, basal, linear; stem simple, short; flowers short-lived, in terminal and lateral clusters within membranous colourless spathes; perianth-segments free, clawed, the inner slightly smaller than the outer; stamens appressed to the style and style-branches; filaments partly united; style-branches 3, flattened, terminating in 2 erect petaloid crests; stigma a small bilobed flap on each style-branch just above the anther; ovary with a short stalk-like elongation supporting the flower; fruits enclosed in the spathes. 20 species in the Mediterranean region and South Africa.

*1. *G. setifolia* (L. f.) Foster, *Contrib.Gray Herb.* n.s. 114:40 (1936). **Thread iris.** Dwarf plant, rising from a small corm covered with fibres; leaf 1, radical, spreading, narrow-linear, tough, c.1 mm broad, 25-70 cm long; stem short, bearing 3-5 hyaline nerved spathes, each spathe containing 4-6 flowers like those of a minute *Iris*; perianth lilac, blotched with orange and purple, the segments 15-18 mm long, spreading, sub-equal in length, but the inner ones much narrower; filaments more or less united in a tube; style-branches terminating in erect bifid petaloid lobes; ovary cylindrical, tapering into a beak 7-8 mm long, which resembles a perianth-tube and remains persistent on the membranous cylindrical 10-15 mm long capsule containing many lustreless, brown, angular seeds.—*Iris setifolia* L.f., *Suppl.* 99 (1781); *Moraea xerospatha* MacOwan ex Bak., *Fl.Capens.* 6:529 (1897); *M. xerospatha* var. *monophylla* J. M. Black, *Fl.S.Aust.* 143 (1922).

Native to South Africa; naturalised in W. Aust., N.S.W., Vic. and S. Aust. (Eyre Pen., Flinders Ranges, Northern Lofty, Yorke Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions).

Flowers Sept.-Nov.

9. HOMERIA Vent.

Dec. Gen. Nov. 6 (1808).

(Greek *homḗrēō*, I agree; alluding to the stamens united by their filaments.)

Corm globular, with thick brown tunic; leaves few, radical, with closed sheaths; spathes cylindrical on erect peduncles, which are terminal or rise from short branches enclosed in sheathing bracts; flowers pedicellate, 2-4 in each spathe; perianth funnel-shaped with a very short tube and sub-equal spreading segments; filaments completely united in a tube round the style; anthers linear, appressed to the style-branches, which are short, broadly cuneate, truncate and more or less notched at summit; capsule long, cylindrical. (Adamson & Salter, *Fl. Cape Peninsula* (1950) 231.) About 40 species in South Africa.

1. Plants with 2-3 long leaves, the others short, sheathing. *H. miniata* 2.
1. Plants with only 1 long leaf, the others all short, sheathing.
 2. Lower part of the perianth-segments curved up, forming a wide cup c. 2 cm diam. *H. ochroleuca* 3.
 2. Lower part of the perianth-segments curved up, forming a small cup 0.7-1 cm diam. *H. collina* 1.

*1. *H. collina* (Thunb.) Vent., *Dec. Gen. Nov.* 2:5 (1808). **One-leaved Cape Tulip.** Corm 0.8-2 cm diam., tunics of dark spine-tipped fibres, 20-45 cm high; stem simple or branched; leaves 2-4, the lowest arising well above the base of the stem, 20-80 cm long, folded, the upper 1-3 short; spathes acuminate, the tips usually membranous, cuspidate; inner longer than the outer; flowers pale salmon-pink or yellow, sickly sweet-scented; perianth-segments obovate or oblanceolate, forming a small cup 0.7-1 cm diam.; outer obtuse or shortly acute, 2.5-4 cm long, 1.1-6 cm wide; inner narrowing to the base; filaments 6-8 mm long, minutely pubescent, completely united; style-branches 4-5 mm long, slightly longer than the anthers, truncate, minutely crested —*Moraea collina* Thunb., *Diss. Moraea* 11 (13) (1787); *H. breyniana* sensu Hj. Eichl., *Suppl.* 88 (1965).

Native to South Africa; naturalised in all Australian States except N.T. and Qld. Recorded in S. Aust. from (?Eyre Pen., ?Yorke Pen., ?Northern Lofty, Southern Lofty, ?Kangaroo I. and ?S.E. regions).

Flowers Sept.-Nov.

This species has been confused with *H. ochroleuca* and at present the status and distribution of both species is uncertain; it is likely that most specimens do belong here.

P. Goldblatt (1973), *JIS. Afr. Bot.* 39:133-140, proposed that the identity of *H. breyniana* (L.) G. J. Lewis was too uncertain for the name to be used for this species.



Fig. 335—*Homeria collina*.

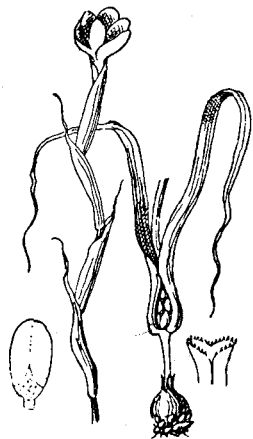


Fig. 336—*Homeria miniata*.

*2. *H. miniata* (Andr.) Sweet, *Brit. Flower-gdn.* 2:t.152 (1826). **Two-leaved Cape Tulip.** Corm 1-2 cm diam., often surrounded by small cormlets; tunics of woody fibres; height 30-60 cm; leaves 4-5, the 2 lower 0.5-1 m long, sometimes with bulbils in the axils, the third 12-21 cm long, the 1-2 upper very short; flowers salmon-pink with a pale yellow star in the middle, sweet-scented; perianth-segments forming a small cup, obtuse; outer oblong, 1.8-2.5 cm long; inner narrowing to the base; filaments 8 mm long, completely united, pubescent near the base; style-branches very short, bifid, projecting between the anthers.—*Moraea miniata* Andr., *Bot. Rep.* 6:t.404 (1804).

Native to South Africa; naturalised in W.Aust., N.S.W., Vic. and S.Aust. (Eyre Pen., Yorke Pen. and Southern Lofty regions).

Flowers Sept.-Oct.

*3. *H. ochroleuca* Salisb., *Trans.Hort.Soc. London* 1:308 (1812). **One-leaved Cape Tulip.** Corm 2-3 cm diam.; tunics of dark flattened spine-tipped fibres; stem branched, 50-70 cm high, leaves 3-4, the lowest arising about half-way up the stem, 0.75-1 m long, the 2-3 upper short; flowers golden-yellow or yellow and salmon-pink, unpleasantly scented; perianth-segments forming a deep cup c. 2 cm in diam.; outer oblong, obtuse, 3.5-4.2 cm long; inner obovate; filaments 9 mm long, completely united; style-branches 8 mm long, truncate, 2-3 mm wide.—*H. collina* var. *ochroleuca* (Salisb.) Bak., *Fl. Cap.* 6:28 (1896).

Native to South Africa; naturalised in ?Vic. and S.Aust. (?Eyre Pen., ?Yorke Pen., Southern Lofty, ?Kangaroo I. and ?S.E. regions).

Flowers Sept.-Nov.

Many authors have not considered this species to be more than a variety of *H. collina*, from which it appears to be difficult to distinguish it. Because of confusion between these species its status and distribution have not been satisfactorily determined, but most specimens probably belong to *H. collina*.

10. HOMOGLOSSUM Salisb.

Trans.Hort.Soc.London 1:325 (1812).

(Greek *homoios*, similar; *glōssa*, tongue; alluding to the shape of the perianth lobes.)

Corm small, globose; tunics of fibres; stem simple; leaves 3-5; spike with few flowers; spathes green; flowers irregular, reddish; perianth-tube curved, the lower part slender, slightly shorter than the broadly cylindrical upper part; lobes nearly equal or the 3 upper slightly larger than the 3 lower, the uppermost arched; stamens and style arched under the upper perianth lobe; style-branches 3, short. (Adamson & Salter (1950) *Flora of the Cape Peninsula*.) About 20 species in South Africa.

*1. *H. watsonium* (Thunb.) N.E.Br., *Trans.R.Soc.S.Afr.* 20:278 (1932). Stems 40-55 cm high; leaves 4, the lowest at least as long as the stem, with very prominent margins and midrib, spike with 2-4 flowers; spathes acute, 5.5-8 cm long; flowers red; perianth-tube with a small pouch near the middle, 5.5-3 cm long; lobes acuminate or acute, the upper semi-erect, c. 3 cm long, the lowest c. 2-6 cm long.—*Gladiolus watsonius* Thunb., *Diss. (Gladiolus)* 14 (1784).

Native to South Africa; grown in Australia as a garden ornamental and naturalised in S.Aust. (Southern Lofty region).

Flowers Sept.

11. IRIS L.

Sp.Pl. 38 (1753).

(Greek *iris*, rainbow; varied colour of the flowers.)

Stout plants, with a thick horizontal rootstock, leaves sword-shaped, equitant; flowers 2 or more rarely solitary in each spathe; perianth-tube short or rather long, cylindrical, the lobes broad and conspicuous, the outer 3 spreading or reflexed, the inner 3 erect; stamens equilateral, the anthers linear, basifixed, the filaments almost always free; the 3 style-branches often longer

than the style, winged on both sides, the wings ending in 2 petaloid erect lobes, stigmatic at base, which cover the anther opposite to them; capsule ovoid or oblong, 3-6-angled, 3-celled, with globular or angular seeds. About 300 species in the northern hemisphere.

1. Outer perianth-segments yellow-bearded; perianth-tube to 2.5 cm long *I. germanica* 1.
1. Perianth-segments glabrous; perianth-tube 10-24 cm long *I. unguicularis* 2.

*1. *I. germanica* L., *Sp.Pl.* 38 (1753). **German Iris.**

Perennial, with a long rootstock and sword-shaped leaves shorter than the stem; 30-50 cm high, 25-40 mm broad; flowers 1-3 in the spathe, large, blue or white; spathe large, its oblong bracts scarious on margins; perianth-tube much shorter than the broad equal lobes, which are c. 7 cm long, the 3 outer ones recurved, with a yellow beard running down the midrib for half their length, the 3 inner segments erect-incurved.

Garden plant, probably of hybrid origin. Naturalised in N.S.W., Vic. and S.Aust. (Southern Lofty and S.E. regions).

Flowers Sept.

*2. *I. unguicularis* Poir., *Voy.Barb.* 2:86 (1785). Perennial, with a short compact rhizome and linear to narrowly sword-shaped leaves 50-60 cm high and to 15 mm broad; spathe large, its linear bracts scarious at the tip only; flowers principally lavender-coloured; perianth-tube longer than the lobes, 10-24 cm long; outer lobes recurved, without a beard; the inner lobes c. 9 cm long, erect.

Native to the Mediterranean region; cultivated as a garden ornamental in Australia and possibly naturalised in S.Aust. (Southern Lofty region).

Flowers June-Aug.

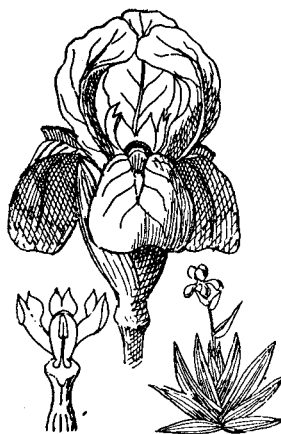


Fig. 337—*Iris germanica*.

12. IXIA L.

Sp.Pl. ed. 2:51 (1762).

(Greek *ixia*, the name of a plant of particularly variable colouring.)

Corm small, fibrous; leaves narrow, equitant, near the base of the stem; flowers solitary in small sessile spathes forming simple or branched spikes; perianth-tube slender, usually short, the 6 lobes equal, oblong, finally spreading; stamens equilateral, the filaments usually free, short, the anthers lanceolate, basifixed; style filiform, with 3 recurved simple filiform branches; capsule globular or ovoid. (G. J. Lewis (1962) *Jl.S.Afr.Bot.* 28:45-195.) About 50 South African species.

Plants naturalised in Australia are of horticultural and possibly hybrid origin: The key and descriptions have been adapted from G. J. Lewis (1962).

1. Perianth-tube 4-7 cm long *I. paniculata* 2.
1. Perianth-tube less than 1 cm long.
 2. Flowers green with a dark purple or reddish centre; anthers about 3 times as long as filaments *I. viridiflora* 4.
 2. Flowers not green; anthers shorter than or up to twice as long as filaments.
 3. Spathes with the upper half rust coloured or densely streaked or spotted with reddish-brown and more or less papyraceous, more than 8 mm long *I. maculata* 1.
 3. Spathes whitish, sometimes minutely flecked with brown at the apex or faintly striate, to 7 mm long *I. polystachya* 3.

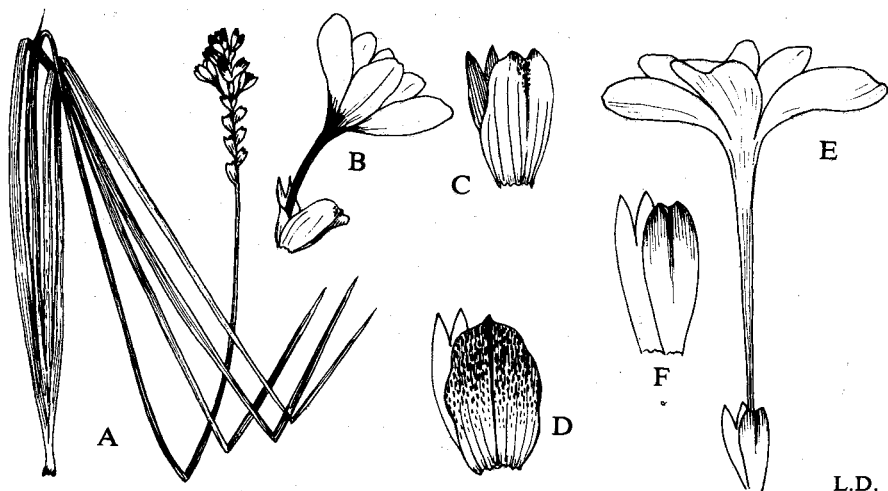


Fig. 338—*Ixia*. A, *I. polystachya*, habit, x $\frac{1}{4}$; B, *I. polystachya*, spathe-valves and flower, natural size; C, *I. polystachya*, spathe-valves, x 2; D, *I. maculata*, spathe-valves, x 2; E, *I. paniculata*, flower, natural size; F, *I. paniculata*, spathe-valves, x 2.

*1. *I. maculata* L., *Sp.Pl.* ed. 2:1664 (1763). **Yellow ixia.** Corm 1-1.8 cm diam.; stem 18-50 cm high, simple; leaves 5-8, subulate to lanceolate, 10-35 cm long, 2-7 mm broad; spike short, capitate with 4-many flowers; spathes 0.8-1.5 cm long, ferruginous and densely streaked all over or pale at the base, papyraceous; flowers orange or yellow with a dark centre; perianth-tube 5-8 mm long; lobes 1.5-3 cm long; filaments 3-5 mm long; anthers 7-9 mm long.

Native to South Africa; cultivated as a garden ornamental in Australia and naturalised in Vic. and S.Aust. (Southern Lofty region).

Flowers Oct.-Nov.

*2. *I. paniculata* Delaroché, *Pl.Nov.Descrip.* 26 (1766). Corm 1-1.5 cm diam.; stem 30-100 cm high, usually with 1 or 2 branches; leaves linear to lanceolate, 15-60 cm long, 3-12 mm broad; spike 4-14 cm long, fairly lax or dense, with 5-18 flowers; spathes 0.8-1.5 cm long, pale, soft at the apex, hyaline below; flowers cream coloured (to yellowish); sometimes pinkish outside or in the throat; perianth-tube 4-7 cm long; lobes 1.5-2.5 cm long; filaments 5-6 mm long; anthers 6-8 mm long.

Native to South Africa; cultivated as a garden ornamental in Australia and reported to be naturalised in S.Aust. (Southern Lofty region).

Flowers Nov.

*3. *I. polystachya* L., *Sp.Pl.* ed. 2:51 (1762). **Variable ixia.** Corm 0.8-2.5 cm diam.; stem 30-100 cm high sometimes with 1-4 branches; leaves 5-8, linear to lanceolate, 20-60 cm long, usually 2-8 mm broad; spike lax or compact, with few or many flowers; spathes 3-7 mm long, whitish, sometimes minutely flecked or striate with brown; flowers scented, white, mauve or blue, sometimes of different colour in the centre; perianth-tube 0.5-1.4 cm long; lobes 1-2.5 cm long; filaments 3-4 mm long; anthers 4-7 mm long.

Native to South Africa; cultivated as a garden ornamental in Australia and naturalised in Vic. and S.Aust. (Southern Lofty and Kangaroo I. regions).

Flowers Nov.-Dec.

J. M. Black (1943) regarded the common *Ixia* sp. in S.Aust. as *I. flexuosa* L., *Sp.Pl.* ed. 2:51 (1762). It differs from *I. polystachya* in having pinkish spathes, white or mauve but never blue flowers, 4-6 mm long, tube and anthers (3-4.5 mm long) shorter than or equal to filaments. This species was considered by N. C. W. Beadle, O. D. Evans & R. C. Carolin (1972) *Flora of the Sydney Region* to occur in their area, but was not recognised by J. H. Willis (1970) *A handbook to plants in Victoria* and most, if not all, of the specimens identified as *I. flexuosa* probably belong to *I. polystachya*.

*4. *I. viridiflora* Lam., *Encycl.* 3:340 (1789). Corm 1-2 cm diam.; stem 50-95 cm high, usually simple; leaves 5-7, linear, 40-55 cm long, 2-4 mm broad; spike usually lax, with 12-many flowers; spathes 0.8-1 cm long, straw coloured; flowers green with a dark centre; perianth-tube 6-9 mm long; lobes 1.6-2.5 cm long; filaments 3-4 mm long; anthers 9-13 mm long.

Native to South Africa; cultivated as a garden ornamental in Australia and probably naturalised in the Southern Lofty regions of S.Aust.

13. MORAEA Miller

Figs.Pl. 159, t.238 (1758).

(After Robert Moore, an English botanist of the 18th century.)

Corm with a fibrous tunic; leaves few, basal; flowers pedicellate, 2 or many in each spathe, each flower with its own inner hyaline bract, opening one after the other and fading quickly; perianth more or less sessile on the ovary; perianth-segments free, spreading in the upper half, the inner ones narrower or shorter; filaments more or less united in a tube around the style; anthers erect, appressed to the style-branches, which terminate in 2 erect petaloid lobes, sometimes united in lower part, stigmatic at base. About 100 species in Africa and Madagascar. (P. Goldblatt (1976) *Ann.Miss.Bot.Gard.* 63:657-786).

1. Inner perianth-segments much smaller than the outer, usually tricuspidate; produced leaf 1.
2. Flowers white with a bright blue mark in the centre *M. aristata* 1.
2. Flowers yellow, speckled in the centre but without a conspicuous blue mark *M. bellendenii* 2.
1. Inner perianth-segments oblanceolate-unguiculate, slightly smaller than the outer; produced leaves 2 or more.
3. Stems and branches glabrous *M. fugax* 3.
3. Stems and branches pubescent *M. vegeta* 4.

*1. *M. aristata* (Delaroché) Aschers. & Graebner, *Syn.Mitteleur.Fl.* 3:518 (1906). Stems 25-35 cm high, simple or once branched, glabrous; leaf 1, linear, glabrous; spathes with dark brown acuminate tips; flowers white with a bright blue heavily bearded central mark; outer segments 3-3.5 cm long; the blade spreading c. 2 cm long; the claw c. 12 mm long; inner segments 1.5-2 cm long, tricuspidate; the middle cusp linear, spreading; lateral cusps shorter and obtuse; style-crests triangular, c. 7 mm long; style-branches c. 7 mm long.—*Vieusseuxia aristata* Delaroché, *Pl.Nov.Descr.* 33 (1766).

Native to South Africa; grown as a garden ornamental in S.Aust. and one specimen of an apparently naturalised population recorded in the Southern Lofty region (between Balhannah and Nairne).

Flowers Sept.-Oct.

The other cultivated *Moraea* spp. with a conspicuously marked centre to the flower both have pubescent stems and/or leaves. *M. neopavonia* Foster has anthers much exceeding the style-crests while *M. villosa* (Ker) Ker anthers are shorter than the style-crests.

*2. *M. bellendenii* (Sweet) N.E.Br., *Kew Bull.* 1929:139 (1929). Stems 30-100 cm high, usually with several branches, glabrous; leaf 1, linear, glabrous; spathes cylindrical, c. 5 cm long, on a long peduncle with a sheathing bract at the base, each bearing 2-3 flowers; valves scarious at top and long-pointed; outer perianth-segments pale-yellow, brown-streaked and villous on claw; the blade spreading to ascending, 14-18 mm long; the claw 9-13 mm long; inner segments 8-10 mm long, tricuspidate; the middle cusp linear, coiled obliquely inward; lateral cusps shorter and obtuse; style-crests narrowly triangular, 3-8 mm long; style-branches c. 6 mm long.—*Vieusseuxia bellendenii* Sweet, *Hort.Brit.* ed. 1:395 (1827); *M. pavonia* Ker, *Curtis'sBot.Mag.* 31:t.1247 (1809) var. *lutea* Bak., *Fl.Cap.* 6:24 (1896).



Fig. 339—*Moraea bellendenii*.

Native of South Africa; grown as a garden ornamental in Australia and naturalised in S.Aust. (Southern Lofty region).

Flowers Aug.-Nov.

*3. *M. fugax* (Delaroché) Jacq., *Hort.Bot.Vind.* 3:14 (1776). Stem 20-75 cm high, naked below but with leaves at the top immediately below the inflorescence; leaves 3-7, the 2 lower linear or terete and to 1.5 m long; spathes slightly curved, the inner longer than the outer, acute or acuminate, half-membranous; flowers sweet-scented, mauve or white; outer segments with a yellow or white mark, obtuse or acute, 3.5-4 cm long, the claw pubescent; inner segments smaller, glabrous; style-crests acute or acuminate; style-branches c. 1-2 cm long.—*Vieusseuxia fugax* Delaroché, *Pl.Nov.Descr.* 33 (1766); *Iris edulis* L.f., *Suppl.* 98 (1781); *M. edulis* (L.f.) Ker, *Curtis'sBot.Mag.* 17:t.613 (1803).

Native to South Africa; grown as a garden ornamental in Australia and possibly naturalised in S.Aust. (Burnside, Southern Lofty region).

Flowers Sept.-Oct.

*4. *M. vegeta* L., *Sp.Pl.* ed. 2:59 (1762). Stems 12-30 cm high, pubescent, simple or branched; leaves 3-4, glabrous, 10-35 cm long, 5-9 mm broad; spathes acute, 2-3.5 cm long; flowers yellow-brown marked with blue; outer segments with a bright yellow mark, obtuse, 2-2.5 cm long; inner segments slightly smaller; style-crests acute, 1 cm long; style-branches 4-5 mm long.—*M. juncea* non L., sensu Hj. Eichl. *Suppl.* 87 (1965).

Native to South Africa; grown as a garden ornamental in Australia and naturalised in S.Aust. (Northern Lofty, Southern Lofty and Kangaroo I. regions).

Flowers Sept.-Nov.

14. ORTHROSANTHUS Sweet

Fl.Austr. t.11 (1827).

(Greek *orthos*, morning; *anthos*, flower; the flowers open early in the day.)

Rootstock short, woody; leaves stiff, equitant at base of stem; inflorescences axillary, paniculate; spathes paired, sessile or stalked; flowers blue, seldom white, fugitive, several in oblong spathes; perianth-tube very short, slender, the 6 spreading lobes subequal; filaments short, free; anthers oblong, basifixed; style very short, the 3 branches simple, filiform, alternate with the anthers; capsule oblong, opening in 3 valves; (D.Geerinck (1974) *Bull.Jard.Bot.Nat.Belg.* 44:36). 3 species in America, 4 species in Australia.

1. *O. multiflorus* Sweet, *Fl.Austr.* t.11 (1827). **Morning flag.** Stem erect, rigid, 30-50 cm high; leaves linear, shorter than or as long as stem, flat and 2-4 mm broad, finely striate; inflorescences bearing 1 sessile and 1-4 variously pedunculate clusters in the axil of the subtending leaves;

spathes surrounding 5-7 flowers, 1.2-1.5 cm long; flowers bluish, 2.5-3 cm long; perianth-tube 2-3 mm long, the lobes ovate, 15-20 mm long; capsule 16-18 mm long, trigonous, narrowed at both ends, with about 15 small wrinkled seeds in each of the 3 cells.—*Sisyrrinchium cyaneum* Lindl., *Bot.Reg.*13:t.1090 (1829).

Occurs in W.Aust., Vic. and S.Aust. (Kangaroo I. region).

Flowers Aug.-Oct.

15. PATERSONIA R.Br. ex Ker

*Curtis's Bot.Mag.*t.1041 (1807).

(After William Paterson, 1755-1810, an early botanical collector in Australia, and Lieut.-Governor of N.S.W., 1800-1810.)

Perennial herbs, with short rootstock; stems rigid; leaves equitant, radical; flowers blue, more rarely yellow or white, few within a terminal spathe of 2 rigid bracts; the outer spathe enclosing two 1-4-flowered sessile spikes, each with its 2 narrower brown bracts and a scarious bract subtending each flower; perianth with a filiform tube and 3 outer broad and spreading lobes, the 3 inner very small and erect; filaments short, united in a tube almost to the top, the anthers basifixed; style filiform, longer than the anthers, with 3 simple obovate spreading or reflexed branches, papillose along the margin and alternate with the anthers; capsule opening loculicidally in 3 valves. (D. Geerinck (1974) *Bull.Jard.Bot. Nat.Belg.* 44:36). 1 species in Borneo, 1 species in New Guinea, 12 species in Australia.

1. Inflorescence shorter than the leaves *P. fragilis* 1.

1. Inflorescence equalling or longer than the leaves *P. occidentalis* 2.

1. *P. fragilis* (Labill.) Aschers. & Graebner, *Syn.Mitteleur.Fl.* 3:522 (1906). **Short purple-flag.** Leaves 25-40 cm long, almost flat to cylindrical; inflorescence distinctly shorter than the leaves; peduncle 10-20 cm long; spathes narrowly suboval, 2.5-5 cm long, 6-12 mm broad, golden brown, distinctly striate; flowers bluish to purple; perianth-tube 2.5-3.5 cm long; outer lobes c. 2.5 cm long; anthers 2.5-3 mm long; style c. 4.5 cm long; capsules 2.5-3 cm long.—*Genosiris fragilis* Labill., *Nov.Holl.Pl.Sp.* 1:13 (1804); *P. glauca* R.Br., *Prod.Fl. Nov.Holl.* 304 (1810).

Occurs in N.S.W., Vic., Tas. and S.Aust. (Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Oct.-Dec.

2. *P. occidentalis* R.Br., *Prod.Fl.Nov.Holl.* 304 (1810).

Long purple flag. Leaves 15-50 cm long, flat; inflorescence equalling or slightly to distinctly longer than the leaves; peduncle usually 15-50 cm long; spathes subelliptic, usually 3-5 cm long and 10-25 mm broad, brownish to greyish, smooth or nearly so; flowers bluish to purple; perianth-tube 2.5-3.5 cm long; outer lobes 1.5-3.5 cm long; anthers 3-6 mm long; style 3.5-4 cm long; capsules 1.5-2.5 cm long.—*P. longiscapa* Sims ex Sweet, *Fl.Austr.* t.39 (1828). (Plate 6).

Occurs in W.Aust., Vic., Tas. and S.Aust. (Southern Lofty and S.E. regions.)

Flowers Oct.-Feb.

16. ROMULEA Maratti

Pl.Rom.Sat. 13 (1772).

(After Romulus, legendary founder of Rome; several species grow in the Mediterranean region.)

Corm small, ovoid, covered by a glossy brown tunic; leaves narrow-linear, much longer than the stiff stem, radical and along the base of the short stem, often curved; flowers solitary in a terminal spathe; perianth funnel-shaped, with a very short tube and sub-equal segments; stamens equilateral and alternate with the style-branches; filaments free, short;



Fig. 340—*Patersonia occidentalis*.

anthers erect, basifixed; style slender, with 3 bifid branches; capsule coriaceous, oblong. (M.P. De Vos (1972) *Jl S.Afr.Bot.suppl.*9). About 90 species in Europe and Africa.

1. Flowers pale-violet, 8-10 mm long, slightly exceeding spathe *R. minutiflora* 1.
1. Flowers bright-purple, 15-20 mm long, twice as long as the spathe *R. rosea* 2.

*1. *R. minutiflora* Klatt, *Abh.nat.Ges.Halle* 15:339 (1882). **Onion-grass.** Leaves 5-12, terete to compressed, linear, 3-20 cm long, 0.5-1.3 mm broad, with blunt edges and 2 grooves on each side so that a transverse section resembles a Maltese cross; flowers 2-4, slightly longer than spathe, terminating rather short stems; spathe-bracts membranous, both or only the inner one with brown-spotted edges; perianth 8-10 mm long, pale-violet with a yellow throat, the outer segments green on the back, with purple stripes; stamens three-quarters as long as perianth and slightly exceeding the style, whose branches are shortly bifid or notched; capsule broadly oblong, to 15 mm long, with about 4-12 reddish-brown depressed globular seeds in each of the 3 cells.—*R. columnae* sensu J. M. Black, *Fl.S.Aust.* 206 (1943).

Native to South Africa, naturalised in S.Aust. (Flinders Ranges, Eyre Pen., Southern Lofty and S.E. regions).

Flowers Aug.-Sept.

*2. *R. rosea* (L.) Eckl., *Top. Verz.* 19 (1827). **Onion-grass.** Leaves 5-10, compressed, linear, 8-30 cm long, 1-2 mm broad, with blunt edges and 2 grooves on each side, so that a transverse section resembles a Maltese cross; flowers 2-4, twice as long as the spathe, terminal on stems, much shorter than the leaves; spathe-bracts herbaceous, striate, the upper one with broad, scarious, brown-dotted borders; perianth 15-20 mm, rarely slightly longer, segments lanceolate, 3-nerved on back, purplish pink inside with a yellow base, purplish and green outside; style-branches deeply bifid, slightly shorter than the stamens, which are nearly half as long as the perianth; capsule broadly oblong, 6-10 mm long, with about 4-12 reddish-brown depressed or globular seeds in each of the 3 cells.—*Ixia rosea* L., *Syst.Nat.ed.* 12:75 (1767).

Native to South Africa.

The variety naturalised in Australia is var. **australis** (Ewart) De Vos, *Jl S.Afr.Bot.suppl.* 8:254 (1972).—*R. cruciata* (Ker) Eckl. var. *australis* Ewart, *Proc.R.Soc.Victoria* 19:43 (1907); *Trichonema longifolium* Salisb., *Trans.Hort.Soc. London* 1:316 (1812); *R. longifolia* (Salisb.) Bak., *J.Linn.Soc.(Bot.)* 16:89 (1877); *R. parviflora* Eckl., *Top. Verz.* 19 (1827), nom nud., partly.

Naturalised in W.Aust., N.S.W., Vic. and S.Aust. a common weed of pastures, roadsides and lawns (Eyre Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions).

Flowers Aug.-Nov.



Fig. 341—*Romulea rosea*.

17. SPARAXIS Ker

Ann.Bot. (Koenig & Sims) 1:225 (1804).

(From Greek *sparassō*, I tear; alluding to the torn summits of the spathe.)

Corm with fibrous tunic; leaves narrowly sword-shaped or broad-linear but not rigid, equitant at base of stem; flowers usually few, solitary in each spathe along the more or less zig-zag rhachis of the spike; spathe membranous, whitish, with longitudinal brown nerves, lacerate at summit, sometimes with 3 long teeth on the outer spathe-bract and 2 on the inner one; perianth-tube straight, shorter than the lobes, the slender basal part c. 5 mm long, the upper part funnel-shaped; lobes equal, oblong, the upper part radiating; anthers basifixed, rather shorter than the

free filaments; style-branches undivided, slender; ovules many, superimposed; capsule oblong, coriaceous, truncate, wrinkled transversely. (P. Goldblatt (1969) *Jl S.Afr.Bot.* 35:219-252). 6 species in South Africa.

1. Perianth cream-coloured inside, usually purplish outside and sometimes purplish inside, sometimes with a dark spot in the middle. *S. bulbifera* 1.
1. Perianth orange, red or purple inside, with a black blotch in the centre of each segment and a yellow throat. *S. tricolor* 2.

*1. *S. bulbifera* (L.) Ker, *Ann.Bot. (Koenig & Sims)* 1:225 (1805). **Harlequin-flower.** Corm 0.9-1.6 cm diam.; stem erect, often with 1(-3) branches, 15-50 cm tall, after flowering bearing many small cormlets in the axils of all the leaves; leaves 5-9, 4-10 mm broad; spike lax, with 1-4 flowers; spathes marked with brown streaks, deeply lacerate and with 1-3 long cusps; flowers irregular, cream-coloured inside, usually purplish and usually marked with purple outside; perianth-tube yellow or green, 1.4-1.6 cm long; lobes oblanceolate, subacute, 2.5-2.8 cm long; stamens asymmetrically disposed; style arched to lie behind the stamens.—*Ixia bulbifera* L., *Amoen.Acad.* 300 (1756); ?*S. grandiflora* sensu Willis, *A handbook to plants in Victoria* 1:339 (1970).

Native to South Africa, grown as a garden ornamental in Australia and naturalised in ?Vic. and S.Aust. (Eyre Pen., Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Sept.-Nov.

Because of confusion between *S. bulbifera* and *S. grandiflora* (Delaroché) Ker, the following characters for distinguishing the latter are cited from Goldblatt (1969):—"stem always simple and not bearing a cauline leaf; cormlets not produced in numbers and never exposed". The characters of flower and spathe size, which have generally been used in the past were not found by Goldblatt to differ significantly between these species.

*2. *S. tricolor* (Schneev.) Ker, *Ann.Bot. (Koenig & Sims)* 1:225 (1805). **Tricolor Harlequin flower.** Corm 1-2 cm diam., stem erect or semi-erect, simple, 10-40 cm tall, bearing a few small cormlets at the lower nodes; leaves 5-10, 1-2 cm broad; spike lax, with 2-5 flowers; spathes marked with brown flecks, lightly lacerate or entire; flowers regular, orange red or purple inside, with a black blotch in the centre of each segment and a yellow throat; perianth-tube c. 8 mm long; lobes broadly oblanceolate, acute, 2.5-3.3 cm long; stamens symmetrically disposed around the erect style.—*Ixia tricolor* Schneev., *Icon.Pl.Rar.* t. 39 (1795).



Fig. 342—*Sparaxis tricolor*.

18. SYNNOTIA Sweet

Brit.Flow.Gard. t. 150 (1826).

(After W.Synnot, a collector at the Cape of Good Hope.)

Corm with fibrous tunic; leaves lanceolate, not rigid, equitant at base of stem; flowers 2 or 3, solitary in each spathe along the more of less zig-zag rhachis of the spike; spathe membranous, whitish, with longitudinal brown nerves, lacerate at summit, perianth-tube funnel-shaped, curved, longer than the lobes; lobes unequal, the uppermost one longer and erect, the lower 5 spreading so that the perianth appears 2-lipped; anthers basifixed, rather shorter than the free filaments; style-branches undivided, slender; ovules many, superimposed; capsule oblong, coriaceous, truncate, wrinkled transversely. 5 species in South Africa.

*1. *S. villosa* (Burm.f) N.E. Br., *Kew Bull.* 1929:133 (1929). Corm globular, with brown fibrous tunic; stem 8-35 cm high, with 1-4 flowers in a loose spike; leaves flat, equitant, shorter than stem, 6-10 mm broad; spathe bracts scarious, 15-18 mm long, striate, reddish-brown near the toothed summit, about as long as the narrow cylindrical part of the tube; perianth 3.5-4 cm

long; tube c. 25 mm long, the lower half slender, cylindrical, swelling into a wide funnel c. 10 mm long; upper lobe erect, purple, c. 15 mm long, the other 5 narrower and shorter, more or less spreading, yellow or white.—*Gladiolus villosa* Burm.f., *Prod.Fl.Cap.* 2 (1768); *G. bicolor* Thunb., *Diss.(Gladiolus)* 16 (1784); *S. bicolor* (Thunb.) Sweet, *Hort.Brit.* ed. 2:50 (1830).

Native to South Africa, grown as a garden ornamental in Australia and naturalised in S.Aust. (Southern Lofty region).

Flowers Sept.-Oct.

19. TRITONIA Ker

Curtis's Bot.Mag. t. 581 (1802).

(The author said he derived the name from Triton "in the signification of a weather-cock", alluding to the stamens.)

Corm with fibrous tunics; stem glabrous, simple or branched; leaves glabrous, equitant towards base of stem, linear to sword-shaped; flowers solitary within each spathe; perianth-tube cylindric below, funnel-shaped upwards; filaments free; anthers basifixed; style filiform; style-branches spreading, sometimes slightly dilated at the tip, shorter than the style; capsule subglobose to ovoid, membranous to subchartaceous, 3-valved. More than 50 species in Africa.

*1. *T. lineata* (Salisb.) Ker, *Ann.Bot. (Koenig & Sims)* 1:228 (1804). **Lined tritonias.** Stem stiff, about 50 cm high; leaves equitant, flat, acuminate, linear-lanceolate, 12-28 cm long, but not reaching inflorescence, 10-15 mm broad, the midnerve prominent; flowers 7-15 in a loose distichous somewhat zig-zag spike; spathe stiffly scarious, multistriate, the outer bract obtuse, brown, 10-16 mm long, the inner one shorter, 2-toothed; perianth pale-yellow, with 3 brown parallel nerves down the centre of each lobe and diverging veins; tube 15 mm long, funnel-shaped above; lobes obovate-oblong, c. 20 mm long, almost equal, but the upper one rather broader; anthers basifixed, purple; style longer than stamens, the 3 branches simple, linear-cuneate.—*Gladiolus lineatus* Salisb., *Prod.Chapel Allert.* 40 (1796).

Native to South Africa; grown as a garden ornamental in Australia and naturalised in N.S.W., Vic. and S.Aust. (Southern Lofty and Kangaroo I. regions).

Flowers Oct.-Nov.

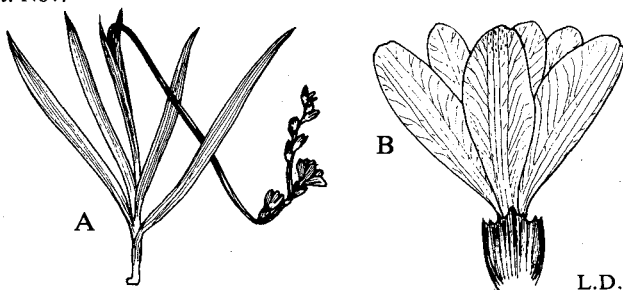


Fig. 343—*Tritonia lineata*. A, habit, x $\frac{1}{10}$; B, flower, natural size.

20. WATSONIA Miller

Gard.Dict. ed. 7 (1759).

(After Sir William Watson, M.D., an English Professor of Botany, 1715-1787.)

Corm globular; leaves rigid, broadly sword-shaped, equitant; flowers solitary in the spathe, which has stiff, striate bracts; perianth funnel-shaped, with a long curved tube and subequal lobes; filaments long, free; anthers linear, versatile; style long, slender, with 3 bifid branches; capsule globular. 60-70 species in South Africa and Madagascar.

1. Upper part of perianth-tube cylindrical; bulbils usually numerous in axils of spathe
1. Upper part of perianth-tube funnel-shaped; bulbils absent from inflorescence.
2. Perianth to 4 cm long.
2. Perianth 5-6 cm long.

W. bulbillifera 1.*W. marginata* 2.*W. pyramidata* 3.

*1. *W. bulbillifera* J. W. Matthews & L. Bolus, *Ann.Bol.Herb.* 3:140 (1922). **Bulbil watsonia**. Stems stiff, erect, 1-2 m high, usually branched; leaves 2-3.5 cm broad; flowers pink to scarlet in a loose spike 15-30 cm long; spathe-bracts reddish, 2-2.5 cm long; bulbils usually numerous in the axils of the spathe; perianth-tube 3.5-4.5 cm long, swollen upwards but more or less cylindrical towards the apex; the lobes oblong, 2-2.5 cm long; anthers c. 10 mm long.—*W. meriana* sensu J. M. Black, *Fl.S.Aust.* 202 (1943).

Native to South Africa, grown as a garden ornamental in Australia and naturalised in W.Aust., Vic. and S.Aust. (Northern and Southern Lofty regions).

Flowers Oct.-Dec.

This species appears to be very close to *W. meriana* (L.) Miller, which has larger flowers and lacks bulbils. Specimens collected in S.Aust. vary in flower size and this does not appear to be well correlated with the occurrence of bulbils. The situation may have been complicated by hybridisation and requires investigation.

*2. *W. marginata* (L.f.) Ker, *Curtis's Bot.Mag.* 17:t.608 (1802). Stems stiff, erect to 1 m or more high, usually branched; leaves 3-5 cm broad, with prominent yellowish margins; flowers pale-magenta to rose-coloured in a dense spike; spathe-bracts 1.2-1.5 cm long; bulbils absent; perianth-tube c. 1.5 cm long, the upper part funnel-shaped; the lobes oblong, 1.5-2 cm long.—*Gladiolus marginatus* L.f., *Suppl.* 95 (1781).

Native to South Africa; grown as a garden ornamental in Australia and possibly naturalised in S.Aust. (Southern Lofty region).

Flowers Sept.-Oct.

*3. *W. pyramidata* (Andr.) Klatt in Durand & Schinz, *Consp.Fl.Afr.* 5:194 (1895). **Rosy watsonia**. Stems stiff, erect, 0.75-1.25 m high; leaves 2.5-4 cm broad; flowers pale or deep magenta-pink in a many-flowered spike; spathe-bracts 1.2-1.7 cm long; bulbils absent; perianth-tube 2-2.3 cm long, the upper part funnel-shaped; the lobes oblong, c. 2.8-3.4 cm long.—*Gladiolus pyramidatus* Andr., *Bot.Rep.* 5:t.335 (1803).

Native to South Africa; grown as a garden ornamental in Australia and naturalised in W.Aust. In Vic. it occasionally persists and in S.Aust. a hybrid form has become naturalised at Crafers (Southern Lofty region).

Flowers Nov.

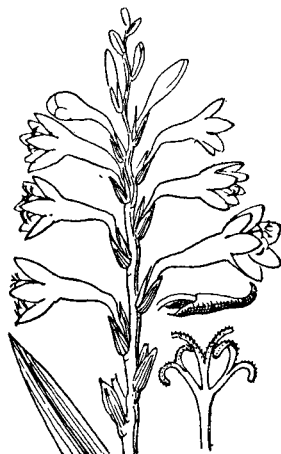
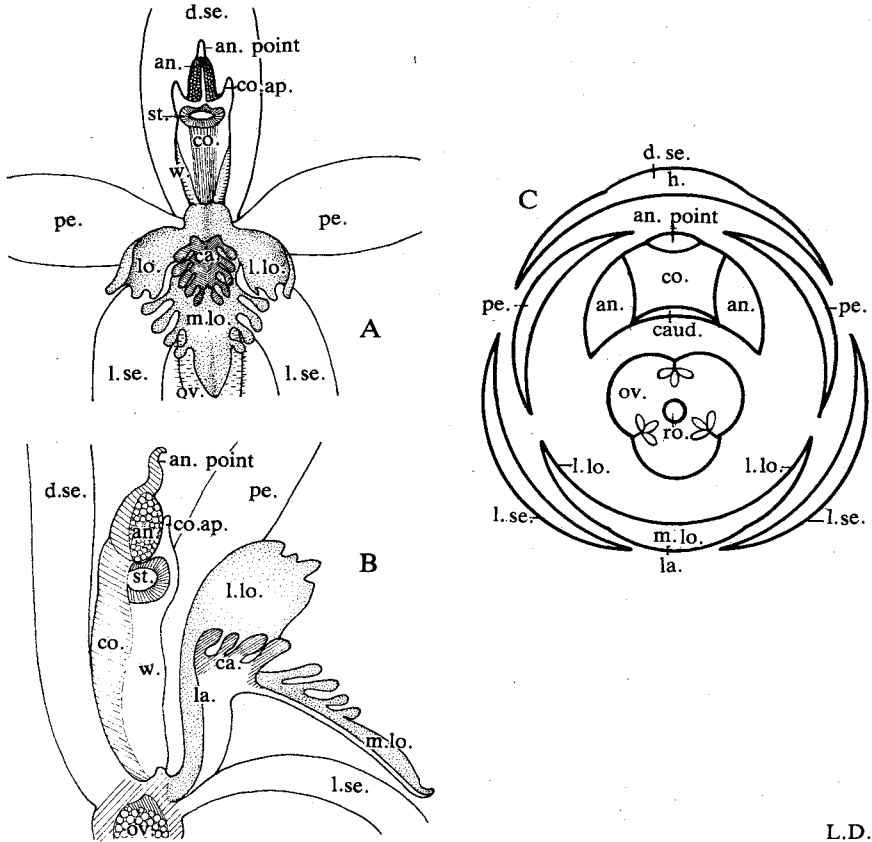


Fig. 344—*Watsonia bulbillifera*.

FAMILY 48.—ORCHIDACEAE

(Prepared by J. Z. Weber and R. Bates)

Perennial, rarely annual, terrestrial, epiphytic or saprophytic herbs; arising from creeping rhizomes or annually renewed tubers or thickened rootstocks usually functioning as storage organs. Aerial stem often swollen at the base into a pseudobulb, and often with adventitious or



L.D.

Fig. 345—*Caladenia latifolia*. A, flower, front; B, flower bisected longitudinally; C, diagram of the floral parts of some Orchidaceae.

| | | | | | |
|-------|-------------|------|----------------|-----|-------------|
| an. | = anther | g. | = gland | ov. | = ovary |
| ap. | = appendage | h. | = hood | pe. | = petal |
| ca. | = callus | l. | = lateral | ro. | = rostellum |
| caud. | = caudicle | la. | = labellum | se. | = sepal |
| co. | = column | lam. | = lamina | st. | = stigma |
| d. | = dorsal | lo. | = lobe | w. | = wing |
| | | m. | = mid (middle) | | |

aerial roots. Leaves parallel-veined or curviveined, entire, often distichous; the base of the leaf sheathing or not; in saprophytic species the leaves usually reduced to bracts or scales. Flowers bisexual, zygomorphic, very rarely regular, in spikes, racemes or panicles, or solitary; perianth mostly petaloid of six segments in two whorls, free or variously connate, occasionally joined to form a tube; the three outer segments called *sepals*; the two lateral inner ones called *petals*; the third petal (except in *Thelymitra*) modified to form the *labellum* which often differs greatly in size and shape and often bears outgrowths—*calli*, hairs, fringes or other appendages; nectary

sometimes contained within a spur or sac from one or more of the perianth-segments. Anther and stigma borne on a more or less erect, usually fleshy structure (*column*), a prolongation of the floral axis; anthers one or two, two-locular, introrse, opening by longitudinal slits; pollen grains rarely free, usually aggregated in tetrads or larger groups (*pollinia*) that are mealy, waxy or quite hard and sometimes terminating in a sterile *caudicle*. Stigma borne in the part of the column facing the labellum, of two or three lobes, the median lobe sometimes represented by a small process (*rostellum*), between the stigma and the anther; viscid areas are sometimes associated with the rostellum and to these the pollinia become attached either directly or by a connecting strip of non-viscid rostellar or columnar tissue known as the *stipe*. Ovary inferior, one-locular with three parietal placentae, rarely three-locular. Fruit a capsule, usually dehiscent by three or six longitudinal slits; seeds numerous and very minute, often elongated, without endosperm or differentiated embryo.

Worldwide; the largest family in the world, with 500-800 genera and perhaps 30 000 species. At least 80 genera occur in Australia. Epiphytic species are very abundant in the tropics but not represented in S.Aust.

The following were found particularly useful in the preparation of this treatment:—

George, A. S. 1971. A check list of the Orchidaceae of Western Australia *Nuytsia* 1(2):166-196.

Moore, L. B. & Edgar, E. 1970. *Flora of New Zealand*, vol. 1.

Nicholls, W. H. 1969. *Orchids of Australia*.

Rupp, H. M. R. 1969. *The orchids of New South Wales*, facsimile edition with supplement by D. J. McGillivray.

Willis, J. H. 1970. *A handbook to plants in Victoria*, vol. 1.

1. Leaves absent, scale-like at flowering.
 2. Labellum above column (e.g. fig. 408); plant greenish when fresh PRASOPHYLLUM 18.
 2. Labellum below column; plant usually brownish.
 3. Perianth-segments free, spreading from the base DIPODIUM 8.
 3. Perianth-segments fused to form tube GASTRODIA 11.
1. Leaves present with well developed lamina at flowering.
 4. Leaf 1.
 5. Leaf glabrous.
 6. Leaf nearly as wide as long.
 7. Stem shorter than flower; flower 1 CORYBAS 6.
 7. Stem longer than flower; flowers several.
 8. Labellum undivided, margin entire, glabrous
 9. Labellum with 2 basal calli only ACIANTHUS 1.
 9. Labellum with 2 to 4 rows of calli (*C. menziesii*) .. CALADENIA 2.
 8. Labellum divided or fringed, toothed or pubescent (e.g. fig. 345).
 10. Labellum wider than long, characteristically fimbriate LEPORELLA 13.
 10. Labellum longer than wide.
 11. Labellum 3-lobed, midlobe fringed, lamina with sessile calli; plant drying black LYPERANTHUS 14.
 11. Labellum margin entire, lamina glandular-villous ERIOCHILUS 10.
 6. Leaf at least twice as long as wide.
 12. Flower almost regular as to perianth; labellum not differentiated THELYMITRA 21.
 12. Flower with well differentiated labellum (e.g. fig. 401).

- 13. Labellum villous (bearded) CALOCHILUS 4.
- 13. Labellum not villous.
 - 14. Labellum below column MICROTIS 15.
 - 14. Labellum above column.
 - 15. Labellum longer than column; perianth-segments less than 9 mm long PRASOPHYLLUM 18.
 - 15. Labellum shorter than column; perianth-segments more than 10 mm long.
 - 16. Labellum surface smooth CALEANA 3.
 - 16. Labellum surface tuberculate PARACALEANA 17.
- 5. Leaf pubescent.
 - 17. Labellum with calli CALADENIA 2.
 - 17. Labellum without calli GLOSSODIA 12.
- 4. Leaves more than 1 (basal).
 - 18. Labellum 3-lobed (e.g. fig. 393).
 - 19. Petals more than 13 mm long, clawed, conspicuous DIURIS 9.
 - 19. Petals less than 6 mm long, not clawed, hidden by dorsal sepals ORTHOCERAS 16.
 - 18. Labellum not lobed.
 - 20. Labellum above column CRYPTOSTYLIS 7.
 - 20. Labellum below column.
 - 21. Column not winged SPIRANTHES 20.
 - 21. Column winged.
 - 22. Lateral sepals free, spreading from the base CHILOGLOTTIS 5.
 - 22. Lateral sepals partly fused PTEROSTYLIS 19.

1. ACIANTHUS R.Br.

Prod.Fl.Nov.Holl. 321 (1810).(Greek *acies*, a point; *anthos*, flower.)

Terrestrial glabrous herbs, with small rounded tubers; leaf solitary, immediately above the basal scarious sheath or higher up the stem, broadly ovate-cordate, entire, lobed or rarely deeply dissected; flowers usually in a terminal raceme, occasionally solitary, on a scape or stem without scales above the leaf, except the small bracts subtending the pedicels; dorsal sepal erect or incurved over the column, concave, not very broad and often produced into a fine point; lateral sepals narrow, spreading or upwardly curved; petals much shorter, reflexed or spreading; labellum sessile, undivided, spreading, with 2 basal calli or tubercles; column semiterete, incurved or inflexed, rarely winged; anther broad, erect, 2-celled, valvate; pollinia 4, granular or mealy, 2 masses in each cell, each pair connected to a separate disk of the rostellum, without a caudicle. About 20 species in New Caledonia, New Guinea and Australia (5 species). 2 Australian species also occur in New Zealand.

- 1. Labellum triangular, veins inconspicuous.
 - 2. Dorsal sepal more than 2 cm long, filiform, dark purplish *A. caudatus* 1.
 - 2. Dorsal sepal to 1 cm long, lanceolate, green to reddish *A. exsertus* 2.
 - 1. Labellum oblong, lateral veins conspicuous. *A. reniformis* 3.
1. *A. caudatus* R.Br., *Prod.Fl.Nov.Holl.* 321 (1810). **Mayfly orchid.** Very slender, glabrous, 7-15 cm high; leaf radical or nearly so; cordate-ovate, rather thin; margins entire, crenate or sometimes more or less lobed; green above, reddish below, reticulate, rarely exceeding 2.5 cm long; flowers 1-4, crimson, on short pedicels; dorsal sepal more or less inflexed, dilated rather narrowly over the anther, then tapering into a filiform point 2.3-5 cm long; the dilated part concave on a contracted base, 5-6 mm long; lateral sepals free, much shorter than the dorsal sepal, c. 15 mm long, tapering into fine points curving upwards at their ends; petals falco-

lanceolate, reflexed or spreading, 4-5 mm long; labellum triangular, sessile, crimson like the other parts; base erect, semi-orbicular, embracing the column; thereafter broadly but very acutely lanceolate, at first horizontal then abruptly recurved near the tip; the margins entire; lamina glandular with smooth surface, except for 2 tooth-like or triangular calli at the extreme base; column c. 4 mm long, inflexed on the summit of the ovary; almost terete in its lower two-thirds, dilated above, very narrowly winged in the terete part, widening shortly on each side of the stigma and continued upwards as a kind of arillus behind the anther; anther pointless; pollinia 2 in each cell, granular, each pair connected to a separate viscid disk in the upper border of stigma; stigma rather prominent, hemispherical; rostellum double; each part tooth-like, bearing a relatively large viscid disk.

Occurs in N.S.W., Vic., Tas. and S.Aust. (Southern Lofty and Kangaroo I. regions).

Flowers Sept.-Oct.

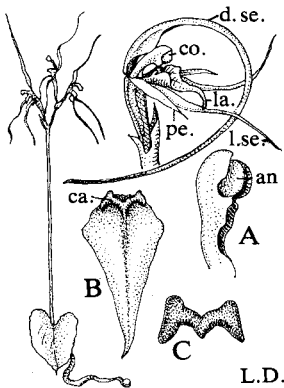


Fig. 346—*Acianthus caudatus*. A, column, side; B, labellum, surface; C, callus.

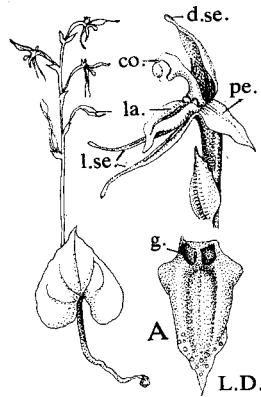


Fig. 347—*Acianthus exsertus*. A, labellum, surface.

2. *A. exsertus* R.Br., *Prod.Fl.Nov.Holl.* 321 (1810). **Gnat (mosquito) orchid.** Slender, glabrous, 7-16 cm high; leaf single, sessile, ovate-cordate; generally a little above the base; green above, red below; margins entire, often sinuous; 1 or 2 marginal nerves, venation otherwise reticulate; flowers 3-20, on short pedicels, in a raceme, reddish-purple or rarely verdant-green; dorsal sepal 5-6 mm long, concave, slightly incurved, much contracted below, expanded above and terminating in a fine short point; lateral sepals almost as long, subulate, free, spreading beneath the labellum; petals lanceolate, 2-3 mm long, acutely bent backwards; labellum ovate-lanceolate with a very acute depressed point, on a short claw or contracted base; generally a deeper red than the perianth-segments; spreading; c. 3 mm long; margins entire; lamina smooth except for a pair of prominent basal glands; column semiterete, enlarged at each end, upper end cup-shaped, c. 2.5 mm long, very much incurved above; anther quite blunt on a sunken clinandrium; pollinia 2 in each cell; each mass semi-circular with clavate ends like a dumb-bell, each pair connected by their middle to a separate viscid disk; stigma transverse, oval, prominent, very concave; rostellum double, represented by a tooth-like prominence at each end of the upper border of the stigma, each bearing a separate viscid disk.

Occurs in W.Aust., Qld, N.S.W., Vic., Tas. and S.Aust. (Flinders Ranges, Eyre Pen., Northern Lofty, Murray, Yorke Pen., Southern Lofty, Kangaroo I. and S.E regions).

Flowers May-July.

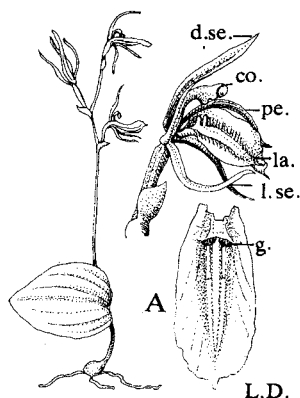


Fig. 348—*Acianthus reniformis*. A, labellum, surface.

3. *A. reniformis* (R.Br.) Schlechter, *Bot.Jb.* 39:39 (1906). **Mosquito orchid.** A slender plant, 7-15 cm high; leaf orbicular-cordate, 2-3.5 cm long, green on both sides; flowers generally 3-6, but sometimes solitary, reddish-brown, rarely verdant-green, sessile or on very short pedicels; dorsal sepal c. 10 mm long; lateral sepals c. 9.5 mm; petals narrower than latter but same length; labellum oblong, with conspicuous lateral veins, as long as the dorsal sepal and c. 4.5 mm wide; column c. 6 mm long, semi-terete, dilated at each end; anther rather globose without a point; pollinia leg-of-mutton shape, each pair attached to a separate viscid disk.—*Cyrtostylis reniformis*, R.Br., *Prod.Fl.Nov.Holl.* 317 (1810).

Occurs in New Zealand, W.Aust., Qld, N.S.W., Vic., Tas and S.Aust. (Flinders Ranges, Eyre Pen., Northern Lofty Murray, Yorke Pen., Southern Lofty, Kangaroo I. and S.E. regions).

Flowers July-Oct.

2. CALADENIA R.Br.

Prod.Fl.Nov.Holl. 323 (1810).

(Greek *kalos*, beautiful; *adēn*, a gland.)

Terrestrial herbs, generally very hairy, but sometimes only slightly so, originating from rounded tunicated tubers, the more recent tubers generally to be found below those of previous seasons; leaf more or less hairy (except in *C. menziesii*), solitary, elongate, generally linear-lanceolate or oblong, from within a scarious sheathing scale close to the ground. Flowers solitary, or in a loose raceme or panicle of (apparently) not more than 10, on an erect scape with an empty bract or sheathing scale about the middle and a similar bract under each pedicel; in one species both leaf and bract are absent at time of flowering; flowers usually erect and variously coloured. Dorsal sepal erect, incurved over the column or more rarely retracted, usually narrow; lateral sepals nearly equal to it, but flat, spreading or reflexed. Petals narrow, erect, spreading or reflexed; labellum often on a movable claw and generally erect at the base, undivided or 3-lobed; the lateral lobes when present erect; the middle lobe or upper part of the undivided labellum recurved; the margins often fringed or toothed; the lamina with sessile or stalked calli arranged in 2 or more longitudinal rows or irregularly scattered or crowded; column erect or incurved, more or less 2-winged in the upper part; anther terminal, more or less oblique, usually pointed, 2-celled, valvate; pollinia 4, lamellar, commonly leg-of-mutton shape, 2 free masses in each cell, granular; stigma immediately below the anther, circular and disk-like; rostellum poorly developed; viscid disk and caudicle absent. A rather large genus comprising over 70 species. Of these, 2 are from New Zealand and the rest from Australia. Of the latter all are endemic with the exception of one (*C. carnea*) which has been reported from New Zealand, New Caledonia, Indonesia and Malaysia. (The species with long-tailed sepals are commonly known as Spider Orchids).

1. Leaf glabrous; petals about twice as long as the sepals, erect, clavate, dark reddish, c. 2 cm long *C. menziesii* 13.
1. Leaf pubescent.
2. No calli at the base of column.
3. Lateral sepals not tapering into filiform tips.
4. Calli irregularly arranged in 2 converging rows, spreading more or less digitately; leaf lanceolate *C. latifolia* 11.
4. Calli in regular longitudinal rows; leaf linear.
5. Labellum 3-lobed.

- 6. Labellum and often the column barred with dark red *C. carnea* 2.
- 6. Labellum and column unmarked.
 - 7. Calli in 4 regular rows *C. cucullata* 5.
 - 7. Calli in 2 rows.
 - 8. Mid-lobe of labellum completely covered by 2 rows of tightly packed reddish-black calli *C. congesta* 4.
 - 8. Labellum with 2 parallel rows of white or yellow-headed calli not extending onto the apex of the mid-lobe *C. carnea* 2.
- 5. Labellum indistinctly lobed.
 - 9. Labellum margin entire *C. tutelata* 18.
 - 9. Labellum margin fringed or dentate.
 - 10. Labellum fringed with dentate lobes; calli of lamina dentate, in 4 to 6 ill-defined rows giving a very hirsute appearance; flower dark blue *C. deformis* 6.
 - 10. Labellum marginal teeth and laminal calli smooth, not congested, not giving a hirsute appearance; flower pink or white *C. angustata* 1.
- 3. Lateral sepals tapering into filiform pubescent or glandular tips.
 - 11. Calli in 2 well-defined rows *C. filamentosa* 8.
 - 11. Calli in 4 rows (or in 2 rows with few irregular calli) *C. radialis* 16.
- 2. Two sessile yellow calli on the base of column.
 - 12. Margins of labellum entire or slightly toothed apically.
 - 13. Sepals shortly acuminate, not glandular *C. tessellata* 17.
 - 13. Sepals clavate or glandular.
 - 14. Petal tip glandular and clavate *C. gladiolata* 9.
 - 14. Petal tip not glandular, clavate.
 - 15. Labellum oblong or broad linear, about 3 times as long as wide *C. leptochila* 12.
 - 15. Labellum ovate, less than 3 times as long as wide; margins slightly irregular.
 - 16. Labellum obscurely 3-lobed; lateral lobes greenish or yellowish, entire; veins hardly visible; calli flat-topped in 4 rows *C. clavigera* 3.
 - 16. Labellum not lobed; veins dark, divergent; calli variable, in 2 or 4 rows, generally small and mammillary *C. ovata* 14.
 - 12. Margins of labellum comb-like or serrate.
 - 17. Petal tip conspicuously glandular pubescent *C. patersonii* 15.
 - 17. Petal tip not glandular pubescent.
 - 18. Labellum not lobed *C. huegelii* 10.
 - 18. Labellum obscurely lobed.
 - 19. Lateral lobes of labellum deeply combed *C. dilatata* 7.
 - 19. Lateral lobes of labellum smooth or serrate.
 - 20. Labellum 9-10 mm long *C. dilatata* 7.
 - 20. Labellum 12-15 mm long *C. huegelii* 10.

1. *C. angustata* Lindl., *Gen. & Spec. Orchid. Pl.* 420 (1840). **Musky caladenia.** Slender, sparsely hairy, 15-45 cm high; leaf narrow-linear, very slightly hairy, 6-12 cm long; flowers dark and glandular on the outside, white inside, 1-5 in a raceme, on slender pedicels; buds characteristic, bluntly falcate in shape, covered with dark glandular hairs; perianth-segments generally dark reddish-brown (except towards the base) on outside, white or light-coloured within, subequal; all

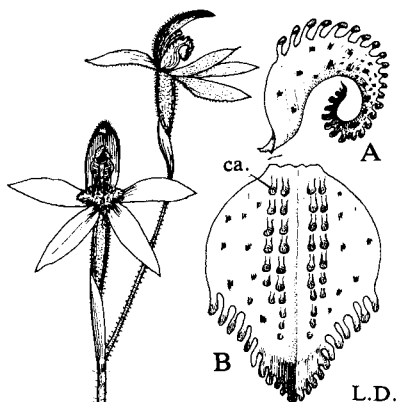


Fig. 349—*Caladenia angustata*. A, labellum, side; B, labellum, surface.

spreading except the dorsal sepal; dorsal sepal erect incurved; c. 10 mm long, concave, acute, contracted at the base; lateral sepals slightly longer than other segments, elliptic-lanceolate; petals falco-lanceolate; labellum c. 7 mm long (extended and including claw), on a movable claw, the basal portion erect against the column, recurved forward about the middle; margins entire except towards the triangular tip, the edges of which are shortly and sparsely denticulate; labellum obscurely 3-lobed, the lateral lobes being ill-defined; calli of the lamina in 4 rows reaching almost to the extreme tip, where the rows are not so evident, clubbed, the stalks shorter towards the tip; column 7-8 mm long, incurved, widely winged especially in upper part.

Occurs in N.S.W., Vic., Tas. and S.Aust. (S.E. region).

Flowers Sept.-Nov.

2. *C. carnea* R.Br., *Prod.Fl.Nov.Holl.* 324 (1810). **Pink fingers.** Plant 7-60 cm high; leaf hairy, narrow-linear often as long as the scape; flowers 1-3, pink, more rarely white; perianth-segments a dusky-green, with glandular-hairs and pink stripes on the outside, pink and glabrous within; tips generally acute, but sometimes blunt; dorsal sepal erect or slightly incurved, linear, 11-16 mm long; lateral sepals spreading, generally longer than the dorsal sepal, 11-20 mm, lanceolate or falco-lanceolate; petals narrower than the sepals, but about the same length, spreading, falco-lanceolate; sometimes, especially in the smaller forms of the species, all the segments of the perianth equal; labellum sessile, 3-lobed, erect at base, recurved beyond the middle; lateral lobes broad, erect, prominent with rounded anterior border and entire margins; middle lobe small, lanceolate, more or less dentate or fringed with a few marginal calli; lamina with two rows of stalked clubbed calli (sometimes larger and in 4-6 rows at the base), not extending beyond the bend; column c. 6 mm long, incurved, rather narrowly winged; anther with rather a long point; stigma elliptic.

Occurs in Malaysia, Indonesia, New Zealand, New Caledonia, Qld, N.S.W., Vic., Tas. and S.Aust.

1. Column and labellum barred with dark red.

2. Tip of labellum yellow; calli in 2 or 4 rows, usually in 2 rows; plant 7-30 cm high.

3. Perianth-segments 5-7 mm long var. *attenuata* 2.

3. Perianth-segments 10-15 mm long var. *carnea* 3.

2. Tip of labellum orange; calli in 2-6 rows; robust plants 30-60 cm var. *gigantea* 4.

1. Column not barred, the labellum barred or not.

4. Labellum not barred; perianth-segments white var. *alba* 1.

4. Labellum barred with dark red; perianth-segments pink, occasionally with deep red tints var. *pygmaea* 5.

1. Var. *alba* (R.Br.) Benth., *Fl.Aust.* 6:387 (1873). **White caladenia.** Plant 7-30 cm high; flower usually solitary, pure white (in S.Aust.); perianth-segments similar to those of var. *carnea*; labellum white, the margins of lobes sometimes stained with purple or crimson; mid-lobe yellow, calli white or yellow; column whitish or green; neither labellum nor column barred with red lines.—*C. alba* R.Br., *Prod.Fl.Nov.Holl.* 323 (1810).

Occurs in Qld, N.S.W., Vic. and S.Aust. (southern Flinders Ranges region).

Flowers May-Oct.; in S.Aust. Sept.

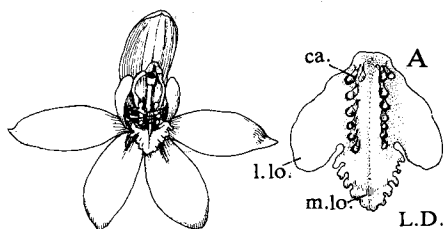


Fig. 350—*Caladenia carnea* var. *alba*. A, labellum, surface.

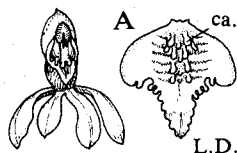


Fig. 351—*Caladenia carnea* var. *attenuata*. A, labellum, surface.

2. Var. *attenuata* W. Brinsley, *Orchadian* 3(2):16 (1968). Plant slender, 10-25 cm high; flowers 1-2, seldom opening; perianth-segments 5-7 mm long, 2-4 mm wide, white inside, green outside; dorsal sepal incurved; labellum c. 5 mm long, barred with dark red, calli yellow in two rows; column 5-6 mm long, barred with dark red.

Occurs in N.S.W., (?) Vic. and S.Aust. (Southern Lofty and S.E. regions).

Flowers Sept.-Nov.

3. Var. *carnea*. Plant 7-30 cm high; flowers 1-3, pink, rarely white; perianth-segments 10-15 mm long, 2-4 mm wide; dorsal sepal not incurved, 10-14 mm long; lateral sepals spreading; labellum 6-8 mm long with 2 rows of yellow calli, which are sometimes enlarged and in 4 rows at the base of labellum, not extending beyond the bend; column 6-8 mm long, barred with dark red as labellum.

Occurs in New Zealand, New Caledonia, Qld, N.S.W., Vic., Tas. and S.Aust. (Flinders Ranges, Eyre Pen., Northern Lofty, Yorke Pen., Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Aug-Dec.

4. Var. *gigantea* R. S. Rogers, *Trans.R.Soc. S.Aust.* 51:13 (1927). Plant to 60 cm, robust, sparsely hairy; flower 1, occasionally 2, usually bright rose pink; perianth-segments 15-20 mm long, 3-5 mm wide, lateral sepals free; labellum 6-8 mm long, mid-lobe orange; calli sometimes in 4-6 rows; labellum and column barred with dark red as in var. *carnea*.

Occurs in Qld, N.S.W., Vic. and S.Aust. (southern Flinders Ranges region).

Flowers Sept.-Oct.

5. Var. *pygmaea* R. S. Rogers, *Trans.R.Soc. S.Aust.* 51:13 (1927). Plant under 10 cm high; flower solitary (in S.Aust.), pink with deep reddish tints, rarely pale; perianth-segments 5-7 mm long, c. 2 mm wide; lateral sepals free or partly connivent; labellum c. 4 mm long, barred with dark red as in var. *carnea*; column c. 5 mm, not barred with dark red.

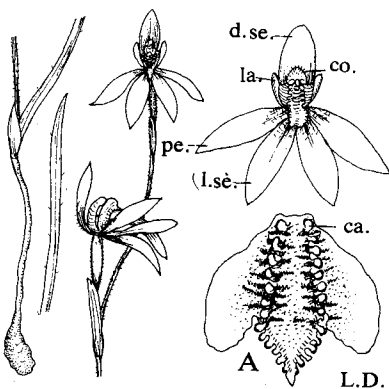


Fig. 352—*Caladenia carnea* var. *carnea*. A, labellum, surface.

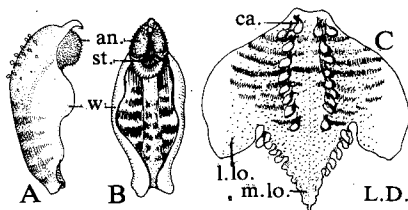


Fig. 353—*Caladenia carnea* var. *gigantea*. A, column, side; B, column, front; C, labellum, surface.

Occurs in N.S.W., Vic., Tas. and S.Aust. (Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Sept.-Oct.

In New Zealand specimens referred to *C. carnea* var. *minor* (Hook.f.) Hatch (1945) appear to be scarcely distinguishable from var. *pygmaea* and these varieties may prove to be synonymous.

3. *C. clavigera* A. Cunn. ex Lindl., *Gen.&Sp.Orchid.Pl.* 422 (1840). **Plain-lip spider orchid.** Stem slender or rather stout, 12-30 cm high, hairy; leaf linear-oblong or lanceolate, hairy; flower mostly solitary, with 1 or 2 narrow bracts on the stem below it; sepals 2-3 cm long, 3-nerved with reddish-brown stripes, narrowed above into long filiform points (with minutely clavate tips in S.Aust.); petals similar but shorter; labellum obscurely 3-lobed, 10-12 mm long and nearly as broad, the middle lobe reddish-brown, obtuse, serrulate or entire, the lateral lobes greenish or yellowish, entire; calli flat-topped, in 4 rows; column widely winged above.—*C. cordiformis* R. S. Rogers, *Trans.R.Soc.S.Aust.* 44:330 (1920).

Occurs in N.S.W., Vic., Tas. and S.Aust. (Southern Lofty (1 record) and S.E. regions).
Flowers Sept.-Dec.; in S.Aust. Sept.-Oct.

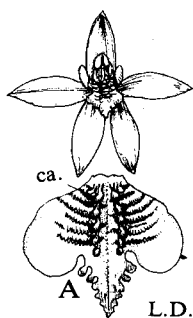


Fig. 354—*Caladenia carnea* var. *pygmaea*. A, labellum, surface.

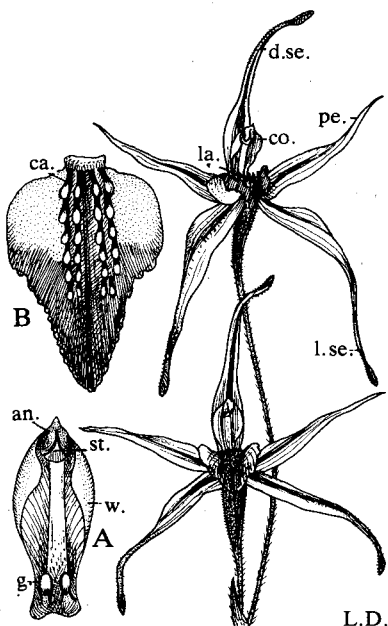


Fig. 355—*Caladenia clavigera*. A, column, front; B, labellum, surface.

4. *C. congesta* R.Br., *Prod.Fl.Nov.Holl.* 324 (1810). **Black-tongue caladenia.** Slender, slightly hairy; 15-60 cm high; leaf linear, 7-12 cm long, very slightly hairy; flowers pink, 1-3, on slender pedicels; perianth-segments covered with glandular hairs on the outside, all spreading except dorsal sepal; dorsal sepal shorter than the other segments, c. 12 mm, incurved over

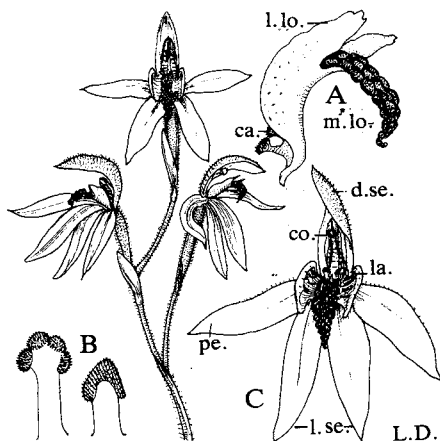


Fig. 356—*Caladenia congesta*. A, labellum, side; B, basal calli; C, flower, front.

column, lanceolate; lateral sepals c. 18 mm long, elliptical-lanceolate; petals c. 14 mm long, falcate; labellum pink, c. 9 mm (extended) on a rather long and narrow claw; very distinctly 3-lobed; basal-half erect against the column, thereafter gradually curved forward; lateral lobes falcate, acute, reaching well beyond the middle of labellum, margins entire; middle lobe oblong-lanceolate, much elongated and very narrow, margins entire; calli dark crimson, imbricate, completely covering middle of labellum to the very tip, at first placed longitudinally in 2 rather obscure rows, the 2 nearest the claw being stalked, the others large, sessile, flat-topped, more or less oblong; column c. 8 mm long, incurved, with rather wide wings, especially in the upper part, blotched with pink markings; anther pointed.

Occurs in N.S.W., Vic., Tas. and S.Aust. (S.E. region).

Flowers Oct.-Dec.

5. *C. cucullata* Fitzg., *Aust. Orchids* 1 (2) (1876).

Hooded caladenia. Very slender plant 10-25 cm high, often wiry-stemmed; leaf linear, 10-25 cm long, sparsely hairy; flowers 2-10, rarely solitary, 20-30 mm diam., on slender 1-3 cm long pedicels; perianth-segments greenish-brown or purple on the glandular exterior, white inside; dorsal sepal strongly cucullate, often obtuse, 7-10 mm long; lateral sepals spreading, 9-12 mm long; petals spreading, narrower and shorter than sepals, variable in length; labellum 3-lobed, the basal portion very shortly erect and the tip very shortly recurved, the surface minutely scabrous denticulate; lateral lobes erect, broad and rounded with the frontal margins crenulate, stained deep-mauve; mid-lobe broad, crenulate or deeply toothed often to the extreme tip, the teeth minutely scabrous denticulate; tip acute, deep mauve; calli in 4 regular rows, very stout, clavate, the head granular; basal calli yellow-headed; intermediate deep-purple or mauve; the anterior ones varying in colour, either purple, pink or white, sessile, often crowded, extending almost to the apex; column broad, abruptly bent forward in the upper third, widely winged above, the wings slightly incurved.

Occurs in N.S.W., Vic., Tas. and S.Aust. (S.E. region).

Flowers Sept.-Nov.

6. *C. deformis* R.Br., *Prod. Fl. Nov. Holl.* 324

(1810). **Bluebeard caladenia.** Slightly hairy, 6-15 cm high; leaf almost glabrous, linear-lanceolate, 5-6 cm long and 4 mm wide; flowers solitary, deep blue, occasionally white; perianth-segments light-coloured on the outside with many scattered minute purple glands, spreading with exception of the dorsal sepal, which is generally erect or recurved; dorsal sepal c. 19 mm long, not very acute, elliptic-lanceolate, 5-nerved; lateral sepals not so long, c. 17 mm, falco-lanceolate; petals sometimes erect, spreading, obliquely oblong-lanceolate, about as long as the lateral sepals; labellum contracted

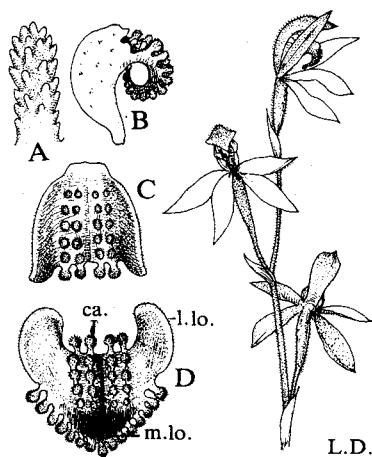


Fig. 357—*Caladenia cucullata*. A, character of labellum fringe; B, labellum, side; C, labellum, basal surface; D, labellum, apical surface.

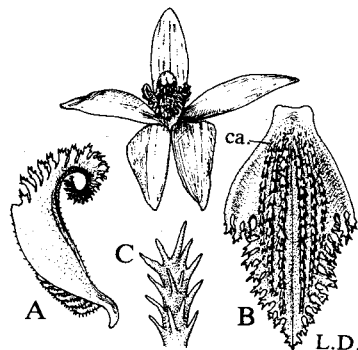


Fig. 358—*Caladenia deformis*. A, labellum, side; B, labellum, surface; C, callus.

towards the base, sessile, c. 11 mm long (when extended) and 7 mm wide; obcuneate, its lower two-thirds erect, clasping the sides of the column; obscurely 3-lobed; the lateral lobes toothed anteriorly, their margins otherwise entire, not very prominent; middle lobe triangular, recurved; dark purple, fringed with dentate calli; calli of lamina linear or slightly clubbed, in 4-6 rather ill-defined rows, not quite extending to the extreme tip, somewhat crowded, those at the base tomentose; column c. 10 mm long, incurved, winged throughout, broadly so in its upper-half; the wings united shortly in front of the base; more or less purple with deep purple dots and markings; anther with a long acute point; pollinia 4, free, lamellate, elongate crescentic.

Occurs in all States except Qld and N.T.; in S.Aust., recorded from the southern Flinders Ranges, Eyre Pen., Yorke Pen., Northern and Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers July-Oct.

A possible intergeneric hybrid with *Glossodia major* R.Br. was recorded by J. H. Willis, *A handbook to plants in Victoria* 396 (1962) and described as *Caladenia tutelata* R. S. Rogers.

A putative hybrid with *C. carnea* was also noted by R. S. Rogers.

7. *C. dilatata* R.Br., *Prod.Fl.Nov.Holl.* 325 (1810). Stem 10-45 cm high; leaf hairy, oblong to elliptical, lanceolate, often rather wide, to 20 mm; flower solitary, sometimes 2, prevailing tints green, yellow, and maroon; perianth-segments all spreading except dorsal sepal, yellowish-green with red central stripe; sepals subequal; dorsal sepal erect, lower-third dilated, thereafter contracted into a clubbed filiform point; lateral sepals with basal part deflexed, the points thereafter spreading and sometimes crossed; petals narrower and shorter, not clavate, falco-lanceolate, 2-4 cm long, not glandular pubescent; labellum maroon, green and yellowish-white, tremulous on a movable claw, 3-lobed, somewhat ovate, recurved near the middle; the lateral lobes green, erect, their side margins entire; middle lobe recurved, widely lanceolate, margins toothed or serrate, with maroon acute tip; calli maroon, golf-stick type, in 4 rows hardly extending beyond the bend, those near the claw large, thick and fleshy, the others small and linear; column much incurved, 10-15 mm long, widely winged, especially in the upper part; 2 yellow sessile calli at the base; anther with well developed sharp point.

Occurs in all States except N.T.

1. Labellum c. 20 mm long, combed or fringed var. *dilatata* 1.

1. Labellum 9-10 mm long, denticulate var. *concinna* 2.

1. Var. *dilatata*. **Green-comb (fringed) spider-orchid**. Often moderately robust, 15-45 cm high; leaf very hairy, 5-12 cm long; flower mostly solitary, rarely 2 or 3, large, often 10 cm diam.; dorsal sepal 3-5 cm long; lateral sepals mostly clavate, 3-5 cm long; petals 3-4 cm long, gradually tapering into fine points; labellum c. 25 mm long; on lateral lobes the anterior margins deeply combed or fringed; column c. 15 mm long.

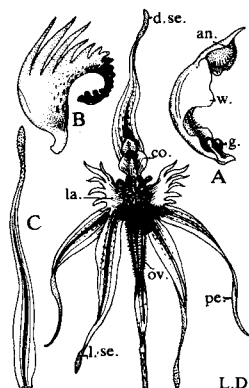


Fig. 359—*Caladenia dilatata* var. *dilatata*. A, column, side; B, labellum, side; C, dorsal sepal with clavate tip.

Common in S.Aust. (Flinders Ranges; Eyre Pen., Northern Lofty, Murray, Yorke Pen., Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Sept.-Nov.

2. Var. *concinna* Rupp, *Proc.Linn.Soc.N.S.W.* 53:554 (1928). Rather dwarf, hairy, 12-30 cm high; leaf slightly hairy, 6-15 cm long; flowers solitary or rarely two, to 5 cm diam.; dorsal sepal c. 2 cm long, tip glandular, lateral sepals c. 2-2 cm long often with minutely glandular tips; petals shorter and narrower, c. 1-8 cm long, lanceolate; labellum on long claw, 9-10 mm long, on lateral lobes the anterior margin fringed with narrow short denticulations; column c. 10 mm long.—*C. toxochila* Tate, *Trans.R.Soc. S.Aust.* 12:129 (1889).

Occurs in N.S.W., Vic., Tas. and S.Aust. (Flinders Ranges, Eastern, Eyre Pen., Murray, Northern and Southern Lofty regions).

Flowers Aug.-Sept.

A putative hybrid between this variety and *C. patersonii* var. *patersonii* was described by J. Z. Weber & R. Bates, *J. Adelaide Bot. Gard.* 1 (2): 131-134 (1977).

8. *C. filamentosa* R.Br., *Prod.Fl.Nov.Holl.* 324 (1810).

Daddy long legs. Stem very slender, 10-30 cm high; leaf linear or lanceolate, 7-15 cm long, hairy; flowers 1-4; perianth-segments dilated in their basal fourth, thereafter produced into hairy filaments (caudae); dorsal sepal erect, incurved; lateral sepals spreading; petals spreading, rather shorter than the dorsal sepal; labellum ovate or cordate, on a short claw, erect against the column in its basal half, with shortly serrate margins, thereafter recurved, the tip entire, not very acute; lamina with calli in 2 closely set rows extending to about the bend, sometimes marked with deeply crimson divergent veins on a lighter ground; column c. 7 mm high, with wide hatchet-shaped wings above, less widely winged below, anther without a point.

- | | |
|---|----------------------------|
| 1. Perianth-segments c. 5 cm long | var. <i>filamentosa</i> 1. |
| 1. Perianth-segments less than 3 cm | var. <i>bicallata</i> 2. |

1. Var. *filamentosa*. Stem 10-30 cm high, slightly hairy; leaf narrow-linear, 7-15 cm long, slightly hairy; flowers 1-4, greenish-white, red, deep-crimson, cream coloured or yellowish, with reddish markings; perianth-segments gradually produced into long hairy filaments; dorsal sepal c. 5 cm long; lateral sepals 5-6 cm long; labellum c. 6 mm long and 3 mm wide. *C. filamentosa* var. *tentaculata* R. S. Rogers in J. M. Black, *Fl.S.Aust.* 138 (1922); *C. tentaculata* Tate, *Trans. R.Soc.S.Aust.* 12:130 (1889), nom. illeg.

Widespread in all Australian States except N.T.; in S.Aust. (Flinders Ranges, Northern Lofty, Eyre Pen., Yorke Pen., Murray, Kangaroo I. and S.E. regions).

Flowers July-Oct.

2. Var. *bicallata* (R. S. Rogers) J. Z. Weber & R. Bates, *comb.nov.* Stem small, slender, c. 10 cm high, hairy; leaf linear-lanceolate, c. 6 cm long, three-nerved, very hairy; flower solitary, cream-coloured, with red veinings; perianth-segments suddenly contracted into rather coarse cylindrical glandular filaments; dorsal sepal c. 2 cm long, one-third of which is dilated; lateral sepals less than 2 cm long, one-half of which is

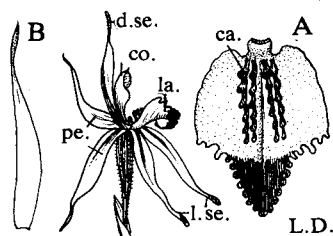


Fig. 360—*Caladenia dilatata* var. *concinna*. A, labellum, surface; B, dorsal sepal.

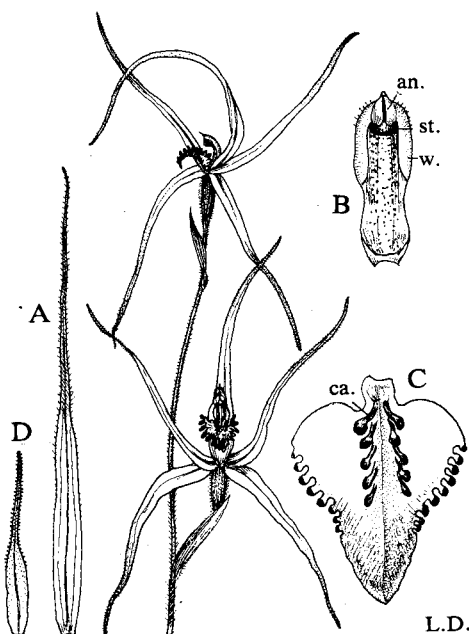


Fig. 361—*Caladenia filamentosa* var. *filamentosa*. A, lateral sepal; B, column, front; C, labellum, surface. D, var. *bicallata*, lateral sepal.

dilated; petals gradually contracted into filaments; labellum ovate, c. 7 mm long and 5 mm wide.—*C. bicallata* R. S. Rogers, *Trans.R.Soc.S.Aust.* 33:17 (1909).

Endemic to S.Aust. (Eyre Pen., Yorke Pen. and Kangaroo I., and one record each from the Southern Lofty and Murray regions).

Flowers Aug.-Sept.

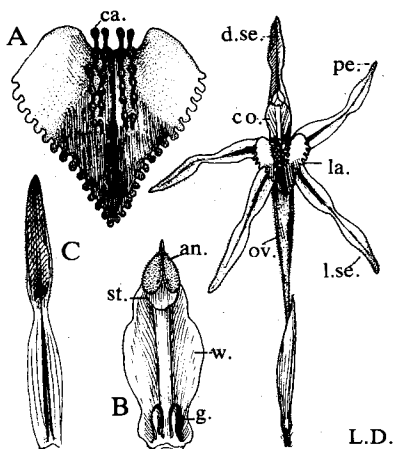


Fig. 362—*Caladenia gladiolata*. A, labellum, surface; B, column, front; C, perianth segment.

fleshy, pyriform, dark reddish-brown, in four crowded rows and not extending to the tip (on long-stemmed specimens the maroon recurved tip extended, producing a slightly tri-lobed labellum; calli less crowded, widely separated into two double rows); column c. 8 mm long, much incurved, with two yellow sessile calli at the base, widely winged in its upper part; wings tapering towards the base.

Endemic to S.Aust. (Southern Flinders Ranges, Northern Lofty and Southern Lofty regions).

Flowers July-Sept.

Hybridism is suspected with *C. patersonii*.

10. *C. huegelli* Reichb. f., *Beitr.Syst.Pfl.* 66 (1871). Stem varying in height, 10-60 cm or more, hairy; stem bract narrow-linear, 2-3 cm long, not sheathing; floral bracts linear, sheathing the peduncle and sometimes base of ovary; leaf linear, narrow-lanceolate, 4-15 cm long and 2-10 mm wide, sometimes channelled, hairy; flowers one or two large, 6-10 cm diam., pale yellowish green, reddish-brown or red, sometimes striped; dorsal sepal erect, incurved, narrower than other perianth-segments, dilated in its proximal end, the upper portion gradually tapering into filamentous clavate tips; lateral sepals lanceolate, narrowing into filamentous clavate tips, spreading or deflexed, gradually narrowing into filamentous tips, not clavate or glandular pubescent; labellum undivided or sometimes obscurely tri-lobed, on movable claw, 10-23 mm long and 8-14 mm wide, yellow to reddish brown proximally, often crimson distally; lower half erect with dentate margins; recurved upper part rather acute, only slightly denticulate or sometimes entire; calli in four rows, sometimes six, mainly golf-stick like at base, sometimes extending to extreme tip where they are usually sessile, light coloured to crimson; column 10-20 mm high, erect and thereafter incurved, sometimes retracted at the base, moderately winged

9. *C. gladiolata* R. S. Rogers, *Trans.R.Soc.S.Aust.* 31:210 (1907). Stem hairy, stunted and 8-20 cm long, or slender and long-stemmed to 30 cm high; leaf hairy, varying in shape and size from oblong-lanceolate to ovate-lanceolate; flower single, rarely 2, greenish-yellow with red markings; perianth-segments of stunted specimens 15-20 mm long, terminating in filaments one third of their length and c. 1 mm wide; perianth-segments of long-stemmed specimens to 30 mm long, one-half of which being the glandulose filaments 0.6-3 mm wide; sepals and petals subequal, widened basal part traversed by a longitudinal red line; distal part thickened, bayonet-shaped, with reddish-brown glands, separated from basal part by a constriction; dorsal sepal erect, incurved or retracted; lateral sepals spreading, flattened except at their extremities; petals four-fifths of length of sepals, linear-lanceolate, spreading; labellum of stunted specimens ovate, c. 9 mm long, on movable claw, undivided, yellowish-green with maroon recurved tip, margins practically entire, at first erect against the column, then recurved from about the middle; lamina without conspicuous veins; calli large,

below, with wide membranous expansion above on each side near the elliptical stigma; two yellow sessile calli at the base; anther with straight sharp point.

Occurs in all Australian States except N.T.

- | | |
|---|---------------------------|
| 1. Labellum lamina and apex pure white | var. <i>rigida</i> 3. |
| 1. Labellum mainly red, or with red apex or red markings. | |
| 2. Labellum with dark divergent veins | var. <i>reticulata</i> 2. |
| 2. Labellum without conspicuous veins | var. <i>huegelii</i> 1. |

1. Var. *huegelii*. Stem often robust, 20-60 cm or more high, sometimes very hairy; leaf linear, 4-15 cm long and 2-10 mm wide (S.Aust.); flowers one or two, mostly large, yellowish, seldom wholly red-brown with reddish markings, slightly glandular pubescent; dorsal sepal concave, slightly incurved, 2-5 cm long, for one-third dilated basally; lateral sepals slightly shorter than dorsal sepal and wider, 2-5-4 mm wide in its proximal end; lateral petals slightly narrower and shorter than sepals, points very acuminate; labellum on short claw, ovate-oblong or broadly ovate-lanceolate, 10-23 mm long and 8-14 mm wide (without fringe); margins on lateral lobes deeply dentate with reddish filamentous teeth, which are often forked at their free ends; mid-lobe triangular with blunt tip, often red or purple, with shortly denticulate margins; calli in four rows, increasing to six seldom eight at the tip, light coloured at the base, purple and sessile anteriorly; column c. 20 mm high, much incurved, moderately winged.—*C. pectinata* R. S. Rogers, *Trans.R.Soc.S.Aust.* 44:352 (1920), *C. ferruginea* Nicholls, *Victorian Nat.* 64:136 (1947).

Occurs in W.Aust. and S.Aust. (Flinders Ranges (southern), Murray, Southern Lofty and Kangaroo I. regions).

Flowers Sept.-Oct.

Hybridism is suspected with *C. patersonii*.

2. Var. *reticulata* (Fitzg.) J. Z. Weber & R. Bates, comb.nov. **Veined spider-orchid.** Stem slender, 10-30 cm high; leaf generally linear, channelled c. 5 cm long and 3-10 mm wide, very hairy; flower usually one, rarely two, varying in colour from prevailing tints yellowish-green to wholly crimson; perianth-segments commonly with central stripe; dorsal sepal linear, 20-30 mm long; lateral sepals 25-35 mm long, having several parallel veins; petals shorter and narrower, lanceolate, usually darker; labellum ovate, 12-15 mm long, striped with purplish veins; its proximal end having dentate margins of crimson linear teeth; apical recurved part rather acute, only slightly denticulate, conspicuously purple; calli in four rows, hardly extending beyond the bend; column 9-11 mm high, retracted at base, thereafter erect and incurved; widely winged above, more narrowly below.—*C. reticulata* Fitzg., *Gdnrs' Chron.* n.s. 17:462 (1882).

Occurs in Qld, N.S.W., Vic. and Tas., in S.Aust. (Northern Lofty, Southern Lofty and Kangaroo I. regions).

Flowers Sept.-Nov.

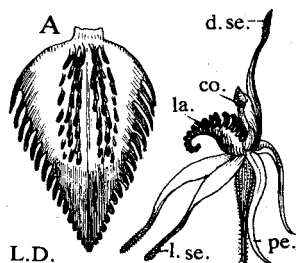


Fig. 363—*Caladenia huegelii* var. *huegelii*. A, labellum, surface.

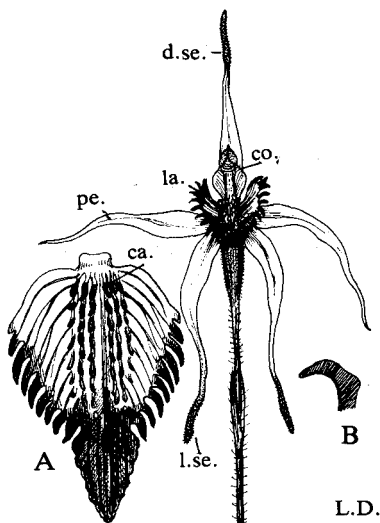


Fig. 364—*Caladenia huegelii* var. *reticulata*. A, labellum, surface; B, callus, golf-stick like.

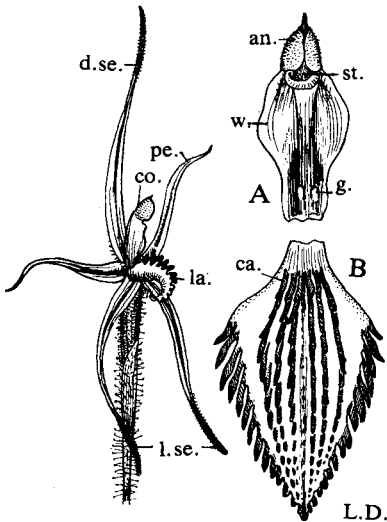


Fig. 365—*Caladenia huegelii* var. *rigida*.
A, column, front; B, labellum, surface.

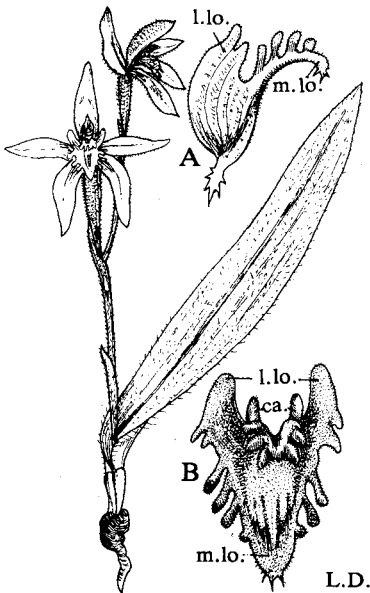


Fig. 366—*Caladenia latifolia*. A, labellum, side; B, labellum, front.

3. Var. **rigida** (R. S. Rogers) J. Z. Weber & R. Bates, comb.nov. Stem slender, 20-30 cm high, quite hairy; leaf linear-lanceolate, 3-20 cm long and 3-5 (-10) mm wide, very hairy; hairs basally often extended into papillose sacks; flowers one or two, cream-white, perianth-segments lengthwise striped reddish-brown, darker on underside; dorsal sepal erect and incurved; 2-4 cm long; lateral sepals spreading rigidly, lanceolate, 2.5-5 cm long and 2.5-4.5 mm wide, 5-nerved, cream-white, striped; petals retroflexed, lanceolate, acute, 5-nerved, striped; labellum ovate-lanceolate, acute, undivided, 9-13 mm long, pure white, basally dentate with subulate brown white-tipped teeth, denticulate towards unstained apex; calli in four rows, linear, bent forwards gradually, sessile, not reaching the apex, red with white tips; column c. 10 mm long, erect-incurved, winged above.—*C. rigida* R. S. Rogers, *Trans.R.Soc.S.Aust.* 54:45 (1930).

Endemic to S.Aust. in the Southern Lofty region.
Flowers Sept.

11. **C. latifolia** R.Br., *Prod.Fl.Nov.Holl.* 324 (1810). **Pink fairies**. Moderately robust, hairy, 15-30 cm high; leaf very hairy, oblong-lanceolate, 4-10 cm long; flowers moderately large, pink or white, 1-4; perianth-segments lighter-coloured on the outside, glandular-hairy, spreading with exception of dorsal sepal; dorsal sepal oblong-lanceolate, erect, not very acute, c. 15 mm long; lateral sepals free or slightly adherent at extreme base, equal to or slightly longer and wider than the dorsal one, oblong-lanceolate; petals elliptic-lanceolate; more contracted at the base, shorter and more acute than the other segments, 12-13 mm long; labellum pink or white, sessile, 6-7 mm long, deeply 3-partite; lateral lobes and base erect and clasping the column, the former oblong obtuse, margins entire; middle lobe recurved, broadly lanceolate, its margins with a few blunt linear teeth; calli of lamina linear or clavate, arranged semi-circularly at or near the bend, or in 2 converging rows; column erect, 6-7 mm long, pubescent on the back, moderately winged throughout; anther with a very long point; pollinia 4, lamellate, a pair of deeply bilobed "butterfly" masses in each cell. (Fig. 345).

Occurs in W.Aust., N.S.W., Vic., Tas. and S.Aust. (Flinders Ranges, Murray, Eyre Pen., Yorke Pen., Northern and Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Sept.-Oct.

12. *C. leptochila* Fitzg., *Gdnrs' Chron.* n.s. 17:462 (1882). **Narrow-lip spider orchid.** Slender; hairy, 15-45 cm high; leaf very hairy, narrow-lanceolate to oblong or elliptical-lanceolate, sheathing at the base; lamina 4-14 cm long; flowers 1 or 2, large, prevailing tints yellowish-green and reddish-brown; perianth-segments with a central reddish-brown stripe, spreading (with the exception of the dorsal sepal); sepals clavate, subequal; dorsal sepal incurved, 2.5-3 cm long, tapering from the base to a fine clavate point; lateral sepals dilated in basal half, thereafter constricted into fine upturned clavate points; petals falco-lanceolate, gradually tapering into fine non-clavate points, 2-2.5 cm long; labellum oblong or broadly lanceolate, 11-13 mm long (including the claw) and 4-5 mm wide, on a distinct movable claw, undivided, dark reddish-brown, erect in lower half, thereafter recurved, margin practically

entire, tip generally acute, sometimes blunt, lamina almost flat; calli sessile (except near the claw), in 4 rows, rarely extending beyond the bend; column 10-12 mm retracted at base, thereafter erect or incurved, widely winged above, more narrowly below; 2 sessile yellow calli at the base; anther with straight sharp point.

Occurs in Vic. and S.Aust. (Flinders Ranges (southern), Murray, Northern and Southern Lofty and Kangaroo I. regions).

Flowers Sept.-Nov.

13. *C. menziesii* R. Br., *Prod. Fl. Nov. Holl.* 325 (1810). **Hare (rabbit) orchid.** Generally rather slender, 6-20 cm high, but sometimes much exceeding this; leaf glabrous or almost so, of variable shape and size, usually ovate-lanceolate or broadly oblong-lanceolate, 3-6 cm long; flowers 1-3, white and pink, occasionally entirely white; dorsal sepal reddish, very glandular-hairy on the back, spatulate-lanceolate, contracted gradually towards the base, rather blunt, abruptly incurved over the anther, concave, c. 11 mm long; lateral sepals spreading, white, traversed by a pink stripe on lower surface, crescentic, wide in middle, contracted towards both ends, same length as the dorsal one; petals reddish, very narrow-linear in lower half, clavate and closely glandular above, erect, c. 20 mm long; labellum on a short claw, c. 7 mm long including claw, white with conspicuous transverse pink markings, orbicular-ovate, undivided, erect at base, tip white, blunt, recurved; margins entire or nearly so; calli on very slender pedicels with large rounded heads, arranged in 2-4 rows, not extending to the top; column c. 7 mm long, erect or

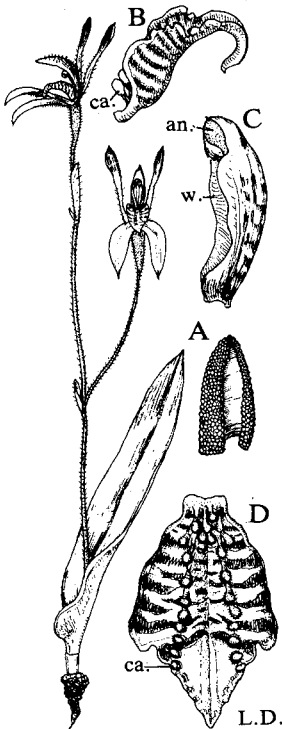


Fig. 368—*Caladenia menziesii*. A, lateral sepal, tip; B, labellum, side; C, column, side; D, labellum, surface.

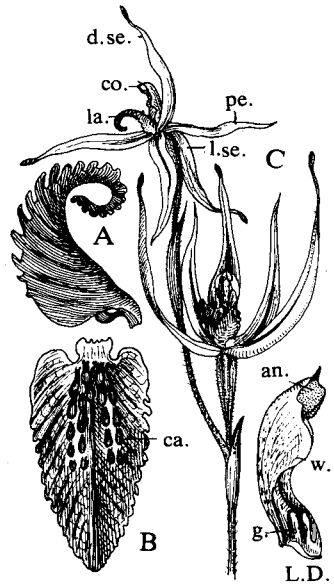


Fig. 367—*Caladenia leptochila*. A, labellum, side; B, labellum, surface; C, column, side.

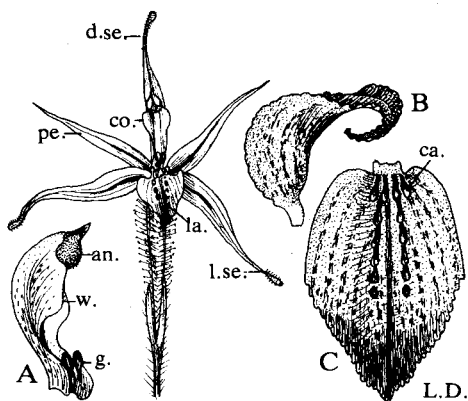


Fig. 369—*Caladenia ovata*. A, column, side; B, labellum, side; C, labellum, surface.

slightly incurved, with transverse pink striae; widely winged throughout; anther compressed laterally like a fireman's helmet, shortly pointed; pollinia 4, lamellate, angular like a try-square.

Occurs in W.Aust., Vic., Tas. and S.Aust. (Eyre Pen., Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Sept.-Nov.

14. *C. ovata* R. S. Rogers, *Trans.R.Soc. S.Aust.* 33:16 (1909). Slender, hairy, 10-23 cm high; leaf very hairy, 3-7 cm long, narrow-lanceolate or oblong-lanceolate; flowers usually solitary, occasionally 2, very rarely 3, large, reddish-yellow; sepals with dark central stripe, dilated in their basal half thereafter contracted into very fine clavate caudae; dorsal sepal 2-2.7 cm long, erect or slightly incurved over column; lateral ones rather longer, spreading; petals shorter than sepals, lanceolate, not clubbed, spreading;

labellum ovate on a short movable claw, 9-10 mm long (without the claw) and 8 mm wide, reddish-yellow with dark-red tip, moderately recurved from about the middle, margin entire, lamina with dark divergent veins; calli extending to about the bend, but very inconstant, in 2 or 4 rows, sometimes represented by a few minute irregularly placed bossings, occasionally entirely absent, generally small mammillary except for a few short clavate ones near the claw; column c. 8 mm long, rather incurved, more winged in its upper than lower half; 2 yellow sessile calli at the base.

Endemic to S.Aust. and restricted to the Kangaroo I. region.

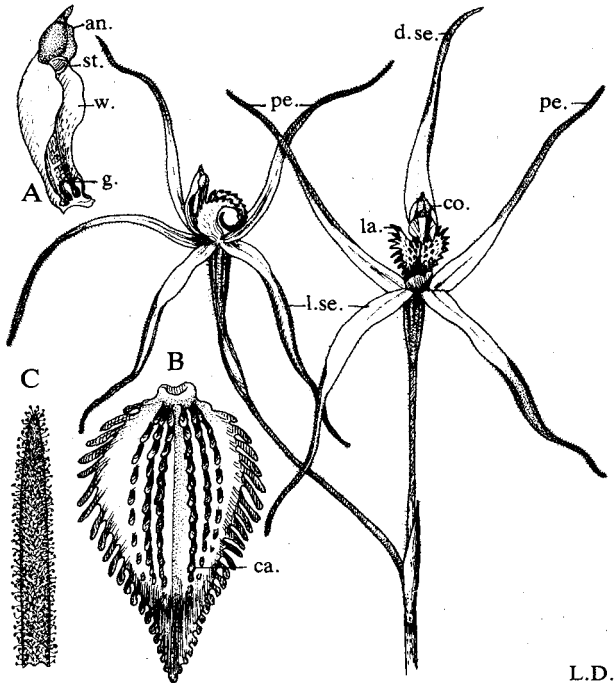
Flowers Sept.-Oct.

15. *C. patersonii* R. Br., *Prod.Fl.Nov.Holl.* 324 (1810). **Common spider orchid.** A hairy species 20-50 cm high; leaf hairy, oblong to linear-lanceolate, sometimes quite short but often exceeding 15 cm long; flowers large, usually solitary, occasionally 2 or 3, generally white or creamy with dark points on perianth-segments and labellum, more rarely crimson or yellow, sometimes yellowish-green and brown, often 10-15 cm diam.; perianth-segments all spreading except dorsal sepal, with points dark and glandular-hairy, but not clavate; dorsal sepal erect or incurved over the column, the portion behind the column dilated, thereafter produced into a long tentacular point, usually 4-5-6 cm long; lateral sepals similar but spreading and drooping, rather longer, with a wider and longer dilated portion; petals shorter than dorsal sepal, 4-5-5 cm long gradually tapering to fine points; labellum 1.5-2 cm long (extended), usually with purple or crimson tip and calli, ovate-lanceolate on a short claw; undivided; the basal half commonly light-coloured, erect, with acutely toothed margins, anterior portion recurved, generally purple or crimson, the margins bluntly toothed or serrate with acute tip; calli of lamina rarely extending beyond the bend, linear-golf-stick in the type, in 4-6 rows; column incurved, c. 12 mm long, winged narrowly in lower part, widely above; 2 yellow sessile calli at the base; anther pointed.

Occurs in all Australian States except N.T.; in S.Aust. Flinders Ranges, Eyre Pen., Murray, Yorke Pen., Southern Lofty and S.E. regions.

Flowers Sept.-Nov.

A highly polymorphic species with many colour variations and forms; several varieties have been recognised throughout Australia, which differ in size and colour of perianth-segments only. S.Aust. specimens are placed in var. *patersonii*.



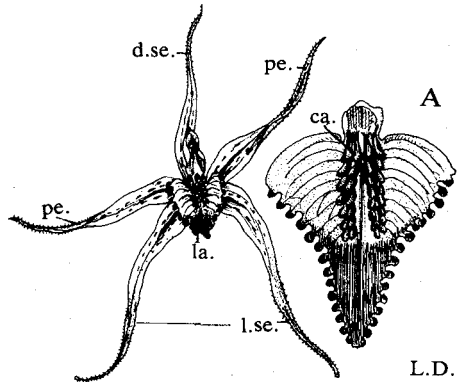
L.D.

Fig. 370—*Caladenia patersonii*. A, column, side; B, labellum, surface; C, petal, tip.

Hybridism of *C. patersonii* is suspected with *C. dilatata*, *C. gladiolata*, *C. huegelii* var. *huegelii*, and *C. tessellata*. The hybrid with *C. dilatata* var. *concinna* was reported in *J. Adelaide Bot. Gdn* 1(2):131 (1977).

C. × variabilis Nicholls, *Victorian Nat.* 66:223 (1950), a putative hybrid between *C. patersonii* and *C. tessellata* (see Willis (1962) *A handbook to plants in Victoria* 1: 387) occurs in Vic. and S. Aust. in the S.E. region.

16. *C. radialis* R. S. Rogers, *Trans. R. Soc. S. Aust.* 51:296 (1927). Stem slender, 15-30 cm high, hairy; leaf narrow-linear, clasping the stem at the base, 5-15 cm long and 4-6 mm wide, villous; flowers one or two, rather large; perianth-segments yellow or reddish-brown with dark lines; segments somewhat similar, lanceolate or dilated at the base, then tapering into filamentous pubescent glandular tips; dorsal sepal erect, incurved, 3-3.5 cm long, three-nerved; lateral sepals and petals a little longer, spreading, 3-5



L.D.

Fig. 371—*Caladenia radialis*. A, labellum, surface.

nerved; labellum on a slender movable claw, ovate, 13 mm long and 9-10 mm wide, much recurved at the apex, the margins usually entire, more rarely slightly serrate; lamina with dark radial veins, recurved part purple; calli linear, golf-stick like, densely crowded in 6 rows on the lower half of the lamina, ending about the middle; column erect, then much incurved, c. 11 mm long, winged throughout, widely in its upper two-thirds; no yellow calli at the base; anther extremely blunt, without mucro.

Occurs in W.Aust. and in S.Aust. only from Wilpena Pound, Flinders Ranges region.

Flowers Aug.-Sept.

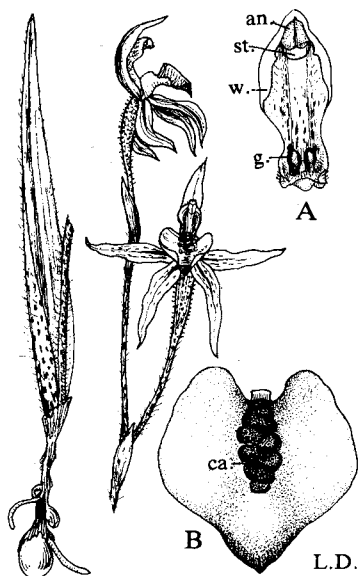


Fig. 372—*Caladenia tessellata*. A, column, front; B, labellum, surface.

17. *C. tessellata* Fitzg., *Aust. Orchids* 1(2) (1876). **Thick-lip spider-orchid.** Stem slender, 10-30 cm high, hairy; leaf linear-lanceolate, hairy, 4-11 cm long; flowers one or two on slender pedicels; perianth-segments subequal, yellowish with brown-red central streak, acuminate with glandular tips, not clavate; dorsal sepal linear-lanceolate, erect, incurved, 15-30 mm long; lateral sepals much wider, spreading, flat, falco-lanceolate, contracted at the base, dilated in the middle, then rather abruptly acuminate; petals much narrower than lateral sepals, linear lanceolate, c. 30 mm long, spreading or depressed; labellum on a narrow movable claw; cordate or broadly ovate, 10-20 mm long and 10-15 mm wide, undivided, margin entire with a conspicuous dark-brown thickening round the apex; rather flat, usually erect at the base, thereafter spreading with depressed tip; reddish-brown or yellow with dark divergent veins; calli in 2 or 4 rows, dark, clavate, fleshy, crowded, stalked towards the base, sessile and congested towards the tip where one-third is naked; sometimes a cluster of slender calli at the base of the lamina; column 10-15 mm high, retracted, then much incurved, widely winged in its upper two-thirds; two yellow sessile oval calli at the base.—*C. cardiophila* Tate, *Trans. R. Soc. S. Aust* 9:60 (1887).

Occurs in N.S.W., Vic. and S.Aust. (Flinders Ranges, Eyre Pen., Yorke Pen., Northern Lofty, Murray, Southern Lofty, Kangaroo I. and S.E. regions).

Differs from the closely related Western Australian *C. cairnsiana* F. Muell. in having two basal glands on column and slightly larger flower.

Hybridism is suspected with *C. patersonii*.

18. *C. tutelata* R. S. Rogers, *Trans. R. Soc. S. Aust.* 31:211 (1907). Slender, almost glabrous, 15-22 cm high; leaf oblong or oblong-lanceolate, very slightly hairy, c. 8 cm long and 6 mm wide; flower solitary, dark-blue, about the size and colour of a well-developed *Glossodia major*; perianth-segments lighter-coloured on the outside, dotted with minute dark-purple glands, subequal, all spreading with exception of the dorsal sepal, not very acute; dorsal sepal c. 2 cm long, elliptic-lanceolate, erect or slightly

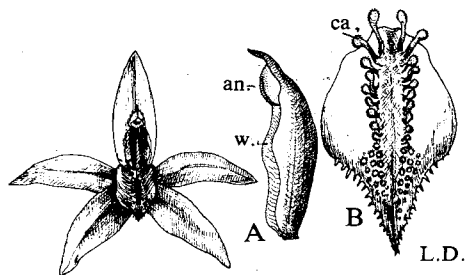


Fig. 373—*Caladenia tutelata*. A, column, side; B, labellum, surface.

incurved, blunter than the other segments; lateral sepals rather wider, elliptic-lanceolate; petals about the same width as the lateral sepals but slightly shorter, falco-lanceolate; labellum undivided, on a very short claw, almost sessile, ovate, c. 11 mm long and 5.5 mm wide, the apex acute, margins entire except for very minute denticulations near the tip; basal half erect, clasping the column; thereafter gradually recurved; calli of the lamina of the golf-stick type, the filaments purple or white, heads white or yellow, generally in 2 well defined rows as far as the middle; thereafter of less regular distribution and shape, sometimes sessile; occasionally reduced to a few tall basal calli; 4 tall sentinel calli of the golf-stick type, c. 3 mm long, attached to the extreme base of the lamina standing vertically in front of the column, sometimes quite free, sometimes with a tendency to cohere or fuse so as to form 2 broad-filamented double-headed calli; column c. 10 mm long, erect, not much incurved, broadly winged on its upper half, narrowly winged below; dorsal surface pubescent; anther with a long point (nearly 2 mm).

Occurs in N.S.W., Vic. and S.Aust. (Southern Lofty and S.E. regions).

Flowers Sept.-Oct.

It probably constitutes a natural hybrid between *Glossodia major* and *Caladenia deformis*, as suggested by Willis in *A handbook to plants in Victoria* 1:396 (1962).

3. CALEANA R.Br.

Prod.Fl.Nov.Holl. 329 (1810).

(After G. Caley, a collector of N.S.W. plants.)

Terrestrial glabrous slender herbs, with an oval or elongated tuber; leaf solitary, radical, narrow-lanceolate; flowers usually 1-3 on slender pedicels; flowers reversed; perianth-segments linear; the dorsal sepal slightly incurved behind the column; the lateral ones spreading or reflexed; the petals erect against the side of the column; labellum placed above the column, articulate on a movable claw with the base or foot of the column; the lamina peltate, ovate, its surface convex, smooth; column elongated, appressed to the ovary, its margins broadly winged throughout their length; anther valvate, 2-celled, a pair of pollen-masses in each cell; pollen granular; caudicle and viscid disk absent. Monotypic and endemic in Australia.

1. *C. major* R.Br., *Prod.Fl.Nov.Holl.* 329 (1810). **Large duck-orchid, flying duck.** Slender, glabrous, 15-30 cm high; stem green or reddish-brown, wiry; leaf radical, solitary, glabrous, narrow-lanceolate, generally reddish, 5-8 cm long; flowers reddish-brown, 1 or 2 on very slender pedicels, the upper flower-bract including a floral rudiment; dorsal sepal linear-spathulate, acuminate on a contracted base, erect or incurved, channelled, c. 12 mm long; lateral sepals slightly longer, reflexed, channelled, slightly divergent, contracted about the middle, then narrowly tubular or pointed; petals narrow-linear, erect against wings of the column, c. 9-10 mm long; labellum attached over the column by a long semi-circular strap-like claw 5-6 mm long; lamina obovate, peltate, 8-9 mm long, smooth, centre inflated and hollow, cavity open below, produced on the columnar side into a beak-like process, and into a flattened blunt appendage at the other end; column incurved; very broadly winged from anther to base; wings slightly adnate to claw of labellum; anther erect, not pointed; stigma circular, prominent, concave; pollinia free, a pair in each cell, elongated, laminate; no caudicle or viscid disk; rostellum rudimentary.

Occurs in Qld, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty and S.E. regions).

Flowers Oct.-Jan.

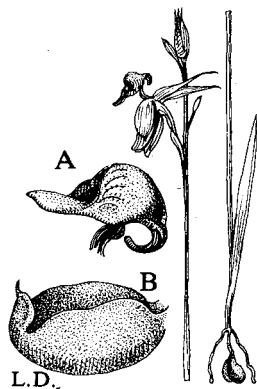


Fig. 374—*Caleana major*. A, labellum, side; B, column, side.

4. CALOCHILUS R. Br.

Prod.Fl.Nov.Holl. 320 (1810).(Greek *kalos*, beautiful; *cheilos*, a lip.)

Terrestrial glabrous herbs, with ovoid tubers; leaf solitary, linear, channelled; bracts sometimes leaf-like; flowers few or numerous, in a loose raceme; perianth-segments free; dorsal sepal broad, erect, hood-like; lateral sepals broad, acute, more or less spreading; petals shorter than the sepals, wide, erect or incurved; labellum exceeding the other segments in length, sessile, undivided, with an oblong base and triangular densely bearded lamina, with purple or metallic-coloured hairs; column short and broad, its wide wings produced behind but not beyond the anther; anther terminal incumbent or horizontal, with a blunt beak, 2-celled; pollinia 4, or 2 each deeply bilobed, granular, unconnected with the rostellum. A small genus of about 10 species in Australia of which one occurs in New Zealand and New Caledonia.

1. Labellum glabrous *C. imberbis* 2.
1. Labellum villous.
2. Two glands at base of column.
3. Base of labellum glabrous or with several raised longitudinal callus-like lines, which may be more or less fused *C. campestris* 1.
3. Base of labellum covered with purple callus-like glands. *C. robertsonii* 4.
2. No gland at base of column; labellum with long strap-shaped apex .. *C. paludosus* 3.

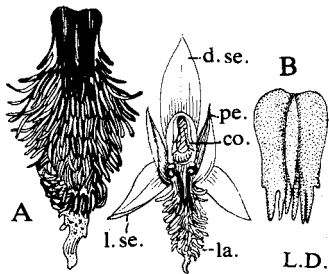


Fig. 375—*Calochilus campestris*. A, labellum, front; B, callus-like lines.

1. *C. campestris* R. Br., *Prod.Fl.Nov.Holl.* 320 (1810).

Copper-beard orchid. Flower-stalk 37-60 cm high; leaf linear-lanceolate, 11-15 cm long, rather rigid and fleshy-triangular in section, erect, channelled, often absent; stem-bracts 2, copper-coloured, elongate, subulate, clasping; flowers 8-15, prevailing tints yellow and reddish-brown; sepals nearly equal in length, yellow with reddish-brown stripes or dots; the dorsal one erect, 8-9 mm long, ovate, concave, acute; the lateral ones slightly longer and narrower, spreading below the labellum; petals erect, ovate-lanceolate, shorter and much narrower than the dorsal sepal, yellow with darker stripes; labellum with fleshy rectangular base and wide triangular lamina, golden-yellow, protruding between and beyond the lateral sepals; margins fringed with reddish-blue hairs with a metallic lustre; the basal portion glabrous or with brilliant reddish-blue raised callus-like lines with a metallic sheen sometimes more or less fused, but all ending in free divergent hair-like extremities; other hairs on lamina not dense and rather shorter than in other species of *Calochilus*; tip recurved and ending in a short, glabrous, sinuous ribbon; column short and widely winged, very open at the base with purple gland at each lower angle; no castellated ridge connecting the glands, but generally reddish-brown markings between them; anthers long, horizontal, with duck-bill point; stigma transverse, reniform.

Occurs in Qld, N.S.W., Tas., N.Z. and S.Aust. (Eyre Pen., Southern Lofty and S.E. regions). Flowers Oct.-Nov.

Variability in the species was described by Jones (*Orchadian* 5:83, 1976).

2. *C. imberbis* R. S. Rogers, *Trans.R.Soc.S.Aust.* 51:4 (1927). **Naked-bearded orchid or beardless calochilus.** Differs from *C. robertsonii* only in having a glabrous labellum.

In South Aust. it is known only by single collection from Spring Mount National Park, near Myponga (Southern Lofty region). Rogers (1927) suggested that it may represent a peloric state of *C. robertsonii* with which it is associated in the field.

Occurs in Vic. and Tas.

Flowers Sept.-Nov.



Fig. 376—*Calochilus imberbis*, labellum.

3. *C. paludosus* R.Br., *Prod.Fl.Nov.Holl.* 320 (1810). **Red-bearded orchid.** Plant slender to quite stout, 15-50 cm high, stem erect; leaf shorter than raceme, linear-lanceolate, acute, channelled, keeled, inclined to be fleshy; stem bracts similar but much shorter; floral bracts narrow, acute; flowers 1-8, rarely more, reddish, dorsal sepal 10-15 mm long, broad-elliptic, prominently cucullate, lateral sepals little smaller, narrowly lanceolate, divaricate, spreading below the labellum; petals c. 8 mm long, obliquely deltoid, subacute tip directed towards dorsal sepal, striped by conspicuous red veins; labellum sessile on a broad rectangular base, 22-27 mm long (including ligule), bare ligulate apex long and often straight, the triangular lamina covered with long reddish hairs; the hairs toward the base reduced to small linear and rounded glands; on each side at the base a short, erect, intramarginal plate-like callus; column short, very broadly winged and without any basal glands; bases of wings united in front by a tooth-like lobe or band, stigma prominent, its lower margin purple or red; anther small, obtuse, as broad as long.

Occurs in New Zealand, Qld, N.S.W., Vic., Tas. and S.Aust. (S.E. region).

Flowers Sept.-Oct.

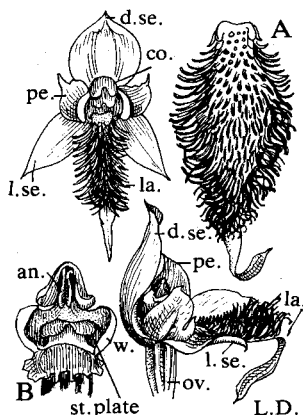


Fig. 377—*Calochilus paludosus*. A, labellum, surface; B, column, front.

4. *C. robertsonii* Benth., *Fl.Aust.* 6:315 (1873). **Purplish-bearded orchid.** Plant seldom exceeding 45 cm in height; leaf usually longer, broader, thinner, and less rigid than in *C. campestris*; flowers usually 2-9, green and purple; dorsal sepal green, ovate, acute, concave, erect, c. 12 mm long; lateral sepals divergent, spreading below or at the sides of the labellum, as long as the dorsal sepal; petals very much shorter, yellowish-green, with dark vertical stripe, ovate-falcate, erect; labellum sessile, c. 20 mm long; the lamina covered with crowded purple callus-like glands at the extreme base and ending in a short glabrous ribbon, otherwise densely bearded with long purple glistening hairs; column short and widely winged, a purple gland at each lower angle, these angles connected by a transverse raised purple (often dotted) ridge; anther almost as long as column, nearly horizontal, bluntly rostrate; stigma transversely oblong; rostellum very long and narrow, unconnected with the pollinia; pollinia 2, each deeply bilobed, crescentic, club-shaped.

Occurs in New Zealand, W.Aust., Qld, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty and S.E. regions).

Flowers Oct.-Nov.

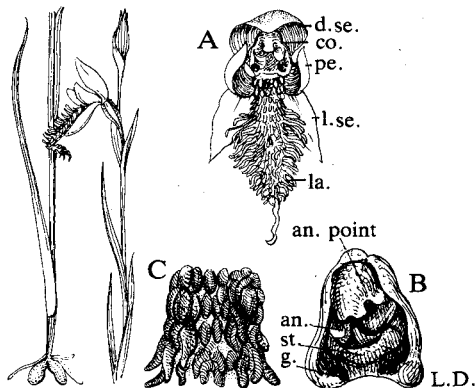


Fig. 378—*Calochilus robertsonii*. A, flower, front; B, column, front; C, callus-like glands.

5. CHILOGLOTTIS R.Br.

Prod. Fl. Nov. Holl. 322 (1810).

(Probably from the Greek *cheilos*, a lip and *glōtta*, the tongue, referring to the labellum or *glōttis*, the mouth of the windpipe.)

Terrestrial glabrous herbs; stem after fertilisation often elongating to 20 cm or more; leaves 2, radical, opposite; flowers solitary, erect; dorsal sepal erect and incurved; lateral sepals free, deflexed or decurved, linear; petals spreading or reflexed; labellum undivided, lamina wide, margins entire, on a short basal claw, its upper surface with numerous darker calli which are a mixture of sizes and shapes; after maturity the claw often bends upwards so the calli are pressed against column; column elongate, slender; wings prominent in upper half, incurved; anther erect, as high as rostellum; pollinia granular without caudicles. 8 species, all occurring in eastern Australia and 2 of them extending to New Zealand.

1. Petals not or only slightly deflexed; labellum ovate on a very short claw less than 2 mm long *C. cornuta* 1.
1. Petals deflexed against the ovary; labellum broadly rhomboid on a claw more than 2 mm long *C. trapeziformis* 2.

1. *C. cornuta* Hook.f., *Fl. Antarct.* 1:69 (1844). **Green bird orchid.** Stem green, at flowering rarely exceeding 5 cm; leaves 3-8 cm long and 1-3 cm wide, linear-oblong to oblong-lanceolate, petiolate, more or less fleshy, margin often undulate or crisped; floral bract 2 cm long, somewhat leaf-like, with long cylindrical base closely ensheathing peduncle and ovary; flower between or above spreading leaves, predominantly green, to 15 mm long, fleshy; dorsal sepal hooded, ovate-lanceolate; lateral sepals recurved; linear; petals erect, spreading distally, ovate-lanceolate; labellum on very short claw, 6-8 mm long, usually broadly ovate; calli dark green or reddish, variously arranged mainly in central group, two often forming thickened auricles near base; column almost as long as labellum, widely winged in upper half, the points of wings higher than the anther.—*C. muelleri* Fitzg., *Aust. Orchids* 2(2) (1885).

Occurs in New Zealand, N.S.W., Vic., Tas. and S.Aust. (S.E. region).

Flowers Oct.-Jan.

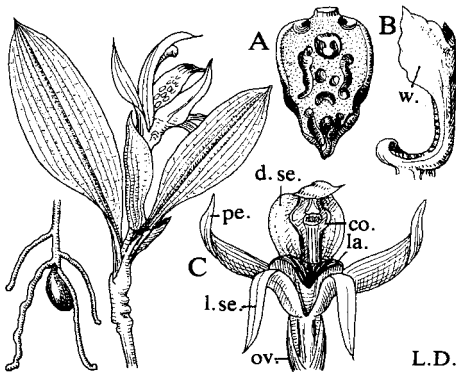


Fig. 379—*Chiloglottis cornuta*. A, labellum, surface; B, column, side; C, flower, enlarged.

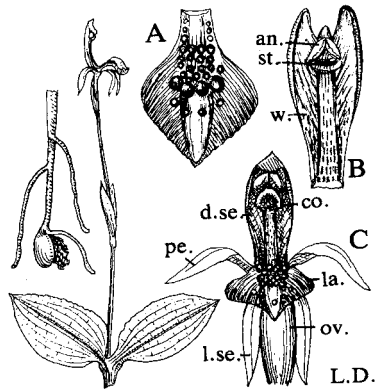


Fig. 380—*Chiloglottis trapeziformis*. A, labellum, surface; B, column, front; C, flower, enlarged.

2. *C. trapeziformis* Fitzg., *Aust. Orchids* 1(3) (1877). **Dainty bird orchid.** Stem often pinkish, 7-10 cm high; leaves 4-8 cm long and 1-2 cm wide, narrow-oblong, acute, tapering to the base, their margins often undulate or crisped; floral bract 1.5-2 cm long, ensheathing the pedicel;

flower borne well above leaves, mainly purplish, less often green, to 15 mm long, not fleshy; dorsal sepal erect, narrowly cuneate with a short point; lateral sepals spreading, sometimes recurved, narrow-linear; petals deflexed against ovary, broad-linear; labellum on short claw, 10-12 mm long, trapeziform or rhomboid with short points; calli dark, chiefly in two groups, one toward the claw and one on the anterior half extending to the apex; column shorter than labellum, widely winged above the centre, the rounded apices higher than anther.

Occurs in Qld, N.S.W., Vic. and S.Aust. (known from near Comaum, S.E. region).

Flowers Sept.-Nov.

6. *CORYBAS* Salisb.

Parad.Lond. t.83 (1805).

(Greek *Korybas*, one of the dancing priests of Phrygia.)

Dwarf terrestrial herbs arising from small rounded tubers; leaf single, ovate-cordate or rotund, with scarious sheathing bract below it; flower relatively large, solitary, sessile or pedicellate; pedicel elongated in the fruiting stage; dorsal sepal large, erect, incurved, hood-shaped; lateral sepals and petals subulate, diminutive; labellum large, tubular, its base erect enclosing the column, expanded towards the orifice, the expanded portion reflexed or recurved; column short, fleshy, erect; anther 2-celled, erect valvate; pollinia 4, in 2 pairs attached directly to the viscid disk of the rostellum without the intervention of a caudicle; granular or mealy. A rather extensive genus comprising at least 60 spp., ranging as far north as the Philippines, extending westward to the Himalayas, traceable through the Indian Archipelago to New Guinea, where it appears to have its maximum distribution (19 species); also reported from islands of the Polynesian group and from New Zealand (8 species); represented in Australia by 11 species.

1. Dorsal sepal gradually contracted toward the base.
2. Margins of labellum denticulate; orifice of labellum looking forwards, widely expanded; calli present.
 3. Dorsal sepal narrow-spathulate to oblong, not hooded; labellum auricles inconspicuous; orifice minutely opening *C. despectans* 1.
 3. Dorsal sepal broadly spatulate, hooded; labellum auricles conspicuous; orifice widely opening.
 4. Labellum tube equal to lamina; lamina margins incurved *C. diemenicus* 2.
 4. Labellum tube longer than lamina; lamina margins spreading *C. dilatatus* 3.
2. Margins of labellum entire; orifice of labellum looking downwards, slightly contracted; calli absent *C. fordhamii* 4.
1. Dorsal sepal abruptly contracted into a narrow claw almost the same length as the orbicular lamina *C. unguiculatus* 5.

1. *Corybas despectans* D. L. Jones & R. C. Nash, *Muelleria* 3:165 (1976) **Helmet orchid**. A small plant rarely exceeding 2 cm; leaf 8-25 mm long and 12-30 mm wide, cordate to orbicular, occasionally lobed, apiculate, green on both surfaces; flower reddish-purple, on an inconspicuous pedicel, 7-12 mm long (without ovary), subtended by a narrow subulate bract c. 3 mm long, lower half erect, upper curved and deflexed, dominated by labellum; ovary 3-5 mm long, cylindric; dorsal sepal 5-10 mm long and 3-4 mm wide when flattened out, gradually contracted into claw, erect in lower half, involute, in upper part curving to c. 60°, hooded, tip acute, obtuse or irregularly notched, greenish-grey with purple striations; lateral sepals subulate, c. 5 mm long, less than 0.5 mm wide at the base, gradually tapering into acute apex, clinging to auricles of labellum, purplish to colourless; petals often chelate, similar, c. 3 mm long; labellum exceeding the dorsal sepal, 8-12 mm long and 9-12 mm wide; erect lower portion involute against the dorsal sepal, enclosing the column, basally furnished with two small auricles at attachment; upper half deflexed through 180°, expanded into a circular lamina, forming a split tube produced into a trumpet-shaped orifice looking downwards, reddish with conspicuous purple venation ending in the denticulate margin; calli of about 4 plates, spiculate, occasionally having minute teeth;

column c. 2.5 mm long, cylindrical, minutely winged; pollinia caudate; stigma more or less rectangular.

Described from S.Aust. (Eyre Pen., Yorke Pen., Southern Lofty, Kangaroo I. and S.E. regions), and probably also entering Vic. and W.Aust.

Flowers June-Aug.

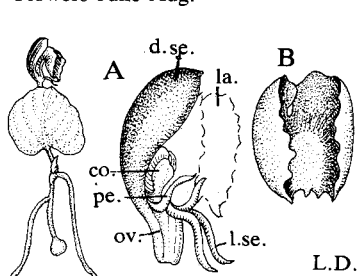


Fig. 381—*Corybas despectans*. A, flower, enlarged; B, labellum, front.

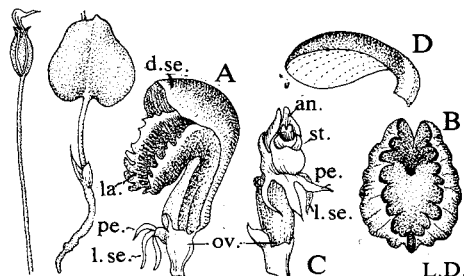


Fig. 382—*Corybas diemenicus*. A, flower, enlarged; B, labellum, front; C, column and ovary; D, dorsal sepal.

2. *C. diemenicus* (Lindl.) Rupp, *Proc.Linn.Soc.N.S.W.* 53:551 (1928), **Slaty helmet orchid**. A small plant 2-3 cm high with inconspicuous stem; flower 15-18 mm without ovary, deep purple to dark grey, sessile; ovary cylindric, c. 5 mm long; dorsal sepal 14-18 mm long; the lower half erect, involute, contracted into sheathing claw, but not abruptly, in upper half curving through c. 90°, expanded into a broad lamina, hooded over labellum, with obtuse apex, dark purple, purplish brown or dark grey, sometimes with crimson veining; lateral sepals linear-subulate, to 5 mm long, appressed to labellum, colourless; lateral petals similar, to 3 mm long; labellum longer than dorsal sepal, 15-20 mm long and 10-16 mm wide when flattened; lower portion erect, involute against the dorsal sepal, enclosing the column, two auricles at attachment; upper portion equal to lower, abruptly bent through up to 180°, expanded into orbicular lamina, margins curled inwards, denticulate orifice directed forwards as a split funnel, notched apically; a large convex white or dark blotch or boss in middle of lamina which is dark prune coloured with crimson veins; column stout, c. 2 mm long and wide, wings smaller; stigma reniform, small.—*Corysanthes diemenica* Lindl., *Gen. & Sp. Orchid.Pl.* 393 (1840).

Occurs in N.S.W., Vic., Tas. and S.Aust. (Flinders Ranges, Northern and Southern Lofty and S.E. regions).

Flowers June-Aug.

3. *C. dilatatus* (Rupp & Nicholls) Rupp, *Proc.Linn.Soc.N.S.W.* 53:551 (1928). **Veined helmet orchid**. Plant attaining a height of 1.5-4 cm; leaf orbicular-cordate, apiculate, with tendency to become 3-lobed, frosty on under-surface, usually 1.5-3 cm long, with a circular marginal vein; flower large, 18-20 mm long (without ovary), reddish-purple; ovary terete, 5-6 mm long; dorsal sepal at first erect, then incurved, c. 18 mm long, gradually contracted into rather a long claw, its lamina very blunt, broad and concave, almost horizontal, forming a hood projecting over and beyond the labellum; lateral sepals colourless, linear, acuminate, c. 4 mm long, connate at their bases with each other and also with the petals, directed more or less horizontally forwards; petals wider and shorter; narrow falco-subulate, c. 2 mm long, colourless, frequently bidentate, assuming variable positions but chiefly directed forwards; labellum large, crimson, sessile, its lower half vertical against the dorsal sepal, enclosing the column in a split tube of gradually increasing calibre; upper part acutely recurved, expanded into a trumpet-shaped orifice with more or less denticulate margins and directed forwards; lamina with a large convex smooth white boss in the centre of the reflexed part and a band of short reddish hairs or calli in front of the

boss, the remaining surface quite smooth, at the base the tube dilated at each side of its attachment into a wide auricle, the orifices of which open downwards; column short, not winged, with prominent wide fleshy shield-like base; pollinia attached without a caudicle to a large viscid disk of the rostellum; stigma reniform.—*Corysanthes dilatata* Rupp & Nicholls, *Proc.Linn. Soc.N.S.W.* 53:87 (1928).

Occurs in W.Aust., N.S.W., Vic., Tas. and S.Aust. (Southern Lofty, Kangaroo I. and S.E. regions).

Flowers June-Aug.

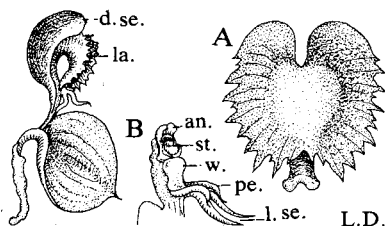


Fig. 383—*Corybas dilatatus*. A, labellum, front; B, column with petals and lateral sepals.

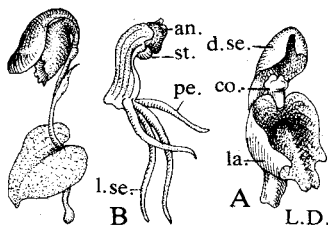


Fig. 384—*Corybas fordhamii*. A, flower, enlarged; B, column with petals and lateral sepals.

4. *C. fordhamii* (Rupp) Rupp, *Victorian Nat.* 59:61 (1942). **Swamp helmet orchid.** A small plant 2-4 cm high; leaf 7-16 mm long and 5-12 mm wide, ovate-cordate; green on both sides, usually on the ground; flower less than 10 mm without ovary, reddish-purple; pedicel 10-12 mm long, reddish-purple to colourless, having a c. 3 mm long sheathing bract in middle; ovary slender, cylindrical, 2-3 mm long; dorsal sepal 13-14 mm long, narrowly cuneate, not abruptly contracted into claw, the narrow lower half gradually curving to c. 90°, lamina ovate-oblong, scarcely exceeding 3 mm at its widest part, deeply hooded, emarginate, reddish-purple from the base to the pallid revolute apex; lateral sepals subulate, 7-8 mm long, appressed to the labellum, colourless or often tinged pale purple; petals similar, 4-5 mm long; labellum shorter than dorsal sepal, usually under 10 mm long on short claw, basal third tubular, dark purple, having two transparent auricles through which the column is visible, lamina reddish, conspicuously striped with dark reddish to purple lines, at first dilated then suddenly contracting to an orifice directed horizontally, having a dark purple striped blotch or boss irregularly fimbriate, directed inward; calli absent; column slender, 3 mm long, bent forwards, obscure wings incurled and almost concealing the stigma; anther obtuse; stigma elliptical.—*Corysanthes fordhamii* Rupp, *Victorian Nat.* 58:83 (1941).

Occurs in Qld, N.S.W., Vic. and S.Aust. (Southern Lofty region).

Flowers July-Sept.; in S.Aust. in Sept.

5. *C. unguiculatus* (R.Br.) Reichb.f., *Beitr.Syst.Pfl.* 43 (1871). **Small helmet orchid.** Not exceeding 3 cm high; leaf ovate-cordate, often with a tendency to become 3-lobed; under-surface generally pale-red streaked with grey, 1-3 cm long; flower sessile, reddish-purple, recurved or reflexed against an ovary c. 5-12 mm long; dorsal sepal reddish-purple, 8-10 mm long, suddenly contracted into a narrow claw c. 5 mm long; claw erect at base, then much incurled; lamina orbicular, concave, c. 5-6 mm diam.; lateral sepals

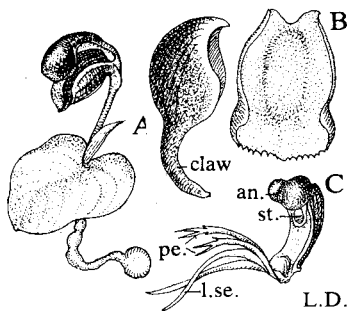


Fig. 385—*Corybas unguiculatus*. A, dorsal sepal; B, labellum, front; C, column with petals and lateral sepals.

colourless, narrow-linear, 4.5-5.5 mm long, spreading below the labellum; petals much shorter, c. 2.5-3 mm long, colourless, very narrow-linear, often chelate, spreading on each side of the labellum; labellum exceeding the dorsal sepal in length; tubular, inflated in the middle line; the orifice oblique, directed downwards and forwards, margins entire or almost so; a longitudinal tract of brush-like linear calli extending almost from the orifice along the middle of the lamina nearly to the extreme base; column very short, incurved, 2-winged; stigma very prominent, large, circular.—*Corysanthes unguiculata*, R.Br., *Prod.Fl.Nov.Holl.* 328 (1810).

Occurs in New Zealand, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty and S.E. regions). Flowers May-Oct., in S.Aust. June-Aug.

7. CRYPTOSTYLIS R.Br.

Prod.Fl.Nov.Holl. 317 (1810).

(Greek *kryptos*, hidden; *stylos*, the column.)

Terrestrial glabrous herbs with tuberous rhizome; leaves few, radical, on rigid petioles, ovate to lanceolate; stems usually with 2 or 3 appressed bracts; flowers with a large reddish-brown, pink, or purple labellum; several in a terminal raceme; flowers large, reversed; perianth-segments free, similar in shape, linear-lanceolate or subulate; labellum much more conspicuously developed and coloured than the petals and sepals, undivided, sessile, the base enclosing the column and more or less contracted above the latter, lamina broad or rather narrow-convex or concave; column wide and exceedingly short, the wings forming distinct auricles or produced posteriorly into a glandular or membranous process with toothed or fimbriate margins behind the anther; anther erect behind the stigma or incumbent over it, sessile, 2-celled, biconvex on the back, blunt or shortly acuminate at the apex; pollinia 4, an upper and a lower mass in each cell, lamellate, ovate, granular; the apices of each pair connected directly with the viscid disk of the rostellum, without the intervention of a caudicle; stigma large and fleshy, its upper border produced into a somewhat triangular rostellum bearing a conspicuous viscid disk. A small genus of 20 species; the 5 Australian being endemic; others are reported from the Malay Archipelago, New Guinea, Taiwan, Philippines, New Caledonia, Fiji, and Samoa.

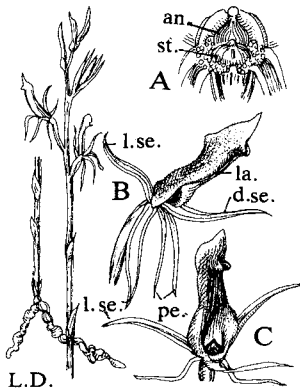


Fig. 386—*Cryptostylis subulata*. A, column, front; B and C, flower, enlarged.

1. *C. subulata* (Labill.) Reichb.f., *Beitr.Syst.Pfl.* 15 (1871). **Large tongue orchid.** Slender, 30-90 cm high; leaves 2 or 3, on petioles 1-9 cm long, lanceolate or oblong-lanceolate, with prominent midrib, 4-15 cm in length and 1-1.5 cm wide; stem-bracts appressed, acute, usually 3; flowers 3-8, sessile, reversed, with large conspicuous yellowish-brown labellum and narrow lighter-coloured perianth-segments; sepals subequal, subulate, c. 20 mm long; petals narrower and much shorter, c. 13 mm long; labellum oblong or oblong-ovate, spreading, c. 25 mm long (extended) and 10 mm in widest part; margins somewhat sinuous towards the base, depressed about the middle, channelled around the tip; lamina concave in the vicinity of the anther, elsewhere convex, traversed in its anterior-half by 2 principal somewhat beaded central raised lines and 2 secondary parallel ones all terminating in a conspicuous reddish-brown bilobed glandular process near the apex, posteriorly a central reddish-brown "guide-line" (not raised) ending below the rostellum with 2 shorter and similar lines on either side of it; column produced laterally and posteriorly into membranous glandular toothed or

fimbriate wings over the back of the anther.—*Malaxia subulata*, Labill., *Nov.Holl.Pl.Sp.* 2:62 (1806); *C. longifolia* R.Br., *Prod.Fl.Nov.Holl.* 317 (1810).

Occurs in Qld, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty and S.E. regions). Flowers Dec.-Jan.

8. DIPODIUM R.Br.

Prod.Fl.Nov.Holl. 330 (1810).

(Greek *dis*, double; *podion*, a little foot; in reference to the 2 stalks, or false-caudicles, of the pollinary apparatus.)

Terrestrial herbs, glabrous, with imbricated sheaths at base of the scape, the upper ones passing into more distant bracts; flowers spotted; perianth-segments free, nearly equal, spreading; labellum sessile, erect, 3-lobed; lateral lobes much shorter than middle one; lamina with a hairy track in middle line; column erect, semi-cylindrical; anther terminal, lid-like, deciduous; pollen-masses 2, waxy, bilobed, attached when mature to the rostellum by a large disk and double stipes produced backwards from the latter. A small genus including about 20 species, 3 of which are endemic to Australia. Others are reported from New Guinea, New Hebrides, Philippines and Malayan Archipelago.

1. *D. punctatum* (Sm.) R.Br., *Prod.Fl. Nov.Holl.* 331 (1810). **Hyacinth (spotted) orchid.** A leafless fleshy plant, 30-75 cm high; with an extensive system of thick elongated tuberous roots; flowers often numerous, large, pink or whitish, spotted, in a loose raceme; perianth-segments free, similar, oblong-lanceolate, recurved or spreading; sepals c. 17 mm long, the petals rather shorter; labellum sessile, erect, c. 13 mm long, 3-lobed, the lateral lobes much shorter than the middle one; lamina with 2 short raised lines from a little below the centre, uniting to form a hairy keel ending in a woolly patch near the apex; column about half as long as labellum; anther hemispherical, lid-like, 2-celled; pollinia 2, bilobed, waxy, attached to a double stipes of the viscid disk; stigma deeply excavated, transversely oval, just below the rostellum. —*Dendrobium punctatum* Sm., *Exot.Bot.* 1:21 (1804).

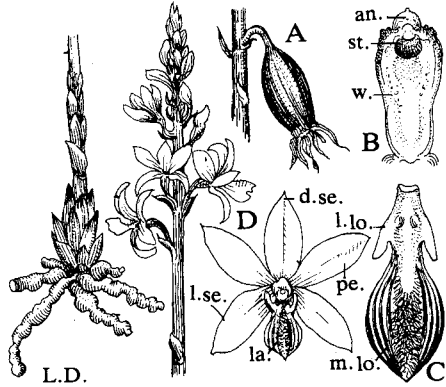


Fig. 387—*Dipodium punctatum*. A, capsule; B, column, front; C, labellum, surface; D, flower.

Occurs in N.T., Qld, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty and S.E. regions). Flowers Dec.-April.

9. DIURIS Sm.

Trans.Linn.Soc. 4:222 (1798).

(Greek *dis*, two; *oura*, a tail; referring to the lateral sepals.)

Terrestrial glabrous plants with underground tubers and several imbricate scales at base of the scape; leaves more than one, generally several, narrow, at or near the base, with a few stem-bracts higher up; flowers 1, 2, or more, in a terminal raceme, rather large and conspicuous, yellow, purple, or white, often spotted or blotched with dark-brown or purple; dorsal sepal erect or slightly recurved at the apex, more or less ovate, its tip blunt and its base clasping the column; lateral sepals narrow-linear, often herbaceous, spreading or deflexed, parallel or crossed, exceeding the dorsal sepal in length; petals longer than the dorsal sepal, oval, elliptical or orbicular, on slender stalks, erect or spreading; labellum usually as long as or longer than the dorsal sepal, deeply 3-lobed; the middle lobe much contracted at the base, with 1 or 2 raised longitudinal lines along the narrow part; column very short, the sexual elements arising separately from the floral receptacle, at first quite separate, but united as the flower approaches

maturity by an adhesion between the pollen-masses and the viscid disk of the rostellum; anther erect, 2-celled, on a very short filament, margins of the filament produced into erect lateral lobes or wings not adnate to the stigmatic-plate; stigma borne on a widened style or "plate" in front of the anther, a slot in its upper border representing the rostellum and likewise enclosing the loose viscid disk, the latter attached at maturity to the apices of the pollinia without intervention of a caudicle; pollinia 2, each deeply bilobed, suspended behind the stigma from the back of the viscid disk; pollen-masses mealy. Endemic to Australia except for 1 representative in Java; c. 45 species. Occurring in all States except N.T.

1. Dorsal sepal and petals without spots or blotches (clear canary to chrome, rarely orange-yellow), but sometimes with a few brown streaks towards their claws.
 2. Dorsal sepal 9-nerved, petals 7-nerved; petals and labellum less than 15 mm long; flowers not nodding *D. fastidiosa* 1.
 2. Nerves on dorsal sepal and petals inconspicuous; petals and labellum 15-20 mm long; flowers often nodding *D. pedunculata* 6.
 1. Dorsal sepal and/or petals normally spotted with conspicuous dark-brown or purple-brown markings or blotches.
 3. Lateral lobes of labellum large, as long or nearly as long as middle one.
 4. Lateral sepals greatly exceeding petals in length, often nearly twice as long; leaves 6 or more, setaceous or almost so *D. palustris* 5.
 4. Lateral sepals shorter than, or approximately equal in length to the petals; leaves not setaceous.
 5. Lateral sepals crossed; blotches generally distinctly demarcated from the yellow ground-colour; 2 longitudinal raised lines at base of labellum *D. maculata* 3.
 5. Lateral sepals nearly parallel; flowers wall-flower colour, dark blotches merging into yellow ground-colour; 1 raised line at base of labellum *D. longifolia* 2.
 3. Lateral lobes of labellum very much shorter than the middle one.
 6. One longitudinal raised line along base of labellum *D. sulphurea* var. *sulphurea* 7.
 6. Two longitudinal raised lines along the base of labellum.
 7. Dorsal sepal with small dots and shorter markings; labellum usually emarginate to obtuse; leaves to 17 cm long *D. palachila* 4.
 7. Dorsal sepal with 2 conspicuous brown dots at the base of lamina; labellum acute, basally the lines surrounded in front and on both sides by a conspicuous dark-brown border; leaves 7-12 cm long *D. sulphurea* var. *brevifolia* 7.
1. *D. fastidiosa* R. S. Rogers, *Trans.R.Soc.S.Aust.* 51:6 (1927). A small, very slender species 5-20 cm high; leaves usually 7-8, setaceous, about half the height of the scape, slightly twisted; stem glabrous, with 2 bracts, one loose, elongated, subulate, the upper short, closely sheathing; flowers 1-3, racemose on long slender pedicels; bracts loose, subulate, exceeding the pedicels;

ovary narrow-elongate; dorsal sepal more or less oval, c. 11 mm long and 6 mm wide, yellow with dark-brown markings in the lower half, erect, subacute, recurved at the apex, clasping the column at the base, 9-nerved; lateral sepals linear, parallel, c. 17 mm long, greenish, spreading, channelled above; petals markedly stipitate, c. 13 mm long, lamina yellow, 7-nerved, claw dark-brown, c. 4 mm long; labellum 10-12 mm long, vertical or sub-vertical, with irregular brown blotches or markings, trilobed, the divisions well above base, lateral lobes oblong, blunt, slightly dentate on the outer margins, c. 6 mm long, slightly exceeding half the length of the labellum, mid-lobe obtuse, spatulate, narrowing posteriorly between the lateral lobes into a claw, margins entire, lamina with 2 pubescent raised parallel lines on the claw, succeeded by a single keel to the apex; anther blunt, equalling in height the rostellum and lateral appendages; lateral appendages membranous, wide with irregular borders and long subulate apex.

Known only from Tottenham, Vic., and Alligator Gorge, Flinders Ranges region, S.Aust.

Flowers Aug.-Sept.

It is believed to be a natural hybrid between *D. palustris* and *D. pedunculata*.

2. *D. longifolia* R. Br., *Prod. Fl. Nov. Holl.* 316 (1810). **Wall-flower orchid, donkey orchid.** Stoutier than most other members of the genus, 10-45 cm high; leaves 2 or 3, linear or lanceolate, acute, channelled, usually of unequal length, 7-20 cm long, 4-12 mm wide; flowers large, sometimes solitary, more often 2-5 on slender pedicels in a loose raceme, yellow and brown, the two colours suffusing into each other as in the wall-flower; dorsal sepal much shorter than the other segments, very broad and rounded, c. 10 mm long; lateral sepals green, linear, rather stout, spreading horizontally, with blunt oblique points, usually parallel but occasionally crossed, 18-19 mm long; petals stalked, recurved or spreading; the claw c. 4 mm long; the lamina oval or elliptical, c. 16 mm long; labellum c. 10 mm long, dark-brown and yellow blended; lateral lobes nearly as long as the mid-lobe, wide, obtuse, margins entire, the anterior rounded, recurved, c. 10 mm long (from base of labellum); middle lobe about the same length or a little longer, its anterior border rounded and retuse; lamina with a single (very rarely double) raised line at its extreme base merging into a central keel extending to the tip; anther without a point, about the same height as the viscid disk of the rostellum; lateral appendages about the same height, linear-falcate, with an irregular upper border.

Occurs in all States except N.T. and Qld; in S.Aust. Eyre Pen., Yorke Pen., Southern Lofty, Kangaroo I. and S.E. regions.

Flowers July-Nov.

Apparent hybrids have been observed with *D. maculata*, *D. palustris* and *D. pedunculata*.

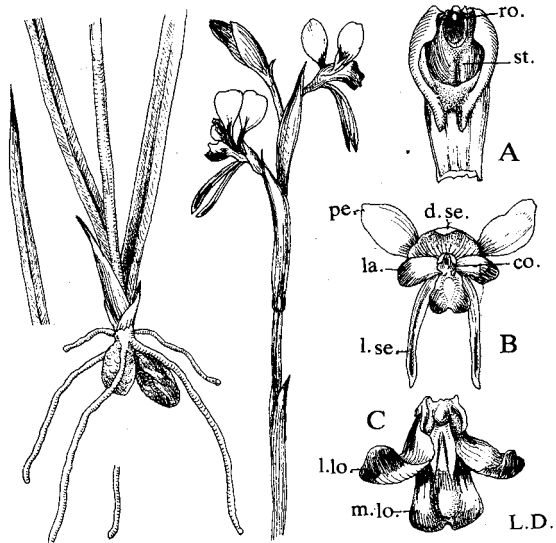


Fig. 388—*Diuris longifolia*. A, stigmatic plate; B, flower, enlarged; C, labellum.

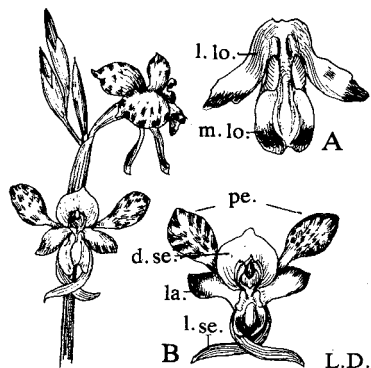


Fig. 389—*Diuris maculata*. A, labellum; B, flower, enlarged.

anterior margins, as long as mid-lobe; mid-lobe obtusate with widely retuse truncate tip; lamina with 2 rather widely separated fleshy prominent raised lines ending about the middle in 2 acute teeth; anther with very short point, about as high as the viscid disk.

Occurs in Qld, N.S.W., Vic., Tas. and S.Aust. (Eyre Pen., Northern Lofty, Murray, Southern Lofty and S.E. regions).

Flowers July-Nov.

Apparent hybrids have been observed with *D. longifolia* and *D. palustris*.

Hybridisation with *D. pedunculata* was recorded by R. S. Rogers in *Trans.R.Soc.S.Aust.* 31:209 (1907).

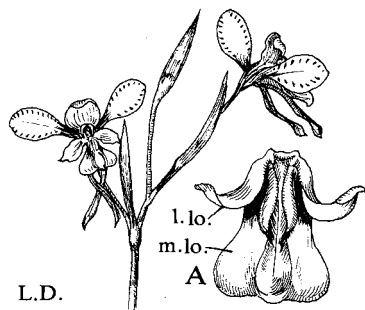


Fig. 390—*Diuris palachila*. A, labellum.

3. *D. maculata* Sm., *Exot.Bot.* 1:57 (1804).

Leopard orchid. Moderately slender, seldom exceeding 30 cm high; leaves 2 or 3, narrow-lanceolate, channelled, rarely exceeding 10 cm long; flowers 2-6, on rather slender pedicels in a flexuose raceme, yellow, much blotched with dark-brown, the latter colour rather distinctly demarcated from the ground yellow and not merging into it, the undersurface of the perianth more blotched than the upper; dorsal sepal more or less ovate, margins irregularly sinuous, apex bent forward, c. 9 mm long; lateral sepals rather stoutly linear with oblique points, greenish, recurved and crossed in the mature flower, c. 11.5 mm long; petals with a total length of 15mm, the stalk linear, dark-brown, reflexed, c. 6 mm, lamina orbicular or almost so, spreading, upper surface yellow, lower surface much blotched with dark-brown; labellum shorter than dorsal sepal, c. 6 mm long; lateral lobes upturned with wide crescentic crenate recurved

4. *D. palachila* R. S. Rogers, *Trans.R.Soc.S.Aust.* 31:209 (1907). **Broad tip diuris.** Slender, glabrous, 10-40 cm high; leaves 2-5, narrow-linear or linear, somewhat lax, often reaching a length of 17 cm; flowers 1-3 on long and slender pedicels, yellow with brown markings; dorsal sepal c. 11 mm long, yellow, usually with brown blotchings or dots chiefly on the outer surface near the base and around the margins; lateral sepals 10-15 mm long, green, linear, acuminate, spreading below the labellum, parallel or more rarely crossed, petals of similar colour and markings to the dorsal sepal; stalk greenish-brown, 4-5 mm long, lamina elliptical, c. 10.5 mm long, spreading; labellum c.11 mm long, yellow with dark-brown dots, short linear splashes and blotches especially on its lower surface; lateral lobes c. 6.5 mm long (rather more than half the length of the mid-lobe), narrow-lanceolate with upturned dentate margins and outwardly curved free

ends; mid-lobe spade- or shovel-shaped, apex crescentic; lamina with 2 widely separated raised longitudinal lines on the narrow base, ending abruptly in 2 teeth at the expanded part, thereafter merged into a central keel extending to the apex; anther as high as viscid disk of rostellum, rather flat with a very short point; lateral appendages of the column as high as the anther, oblong-falcate, anterior margins dentate.

Occurs in N.S.W., Vic., Tas. and S.Aust. in the Southern Lofty region.

Flowers Aug.-Nov.

It was suggested by Rogers (l.c.), that this species is a natural hybrid between *D. maculata* and *D. pedunculata*, but he was of the opinion that it is a distinct and well-marked form, appearing regularly in considerable numbers. The inconsistency in size and shape of perianth-segments, including labellum, makes it difficult to distinguish from *D. brevissima* Fitzg.

5. *D. palustris* Lindl., *Gen. & Sp. Orchid. Pl.* 507 (1840). **Swamp diuris**. Small, glabrous, c. 10 cm high, seldom exceeding 18 cm; leaves 8-10, erect, usually more than half the length of scape, channelled, setaceous and twisted or very narrow-linear; flowers rather small, 1-4 on long slender pedicels, yellow blotched with dark-brown, the dark colour prevailing on the outside; pervaded by faint odour of spice or nutmeg; dorsal sepal ovate, c. 8.5 mm long, recurved in the upper half, purple or dark-brown behind the anther, yellowish beyond this, lateral sepals c. 16 mm long; green, free, linear, parallel, spreading below the labellum; petals stalked, more than about half as long as lateral sepals; the pedicel purplish, narrow-linear, c. 4 mm long; the lamina yellow, oval, emarginate at the tip, recurved, c. 6 mm long and 4.5 mm wide; labellum lobes erect, c. 4.5 mm long, oblong with rounded crenate anterior margins, margins otherwise entire, yellow on inner surface, much blotched outside; mid-lobe oblong, lamina with 2 thick, fleshy longitudinal raised lines from the base to beyond the middle, thereafter merging into a single short raised line dilating at the anterior margin into a rounded emarginate eminence; dark-brown spots at end of the 2 raised lines and also at the tip; anther blunt, rather narrow, a little higher than the rostellum.

Occurs in Vic., Tas. and S.Aust. (Flinders Ranges, Northern Lofty, Murray, Yorke Pen., Southern Lofty and S.E. regions).

Flowers Aug.-Oct.

Apparent hybrids have been observed with *D. maculata*, *D. longifolia* and *D. pedunculata*.

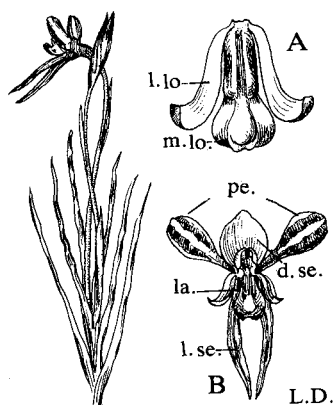


Fig. 391—*Diuris palustris*. A, labellum; B, flower, enlarged, front.

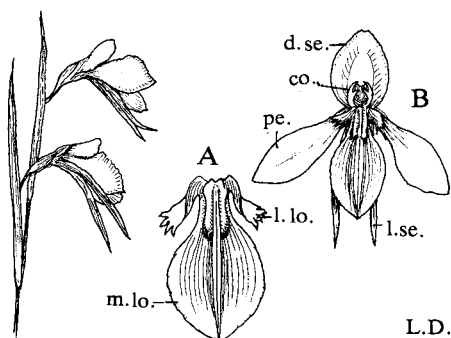


Fig. 392—*Diuris pedunculata*. A, labellum; B, flower, enlarged, front.

6. *D. pedunculata* R. Br., *Prod. Fl. Nov. Holl.* 316 (1810). **Golden moths, snake orchid**. Slender, glabrous, usually 20-40 cm high; leaves generally 5-7, linear, 10-15 cm long; flowers large, solitary, or 2-4 on very slender pedicels, racemose, canary-yellow, with brown or greenish-brown

tinges on the outer surface of the perianth-segments and labellum at the base; dorsal sepal c. 14 mm long, yellow, broadly ovate, erect, much shorter than the other segments of the perianth, also shorter than the labellum, lateral sepals 20-23 mm long, free, green, linear-lanceolate, channelled on the inner side, spreading below the labellum; petals 16-17 mm long, spreading in the mature flower; with yellow elliptical lamina, the stalks green, linear, c. 6 mm long; labellum yellow, c. 18 mm long and 12 mm wide, almost flat in mature flower, tip very blunt, spreading; lateral lobes narrow falco-lanceolate, toothed on their outer margins, 6-7 mm long, recurved outwards; mid-lobe on a contracted base, ovate-rhomboid, about 3 times as long as the lateral ones; the lamina with 2 raised rather widely separated pubescent longitudinal lines on the base, the lines often laminate, ending dentately a little beyond the contracted part, then continued as a single line or fold towards the tip; anther flat or almost so, shorter than the viscid disk; lateral appendages narrowly ovate-lanceolate, very acuminate, margins slightly toothed, same height as anther.

Occurs in Qld, N.S.W., Vic., Tas. and S.Aust. (Flinders Ranges, Northern and Southern Lofty and S.E. regions).

Flowers Sept.-Oct.

Apparent hybrids have been observed with *D. longifolia* and *D. palustris*.

Hybridisation with *D. maculata* was recorded by R. S. Rogers in *Trans.R.Soc.S.Aust.* 31:209 (1907).

***D. punctata* Sm., *Exot.Bot.* 1:13 (1804). Purple diuris.** Flowers not blotched or spotted, purple, lilac or white (drying yellowish-brown), lateral sepals greatly exceeding petals, c. 5 cm long; lateral lobes of labellum much shorter than mid-lobe.—*D. elongata* Sw., *J.Bot.(Schrader)* 1:59 (1805).

Occurs in Qld, N.S.W., Vic. and S.Aust. (Dingley Dell, S.E. region, in Oct. 1909). Now considered to be extinct in S.Aust.

7. ***D. sulphurea* R.Br., *Prod.Fl.Nov.Holl.* 316 (1810).** Plant 15-50 cm high; leaves linear or setaceous, flowers solitary or up to 6 in a loose and slender raceme; dorsal sepal ovate, recurved, with a dark-brown spot on each side of the lower surface near the base; lateral sepals spreading, linear, acuminate, green; petals on brown stalk 4-5 mm long, spreading, lamina elliptical, yellow; labellum sessile, trapezoid, lateral lobes up to about half as long as central lobe, generally c. 5 mm long, not very wide, middle lobe rhombo-cuneate; anther hardly pointed, its apex as high as the viscid disk of the rostellum; lateral appendages of column prominent, a little higher than the viscid disk, incurved.

1. One longitudinal raised line along the base of the labellum var. *sulphurea* 1.
1. Two raised longitudinal lines along the base of the labellum var. *brevifolia* 2.

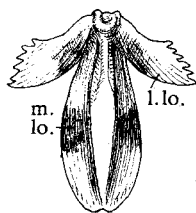


Fig. 393—*Diuris sulphurea* var. *sulphurea*, labellum, surface.

1. **Var. *sulphurea*. Tiger (hornet) orchid.** A stout plant often 50 cm high; leaves 2 or rarely 3, much exceeding the middle of the stem, 18-45 cm long, lax, channelled, never setaceous; flowers large, often to 5 cm in the long diameter; dorsal sepal c. 20 mm long; lateral sepals c. 22 mm long, usually parallel, but sometimes crossed; petals 20-21 mm long; labellum much shorter than dorsal sepal, 12-15 mm long, lateral lobes rather wide and blunt, obovate, middle lobe wide, depressed on each side of the central ridge; lamina with a transverse blotch near the apex, and with a single conspicuous raised longitudinal ridge from the base to just beyond the middle, where it merges into the fold of the lobe; lateral appendages of column semi-ovate.

Occurs in Qld, N.S.W., Vic., Tas. and S.Aust. (S.E. region).

Flowers Aug.-Nov.

2. Var. **brevifolia** (R. S. Rogers) J. Z. Weber & R. Bates, comb.nov. Plant slender, 15-40 cm high; leaves generally 4-8, not twisted, very erect, 7-12 cm long, rarely reaching beyond the middle of the stem; dorsal sepal c. 11 mm long, lateral sepals 15-23 mm long, parallel, or slightly recurved; petals c. 14 mm long, recurved, lamina canary yellow, c. 12 mm long; labellum yellow, at least as long as the dorsal sepal and generally longer, lateral lobes generally 5-7 mm long, rather narrow, margins entire, tips recurved, middle lobe with depressed antero-lateral margins, lamina with 2 parallel raised lines on the basal half continuous with the anterior central keel, the lines surrounded in front and on both sides by a conspicuous dark-brown border; lateral appendages of column linear-falcate.—*D. brevifolia* R. S. Rogers, *Trans.R.Soc. S.Aust.* 46:148 (1922).

Occurs in coastal regions of N.S.W. and S.Aust. (Southern Lofly and Kangaroo I.).

Flowers Nov.-Dec.

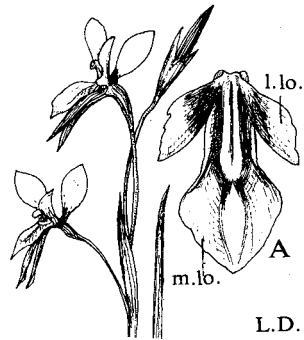


Fig. 394—*Diuris sulphurea* var. *brevifolia*. A, labellum, surface.

10. ERIOCHILUS R. Br.

Prod.Fl.Nov.Holl. 323 (1810).

(Greek *erion*, wool; *cheilos*, a lip.)

Terrestrial glandular pubescent or hairy (rarely glabrous) herbs, originating from more or less globular underground tubers; leaf glabrous, solitary, at the base or nearer the middle of the stem, ovate or lanceolate; flowers pink or white, 1 or 2, more rarely multi-flowered in a spike or raceme, each subtended by a short loose ovate bract; no empty stem-bracts above the leaf; dorsal sepal erect, slightly incurved, concave; lateral sepals longer, spreading, elliptical, contracted into a distinct narrow stipes; petals nearly as long as dorsal sepal, usually narrower, erect or slightly spreading; labellum much shorter, sessile, on a long erect narrow-oblong base, the margins often produced into erect lateral lobes; expanded and much recurved above, the terminal part very convex, entire, glandular-villous; column erect, elongate, narrowly winged; anther erect, blunt, valvate, 2-celled; outer valves large, folded over and concealing the small inner valves; pollinia 8, waxy or granular, 4 pyriform masses in each cell united below into a short acute common apex adherent on each side to a small viscid disk; the 2 disks situated close together on the upper border of the stigma. A small genus with 5 known species confined to Australia.

1. ***E. cucullatus*** (Labill.) Reichb.f., *Beitr.Syst.Pfl.* 27 (1871). **Parson's bands.** Slender, 7-22 cm high, with the characters of the genus; leaf radical, ovate, acute, often small at time of flowering, continuing to develop in size thereafter; flowers 1-3, pink and white; dorsal sepal erect, 7-8 mm long, spatulate, green or greenish-brown; lateral sepals 12-13 mm long, white, elliptical-lanceolate; petals erect, linear-falcate; labellum about as long as petals, the erect part glabrous, often with minute lateral lobes; the recurved part much wider, ovate, with

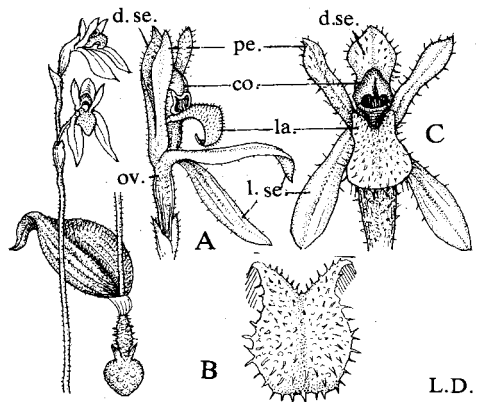


Fig. 395—*Eriochilus cucullatus*. A, flower, side; B, labellum, front; C, flower, front.

transverse ridges or reddish hairs; column c. 5.7 mm, with narrow wings below the stigma; pollinia 8, lamellate, hard and waxy; an anterior and posterior pair in each anther-cell, the 2 pairs united by their apices into a common sharp point (or false-caudicle) which is adherent to the viscid disk on its own side of the anther-septum; stigma rectangular or semi-circular, very prominent and concave, situated just below the anther, with 2 viscid disks on its upper border and close together on each side of the middle line; no definite rostellum.—*Epipactis cucullata* Labill., *Nov.Holl.Pl.Sp.* 2:61 (1806); *Eriochilus autumnalis* R.Br., *Prod.Fl.Nov.Holl.* 323 (1810).

Occurs in all Australian States except W.Aust. and N.T.; in S.Aust. (Flinders Ranges, Eyre Pen., Yorke Pen., Southern Lofty, Kangaroo I. and S.E. regions).

Flowers March-May.

11. GASTRODIA R. Br.

Prod.Fl.Nov.Holl. 330 (1810).

(From Greek *gastrodes*, pot-bellied; alluding to the shape of the flower.)

Plants terrestrial, leafless, saprophytic, lacking chlorophyll; rhizome elongated, sympodially branched, mycorrhizal, bulky and filled with starch, nodes bearing remnants of scale leaves; leaves represented on erect stem only by short sheathing scales; raceme loose, of few to many pedicellate flowers; floral bracts short, scarious; perianth tubular with 5 fleshy lobes, slightly split between the lateral sepals which stand uppermost; tube gibbous beneath labellum; petal lobes small and just within mouth of tube; labellum included, adnate to gibbous part of tube, its free portion oblong with submedian longitudinal calli and undulate margins; column erect, elongated, narrowly winged; anther terminal, bending forward, shortly stalked, the cells contiguous; pollinia 4 in angular granules; stigma in a depression at extreme base of the column. About 16 species distributed from northern India to Japan and southwards through Malaysia, Indonesia, New Guinea to New Zealand. 2 species occur in Australia, 1 endemic.

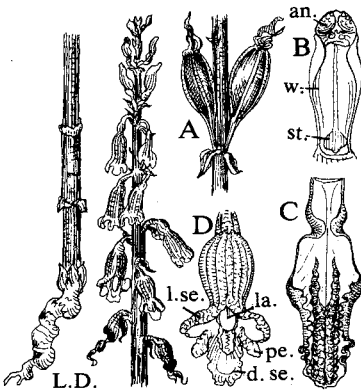


Fig. 396—*Gastrodia sesamoides*. A, capsules; B, column, front; C, labellum, surface; D, flower, enlarged.

1. *G. sesamoides* R.Br., *Prod.Fl.Nov.Holl.* 330 (1810). **Cinnamon bells, (potato orchid).** Plant slender to moderately robust; rhizomes tuberous, thick, fleshy, succulent, scaly; rhizomes tuberous, to 8 cm long and 3 cm across; stem erect, dark-brown, 30-80 cm high and 2-7 mm diam.; sheathing scales, loose and very obtuse, shortly acute, sometimes acuminate, c.1 cm long, crowded at the base, distant higher up; raceme 3-20 cm long, few-to many-flowered, erect first then drooping to bring dorsal sepal next to axis; bracts subtending pedicels as long as or slightly longer than them; pedicels 3-10 mm long; ovary comparatively small; flowers bell-shaped, brown, white towards the apices, reversed, exterior surface often very rough, 13-20 mm long and 4-9 mm diam.; lobes slightly thickened marginally; lateral sepals connate almost to level of labellum-tip; dorsal sepal and petals united, their apices free, the dorsal sepal sometimes a little longer than the other segments; labellum mobile on a broad claw, which is adnate to the basal projection of the lateral sepals, shorter than the rest of the

perianth, ovate-oblong, somewhat obscurely trilobed, lateral lobes very small, the margins upturned and undulate or lacerate, apex of mid-lobe truncate, lamina suffused with yellow or orange, long median calli much crested, extending from the apex to about the middle of the lamina, then divided into two prominent divergent ridges which continue obscurely towards base;

column almost as long as labellum, slender, erect, very narrowly winged throughout, traversed by a wide canal, with a small angular, viscid stigma at the base, anther short, hemispherical, operculate, filament smooth; pollinia in 2 pairs, very granular, united by mucus at their apices; capsule large, obovoid-turbinate.

Occurs in all Australian States except N.T., also in New Zealand; recorded in S.Aust. from the Southern Lofty, Kangaroo I. and S.E. regions.

Flowers Sept.-Feb., in S.Aust. Oct.-Dec.

12. GLOSSODIA R. Br.

Prod.Fl.Nov.Holl. 325 (1810).

(Greek *glossodes*, tongue-shaped.)

Terrestrial herbs, more or less hairy, growing from small underground tubers; leaf solitary, radical, oblong or lanceolate, from within a scariosus sheath close to the ground; flowers 1 or 2, blue or purple, on an erect scape with a sheathing bract at or near the middle and a similar bract under each pedicel; perianth-segments nearly equal, spreading; labellum sessile, undivided, margin entire, its lamina without glands, calli, or plates, but at its base 2 (sometimes fused) linear clubbed calli or appendages erect against the column, and from half to nearly its whole length; column erect, incurved, 2-winged; anther erect, 2-celled, the outer valves broad, the inner much smaller, the connective produced into a small point; pollinia 4, lamellar, unconnected with the rostellum, granular. A small genus of 2 known species endemic to Australia.

1. *G. major* R.Br., *Prod.Fl.Nov.Holl.* 326 (1810). **Wax-lip orchid.** Slender, hairy, 10-25 cm high; leaf solitary, hairy, oblong or oblong-lanceolate, 3-7 cm long; flowers 1 or 2, usually purple, rarely white; perianth-segments all spreading, subequal, 20-25 mm long, 6-10 mm wide, their bases white with purple dots, elliptic-lanceolate, not very acute, outer surface light-coloured and glandular-hairy; labellum sessile with a contracted base, ovate-lanceolate, 10-11 mm long and 5 mm wide, the posterior part white and pubescent, at first erect, but soon recurved forward, dilated laterally into 2 convexities or bosses with a furrow between them; the anterior half purple, glabrous, margins entire; a large purple sigmoid linear appendage with a broad fleshy-yellow bilobed head at the extreme base erect against the column; column erect in its lower part, incurved above, 9-10 mm long; broadly winged, especially in its upper part; anther with acute point.

Occurs in Qld, N.S.W., Vic., Tas. and S.Aust. (Northern Lofty, Southern Lofty and S.E. regions).

Flowers Sept.-Oct.

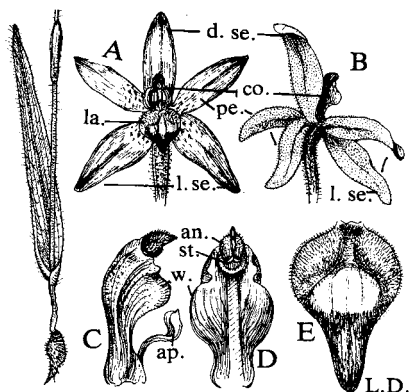


Fig. 397—*Glossodia major*. A, flower, front; B, flower, side; C, column, side; D, column, front; E, labellum surface.

13. LEPORELLA George

Nuytsia 1:183 (1971).

(Latin *lepus*, a hare; in reference to the vernacular name.)

Terrestrial glabrous herbs, originating from a rounded tuber with fibrous roots; leaf basal, solitary (rarely 2), sessile, sheathing, ovate, oblong or broadly lanceolate, often small at the time of flowering, increasing in size thereafter and developing marked parallel veins; dorsal sepal

wide, erect, incurved, acute, concave, contracted gradually towards the base; lateral sepals about equal in length, acute, very narrow, deflexed against the ovary; petals rather longer, erect, pointed, linear-clavate, the clubbed part very glandular; labellum on a short movable claw, much wider than long, obscurely 3-lobed; the lateral lobes large and dome-shaped, fringed or deeply combed anteriorly, with pubescent spots on their upper convex surface; the middle lobe much smaller, rounded, not recurved, less deeply combed, its upper surface smooth or almost so; column incurved, rather widely winged; anther bent forward, 2-celled, valvate; pollinia 4, in 2 pairs, lamellate; stigma triangular, its apex deeply sunk between the divergent lobes of the anther; rostellum poorly developed; no viscid disk or caudicle. Peculiar to Australia and monotypic, but closely allied to *Caladenia menziesii* and the genus *Eriochilus*, which have been included under *Leptoceras* by some botanists. On the other hand the single member of this genus is commonly placed under *Caladenia* and was so included by Bentham.

1. *L. fimbriata* (Lindl.) George, *Nuytsia* 1(2): 183 (1971). **Fringed hare orchid.** Very slender, 15-20 cm high; flowers 1-3, reddish or yellowish-brown, on slender pedicels, a floral rudiment included within the uppermost flower bract; dorsal sepal c. 9 mm long; petals longer than the other segments, c. 11 mm; labellum greenish, with reddish-brown pubescent spots, c. 9 mm wide and 5 mm long; column 6-6.5 mm—*Leptoceras fimbriata* Lindl., *Sketch Veg. Swan Riv. Col.* 53 (1840); *Caladenia fimbriata* (Lindl.) Reichb.f., *Beitr. Syst. Pfl.* 65 (1871); *Eriochilus fimbriatus* (Lindl.) F. Muell., *Wing's South Sci. Rec.* 2:152 (1882).

Occurs in W.Aust., Vic. and S.Aust. (Southern Lofty, Kangaroo I. and S.E. regions).

Flowers April-July.

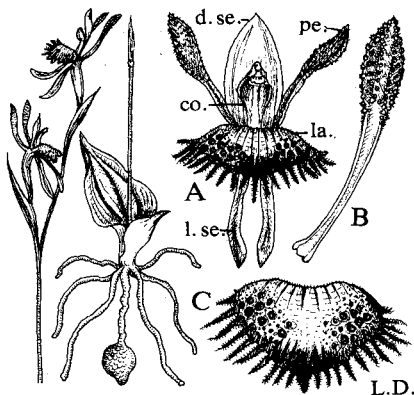


Fig. 398—*Leporella fimbriata*. A, flower, front, enlarged; B, petal, tip; C, labellum, front.

14. LYPERANTHUS R. Br.

Prod. Fl. Nov. Holl. 325 (1810).

(Greek *lypēros*, mournful; *anthos*, flower; referring to the gloomy colour.)

Terrestrial glabrous herbs, sometimes drying black, with small underground tubers; leaves 1-3, usually at or near the base, broad and thick or long and narrow; bracts often large and leaf-like; dorsal sepal usually broad, erect, or incurved over the column; other segments narrow, erect or spreading, about equal in length to the dorsal sepal; labellum much shorter, undivided or 3-lobed; lamina more or less papillose, sometimes bearing raised longitudinal lines; column erect, incurved, more or less winged, as long or nearly as long as the labellum; anther terminal, 2-celled; pollinia 4, or a bilobed mass in each cell, granular or mealy. A small genus comprising 12 species 5 of which are endemic to Australia, 1 to New Zealand and 6 to New Caledonia.

1. *L. nigricans* R. Br., *Prod. Fl. Nov. Holl.* 325 (1810). **Red-beak orchid.** A stout plant, 10-30 cm high, drying black; leaf radical, orbicular-cordate or broadly ovate-cordate, fleshy, of variable size, sometimes 10 cm long; stem-bracts usually 2, loose sheathing, leaf-like, rather blunt, often 3-4 cm long; flowers large, 2-8, purple or with dark-purple stripes; ovary and pedicel included in a capacious bract which also envelopes the perianth; dorsal sepal usually light-coloured with purple stripes, broadly lanceolate, much incurved, often 25 mm long; lateral sepals spreading or deflexed, dark-purple, linear, free, same length as the dorsal one; petals similar to lateral sepals, but recurved or spreading; labellum lighter-coloured with purple veins and dark tip, sessile, obovate-lanceolate, c. 15 mm long, 3-lobed; lateral lobes erect, clasping column; the middle one with rather blunt tip, much recurved, fringed or deeply denticulate; lamina with a wide smooth longitudinal raised line or band between the lateral lobes; a few minute sessile white calli

distributed towards the tip and lateral margins; apex with a few similar calli on the under-surface; column at first erect, then incurved, c. 12 mm long, very narrowly winged; anther terminal, incumbent, with a rather blunt fleshy point; pollinia 2, elongated, each bilobed, very powdery, no attachment by caudicle or otherwise to rostellum; stigma very prominent, circular or lobulate, its upper margin thickened into a convex rostellum in close contact with the bases of the pollinia.

Occurs in W.Aust., N.S.W., Vic., Tas. and S.Aust. (Eyre Pen., Yorke Pen., Murray, Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Sept.-Oct.

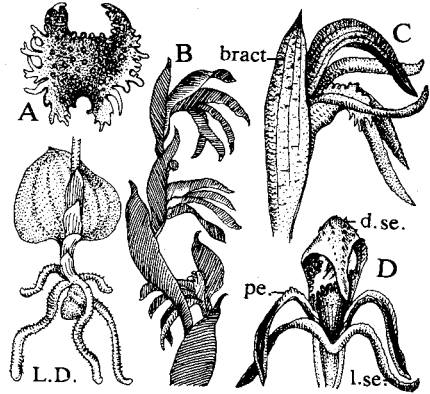


Fig. 399—*Lyperanthus nigricans*. A, labellum, front; B, dried specimen; C, flower, side; D, flower, front.

15. *MICROTIS* R. Br.

Prod.Fl.Nov.Holl. 320 (1810).

(Greek *mikros*, small; *ōtos*, an ear.)

Terrestrial glabrous herbs; underground tuber globose to oval, often produced some distance from parent plant; leaf solitary; sheath long; lamina elongate and terete, more or less hollow; raceme of few to many small flowers; floral bracts small, acute, hardly exceeding short pedicels; perianth glabrous, usually green; dorsal sepal broad and concave, erect; lateral sepals almost equal in length but very much narrower, spreading or recurved, not connate; petals shorter or nearly equal in length to sepals, more or less erect, incurved or spreading; labellum sessile, about as long as other perianth-segments, oblong to ovate or orbicular, truncate or emarginate, usually more or less pendulous; calli usually paired at the base, median and single along the centre and near tip, or quite smooth; column very short or relatively wide with membranous obtuse auricle-like wings, attached to about mid-anther level; anther terminal, erect, almost entirely above stigma, more or less hemispherical, two-celled; pollinia obscurely bilobed, pollen granular; caudicle often very short or absent; stigma broadly oval, slightly prominent; rostellum dark, its oval tip becoming detached, with a very short threadlike stipe to which loosely coherent pollen masses adhere. About 14 species occurring in Australia, mostly south of the tropics, a few of which extend to New Zealand, New Caledonia, Indonesia, the Philippines, Taiwan, China and Japan.

1. Labellum entire, smooth, lacking callosities; lateral sepals spreading not recurved or revolute in the mature flowers.
2. Plant to 10 cm high; labellum oblong to rhomboid; lateral sepals very blunt, not hidden by labellum *M. atrata* 1.
2. Plant over 12 cm high; labellum orbicular to broadly elliptic; lateral sepals acute or linear, hidden by labellum *M. orbicularis* 3.
1. Labellum with callosities; lateral sepals recurved or revolute in the mature flowers.
3. Labellum blunt and entire with two callosities at the base and none near the apex *M. parviflora* 4.
3. Labellum emarginate or crenulate with two callosities near the base and apically.
4. Labellum crenulate, two large callosities at the base, apical callosity prominent *M. oblonga* 2.
4. Labellum with crisped margins, a large callosity occupying upper half, basal callosities squarish and not so prominent *M. unifolia* 5.

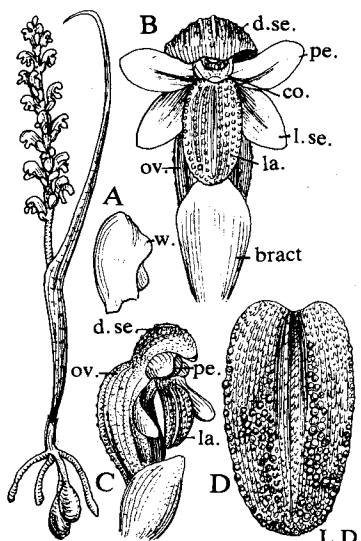


Fig. 400—*Microtis atrata*. A, column, side; B, flower, front; C, flower, side; D, labellum, surface.

1. *M. atrata* Lindl., *Sketch Veg. Swan Riv. Col.* 54 (1840). **Yellow onion-orchid.** A minute species, 3-9 cm high; leaf-fistula close to the inflorescence, lamina exceeding the latter in length; the whole of the living plant including the flowers a yellowish-green colour; flowers very minute in a somewhat dense spike 1-3 cm long; ovary tumid, sessile; dorsal sepal very obtuse, widely galeate, c. 1 mm long; lateral sepals oblong, blunt, spreading but not recurved, nearly as long as the dorsal sepal; petals rather shorter than lateral sepals but similar, spreading or reflexed; the tip quite blunt; margins entire; lamina with 2 longitudinal lines, no callosities; column c. 0.8 mm high, rather rugose and glandular; anther hemispherical, 2-celled; auricles fairly long; pollinia 2, each bilobed, connected directly with viscid disk; no caudicle; stigma semilunar; rostellum showing as a dark-green dot in upper border.—*M. minutiflora* F. Muell., *Fragm. Phyt. Aust.* 1:90 (1858).

Occurs in W.Aust., Vic., Tas. and S.Aust. (Southern Lofty and S.E. regions).

Flowers Oct.-Nov.

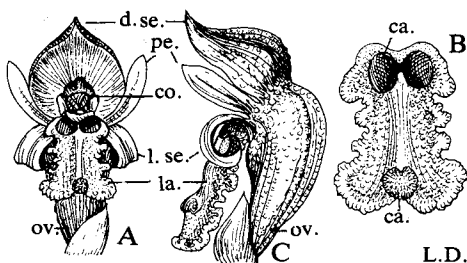


Fig. 401—*Microtis oblonga*. A, flower, front; B, labellum, surface; C, flower, side.

2. *M. oblonga* R. S. Rogers, *Trans. R. Soc. S. Aust.* 47:339 (1923). **Sweet onion-orchid.**

Slender plant, 22-45 cm high; leaf slender, often exceeding the spike, which is lax, 15-22 cm long; flowers small and distant, shortly pedicellate; dorsal sepal 3 mm long, almost erect, narrowly hooded, acute, the apex slightly recurved; lateral sepals tightly revolute; lateral petals c. 2 mm long, erect, obtuse, linear-falcate, the posterior margins overlapped by dorsal sepal; labellum c. 2.5 mm long, reflexed, narrow-oblong, the margins crenulate, with 2 large callosities near base and 1 near summit; column short and stout, with relatively large auricles.

Occurs in Qld, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty and S.E. regions).

Flowers Nov.-Dec.

3. *M. orbicularis* R. S. Rogers, *Trans. R. Soc. S. Aust.* 31:63 (1907). **Onion-orchid.** A very slender species, 15-30 cm high; leaf-lamina shorter than the spike, the fistula situated just below the latter at a characteristic angulation in the stem; spike not crowded, and with a flatter appearance than in other members of the genus; flowers green, minute, sessile; dorsal sepal obtuse, galeate, gradually narrowing towards the base, c. 1.2 mm long; lateral sepals about same length, linear-oblong, blunt, concealed below the labellum; petals rather narrower than the lateral sepals, c. 1.2 mm long, spreading transversely, slightly recurved; labellum orbicular, margin entire, lamina somewhat concave, reflexed, about as long as the lateral sepals; column

very minute, c. 0.5 mm high, with distinct linear auricles; rostellum protuberant, as a dark-green dot; anther 2-celled, galeate; pollinia attached to rostellum by a rather long caudicle.

Occurs in W.Aust., Vic., Tas. and S.Aust. (Southern Lofty and S.E. regions).

Flowers Oct.-Nov.

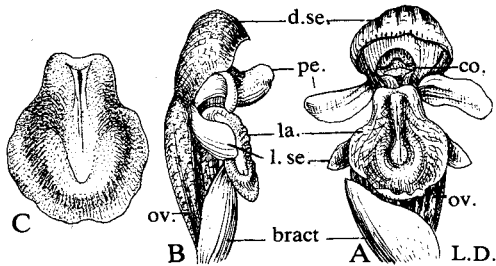


Fig. 402—*Microtis orbicularis*. A, flower, front; B, flower, side; C, labellum, surface.

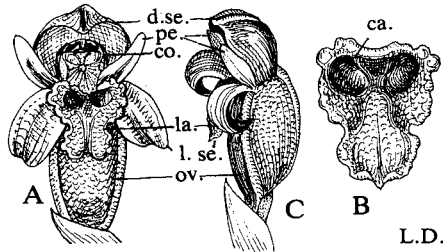


Fig. 403—*Microtis parviflora*. A, flower, front; B, labellum, surface; C, flower, side.

4. *M. parviflora* R.Br., *Prod.Fl.Nov.Holl.* 321 (1810). **Slender onion-orchid.** Plant at flowering 7-50 cm high; stem erect, more or less fleshy; leaf-lamina leek-like, often exceeding raceme; raceme of many flowers, usually crowded; flowers green to yellowish-green, on short pedicels; dorsal sepal galeate, ovate, with short recurved point, 1.5-2 mm long; lateral sepals shorter, oblong, rather blunt, subacute, deflexed, rarely revolute; petals blunt, oblong-linear, erect, more or less under dorsal sepal, c. 1.3 mm long; labellum oblong, ovate-oblong or ovate, broad at base, narrowing towards obtuse tip which ends in a down-turned apiculus; margins entire and quite smooth; basal calli prominent, sometimes appearing as two pairs, surrounding a small pouch which causes a bulge on the under side of labellum, so preventing it from lying flat against ovary; papillose protuberance thickened only towards the apex, variable in size, sometimes present as a callus; column hardly 1 mm long, narrow below stigma, rather prominent rounded wing-like auricles membranous throughout on each side of the anther; pollinia 2, bilobed, attached to the viscid disk by a very short caudicle; stigma semilunar, situated transversely between the wings.

Occurs in all States of Australia, except N.T., also in New Zealand, in the western Pacific Islands and China. Recorded in S.Aust. from the Flinders Ranges, Southern Lofty and S.E. regions.

Flowers Nov.-Dec.

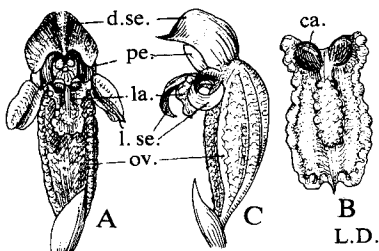


Fig. 404—*Microtis unifolia*. A, flower, front; B, labellum, surface; C, flower, side.

5. *M. unifolia* (Forst.f.) Reichb. f., *Beitr.Syst.Pfl.* 62 (1871). **Common onion-orchid.** Plant 15-50 cm high, usually slender but sometimes moderately robust; stem erect, fleshy; leaf lamina leek-like, exceeding raceme if undamaged; flowers very numerous on well developed plants, spike rather dense, pale green or golden-green; dorsal sepal erect, averaging $c.2 \times 1.5$ mm, margin evenly rounded and lacking recurved tip, ovate-cucullate, contracted near the apex to a sharp point; lateral sepals slightly shorter, but only half its width, obtuse, spreading, recurved; petals oblong, erect, partly concealed by dorsal sepal and half of its size; labellum sessile, averaging $c.1.2 \times 0.8$ mm, oblong, only rarely narrowed at mid-length; tip often bifid,

usually squarely truncate, sometimes slightly emarginate, not apiculate, margin papillose, shallowly crenate, sometimes thickened but rarely undulate; basal calli squarish, flat rather than convex, usually continuous at the sides with narrow band of callus behind slit-like transverse furrow; anterior callus prominent, variously developed, verrucose; labellum rather sharply deflexed to hang more or less parallel to ovary; column $c.1$ mm long, base often broader than stigma; anther hemispherical, two-celled, with minute point; the auricles distinct, blunt, reaching about half-way up the anther; stigma prominent, semiorbicular; rostellum viscid, conspicuous; pollinia 2, bilobed, friable, attached directly or via a long caudicle to the rostellum; easily detached.—*Ophrys unifolia* Forst.f., *Fl.Insul.Aust.Prod.* 59 (1786); *Epipactis porrifolia* Sw., *K.Svenska Vet.Acad.Handl.* 21:233 (1800); *Microtis porrifolia* (Sw.) R.Br. ex Spreng., *Syst. Veg.* 3:713 (1826).

Occurs in all States of Australia, except N.T., extends to New Zealand, New Caledonia, western Pacific islands, China and Japan; in S.Aust. from the Flinders Ranges, Eyre Pen., Northern Lofty, Murray, Yorke Pen., Southern Lofty, Kangaroo I. and S.E. regions.

Flowers Sept.-Dec.

16 ORTHOCERAS R. Br.

Prod.Fl.Nov.Holl. 316 (1810).

(Greek *orthos*, straight; *keras*, a horn.)

Terrestrial glabrous herbs, with more or less ovoid tubers; leaves radical or almost so, several, linear; 2 or 3 membranous scales at the base of the scape; flowers on short pedicels, rather distant and racemose; dorsal sepal rather broad, incurved, contracted at the base, hood-shaped; lateral sepals much longer, narrow-linear, spreading laterally; petals short, erect, often oblong or cuneate; labellum recurved, 3-lobed; the middle lobe contracted at the base and much longer than the lateral ones; a large fleshy callus at the base; anther erect or incurved, tapering to the apex, 2-celled, on an extremely short filament arising from the posterior border of the floral receptacle, the lateral appendages or wings of the filament erect or incurved and adnate to the base (the style) of the stigmatic-plate as in some members of the genus *Prasophyllum*; the stigmatic-plate, carrying the stigma and rostellum, erect in front of the anther; pollen-masses 2, each bilobed, cohering near their apices, suspended loosely from the anther-septum after dehiscence, but later dropping on to the back of the stigmatic-plate without any sort of attachment to the rostellum; mealy and friable; the viscid disk of the rostellum and caudicle absent. A monotypic genus which does not occur in the tropics.

1. ***O. strictum*** R.Br., *Prod.Fl. Nov.Holl.* 317 (1810). **Horned orchid.** A rigid species, 15-45 cm high; leaves 2-5, acute, channelled, sheathing at the base; stem-bracts 1, sometimes 2, at or about the middle, with long sheathing base and subulate lamina; flowers greenish-brown or quite green, 2-7, on rather short pedicels; dorsal sepal with an acute apex, c. 11 mm long; lateral sepals almost terete, at maturity laterally spreading on each side of the hood, c. 2.7 cm long; petals hidden by the dorsal sepal, c. 5 mm long, tips rather blunt and usually notched; labellum sessile, c. 10 mm long and 7 mm wide; the lateral lobes broad, erect, not more than half the total length, margins entire; middle lobe somewhat elliptical, with entire margins; lamina smooth, except for a large pyramidal callus at the base; column c. 4 mm long; anther without a point, much incurved; lateral appendages of column variable in length but usually same height as rostellum.

Occurs in Qld, N.S.W., Vic., Tas., also in New Zealand and New Caledonia, in S.Aust. from the Flinders Ranges, Eyre Pen., Yorke Peninsula, Northern and Southern Lofty, Kangaroo I. and S.E. regions.

Flowers Nov.-Dec.

17. PARACALEANA D. Blaxell

Contr.N.S.W.natn.Herb. 4:280 (1972).

(Greek *para*, similar to; *Caleana*, another genus of the Orchidaceae.)

Terrestrial glabrous slender herbs; leaf solitary, radical, linear; perianth-segments linear; dorsal sepal and petals attached at the base of the column where it joins to the ovary; labellum situated above the column, articulate on movable claw as in *Caleana*, the surface tuberculate; column held at right angles to the ovary; column wings decurrent on the column foot as well as on the column. The genus is represented by 2 species and is limited to Australia and New Zealand; 1 species being common to both.

1. ***P. minor*** (R.Br.) D. Blaxell, *Contr.N.S.W.Herb.* 4:281 (1972). **Small duck-orchid.** Slender, glabrous, 7-18 cm high; leaf solitary, glabrous, reddish-brown, narrow-linear, 4-9 cm long; stem wiry; flowers to 17 mm, smaller than in *Caleana major*, 1-6, reddish-brown, more rarely greenish, on slender pedicels, a floral rudiment within the uppermost bract; dorsal sepal linear-spathulate, erect or slightly incurved, c. 8 mm long; lateral sepals free, linear-lanceolate, channelled on inner surface, erect, arising nearly at right angles from the end of the columnar-foot, c. 7 mm long; petals narrower than the other segments, almost filiform, erect or incurved against the wings of the column, c. 6.5 mm long; labellum peltate, attached by a rather long irritable semi-circular claw to the extremity of

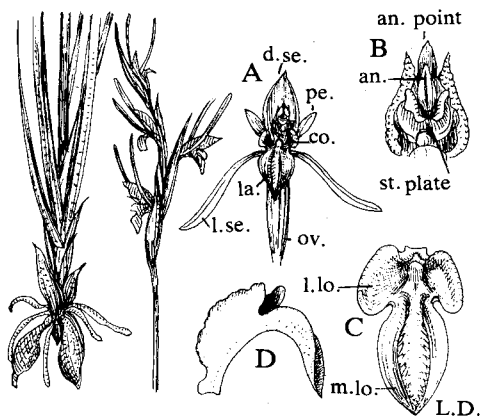


Fig. 405—*Orthoceras strictum*. A, flower, front; B, column, front, with torn stigmatic plate showing anther; C, labellum, surface; D, labellum, side.

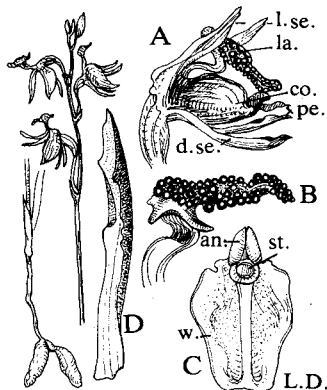


Fig. 406—*Paracaleana minor*. A, flower, side; B, labellum, side; C, column, front; D, petal.

the column-foot; lamina ovate, c. 6 mm long, centre inflated and hollow, apex prolonged into a bifid glandular-tipped process, the base into a short triangular point with a short spur on each side of the claw; upper surface convex, densely tuberculate except near its extreme base, under-surface non-tuberculate, concave, lateral margins also tuberculate; column almost as long as the petals; its base extended into a foot c. 3 mm long; widely winged throughout from anther to free end of foot; anther 2-celled, very blunt, valvate; pollinia 4, free, elongated, lamellate, granular or mealy; stigma standing out prominently below anther, concave, viscid; rostellum rudimentary; no caudicle or viscid disk.—*Caleana minor* R. Br., *Prod.Fl.Nov.Holl.* 329 (1810).

Occurs in New Zealand, Qld, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty and S.E. regions).

Flowers Oct.-Dec.

18. PRASOPHYLLUM R. Br.

Prod.Fl.Nov.Holl. 317 (1910).

(Greek *prason*, a leek; *phyllon* a leaf.)

Terrestrial glabrous herbs from diminutive to large, with ovoid or globular tubers, new tuber usually produced close to that of previous year; leaf solitary, lamina terete, hollow, sometimes reduced to a diminutive bract-like sheath; flowers several or numerous in a raceme, from diminutive to moderate-sized, reversed-labellum above column, sometimes fragrant; bracts smaller than ovary; perianth usually inconspicuous, commonly greenish, white or purple; dorsal sepal lanceolate, or broad and acute, concave, sometimes erect and arched over the column, more frequently recurved; lateral sepals narrower, connate to free; petals usually shorter, lanceolate or linear; labellum sessile or on a movable well-developed claw attached to the base of the column, more or less truliform, undivided, usually erect and concave towards base, recurved distally; margins crisped, ciliate, denticulate or entire; calli on labellum simple and more or less longitudinal; column short below the anther; its margins produced into wings in the form of 2 free lateral processes, usually adnate to the basal margins of the stigmatic-plate (a vertical plate in front of the anther, consisting of a basal portion or expanded style, and an upper portion bearing the stigma and rostellum); rostellum prominent, becoming detached, with thread-like stipe to which pollen masses adhere; pollinia 2, bilobed in each cell, pollen in many small oblong masses; stigma disk-shaped. 80-90 species, the majority temperate Australian; 4 in New Zealand and New Caledonia.

1. Leaf undeveloped or represented only by a small bract.
2. Petals ciliate *P. morrisii* 9.
2. Petals without cilia.
3. Labellum ciliate *P. archeri* 1.
3. Labellum without cilia.
4. Lateral sepals and labellum tapering into a long acumen *P. despectans* 3.
4. Lateral sepals and labellum not tapering into a long acumen.
5. Anther mucro short, less than 0.1 mm; column appendage posterior lobe acuminate; petals greenish *P. nigricans* 10.
5. Anther mucro long, bristle-like, c. 0.3 mm; column appendage posterior lobe rounded; petals reddish *P. rufum* 13.
1. Leaf fully developed.
6. Ovary appressed to the stem, more or less flattened dorsiventrally.
7. Labellum acutely or abruptly reflexed about the middle, conspicuously white; petals whitish *P. australe* 2.
7. Labellum not acutely or abruptly reflexed, greenish; petals greenish *P. elatum* 4.
6. Ovary spreading, more or less turgid.
8. Labellum longer than dorsal sepals; callus plate not protruding greatly beyond the bend *P. patens* 12.
8. Labellum shorter than dorsal sepals.

- 9. Labellum undulate in profile, not reflexed. *P. goldsackii* 7.
- 9. Labellum bent and reflexed in mid portion.
- 10. Labellum usually with lateral constriction near the tip; callus plate beyond bend in labellum oblong, narrow *P. fuscum* 6.
- 10. Labellum not constricted in the distal part; callus plate, if extended beyond bend in labellum, triangular or lobed distally.
- 11. Membranous part of labellum wider than callus plate; callus plate hastate with thickened very glandular margins *P. hartii* 8.
- 11. Callus plate wider than membranous part of labellum and reaching nearly to the tip.
- 12. Lateral sepals not bidentate; perianth-segments prune-coloured *P. fitzgeraldii* 5.
- 12. Lateral sepals bidentate; perianth-segments green or yellowish-green *P. pallidum* 11.

1. *P. archeri* Hook.f., *Fl. Tasm.* 2:14 (1858).

Variable midge-orchid. A slender plant 5-25 cm high; arising from a globular tuber, tubers and base of stem invested in thick fibrous sheaths; leafless except for a long subulate bract below the short squat raceme of 2-15-flowers; flowers on short pedicels, green or yellowish-green with pale-purple linear markings on the perianth-segments, or margins of latter edged with same colour, labellum dark-purple, ovary rotund, turgid; dorsal sepal not very wide, nearly 4 mm long, tip very acute; lateral sepals greenish, connate at base, lanceolate-falcate, very divergent, not bulging, concave on inner sides, a little over 4 mm long; petals narrowly ovate, falcate, yellowish with 3 purple stripes and more or less purple margins, spreading and recurved, same length as dorsal sepal; labellum on a semi-circular claw; broadly ovate or oblong-ovate with markedly recurved tip, about same length as dorsal sepal; margins entire or slightly crenulate; the anterior half fringed with rather short hairs; callous portion wide, triangular, cleft posteriorly, reaching to tip or nearly so; anther with very short point or pointless, higher than lateral appendages and rostellum; pollinia 2, attached by caudicle of medium length to a prominent purple disk; lateral appendages wide, bifid, ciliate along the upper half of their outer borders; stigma oval, concave; rostellum very viscid, reaching only a little above to the base of the anther.—*P. intricatum* Stuart ex Benth., *Fl. Aust.* 6:346 (1873); *P. ciliatum* Ewart & Rees, *Proc. R. Soc. Vic.* n.s. 25:111 (1912).

Occurs in all States except W. Aust. and N.T.; in S. Aust. Southern Lofty and S.E. regions.

Flowers in S. Aust. Feb.-May.

2. *P. australe* R. Br., *Prod. Fl. Nov. Holl.* 318 (1810). **Austral leek-orchid.** Often slender, 25-75 cm high; leaf-lamina usually shorter than the spike; flowers sessile, on a very slender terete elongated ovary appressed to the stem often upwards, c. 10 mm long, in a rather loose spike, sweet-scented, with prevailing tints of white, brown, and green; perianth-segments very acute; sepals yellowish-green and nearly equal in length; the dorsal sepal c. 8 mm long, erect or recurved, concave, ovate-lanceolate; the lateral sepals sometimes free at extreme base, united beyond this almost to the tips; petals erect, yellowish-green with wide reddish-brown stripe down the centre, narrower and rather shorter than the lateral sepals; labellum conspicuously white, sessile, with bulging erect base; acutely reflexed about the middle; the free end voluminous,

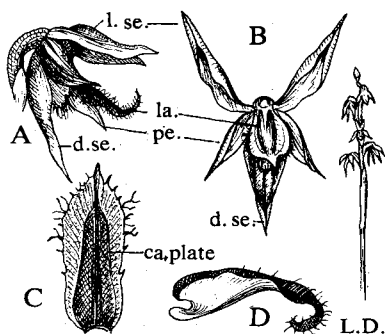


Fig. 407.—*Prasophyllum archeri*. A, flower, side; B, flower, front; C, labellum surface; D, labellum, side.

much crisped, with undulate margins; callous part ending abruptly in 2 much elevated knuckles at the bend; anther erect, with short point, 2-celled, not as high as rostellum; lateral appendages lanceolate-falcate, adnate in front to the pedicel of the stigmatic-plate, the basal lobes thickened and sinuous, about equal in height to the rostellum; viscid disk large, ovate, situated in a triangular depression on the front of the apex of the rostellum; stigma large, prominent, somewhat pentagonal; caudicle rather long; pollinia 2, bilobed.

Occurs in all States except N.T. Recorded in S.Aust. from the Southern Lofty, Kangaroo I. and S.E. regions.

Flowers Nov. and Dec.

3. *P. despectans* Hook.f., *Fl. Tasm.* 2:13 (1858). **Sharp midge-orchid.** A very slender plant, 5-20 cm high, but occasional specimens attain a height of 40 cm; leafless, except for a narrow sheathing, acute bract below the inflorescence; flowers small, few to 40 usually in a dense, pyramidal raceme, variable in colour, pale yellowish-green, purplish or brownish; ovary inclinate, turgid to narrow-oblong, convex, very shortly stalked, a small bracteole at the base; dorsal sepal broadly ovate, acuminate, c. 2 mm long, deeply concave; lateral sepals 2.5-4.5 mm long, falco-lanceolate, acuminate, cylindrical, united at the base, which is rather broad; petals ovate-lanceolate, very acute, 2-3 mm long; labellum inconspicuous, narrow-lanceolate or lanceolate, recurved, 3-3.5 mm long, articulate on a short broad claw attached to the dark-coloured projecting base of the column, the tip tapering into a long acumen; callus plate raised, comparatively broad, occupying the full width of the narrow upper portion; a narrow central longitudinal channel sometimes traversing the centre; membranous part very narrow, thin, margins minutely and irregularly serrulate or quite entire; column appendages glabrous, subulate, falcate, usually exceeding the anther, with a small rounded inner lobe of variable size at the base; anther-point of medium length; pollinia 2, bilobed; caudicle about half the length of pollinia; rostellum bifid, much shorter than the anther; stigma ovate.

Occurs in N.S.W., Vic., Tas. and S.Aust. (S.E. region).

Flowers March-April.

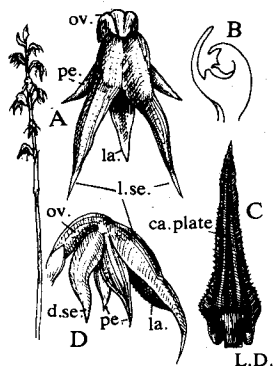


Fig. 409—*Prasophyllum despectans*. A, flower, front; B, column, bisected longitudinally; C, labellum, surface; D, flower side.

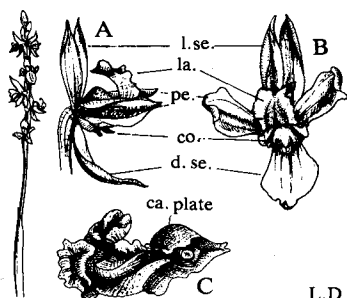


Fig. 408—*Prasophyllum australe*. A, flower, side; B, flower, front; C, labellum, surface.

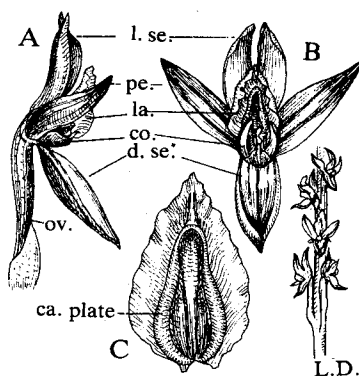


Fig. 410—*Prasophyllum elatum*. A, flower, side; B, flower, front; C, labellum, surface.

4. *P. elatum* R. Br., *Prod.Fl.Nov.Holl.* 318 (1810). **Tall leek-orchid.** Robust, ranging in this State from 45-120 cm high; leaf-lamina usually rather short, but occasionally exceeding the spike; the whole plant varying in colour from a pale-green to dark-purple or almost black; flowers large, sessile, on a narrow elongated terete ovary, appressed to the stem; dorsal sepal lanceolate, c. 10.5 mm long, moderately acute, concave, erect or recurved; lateral sepals united from about the middle almost to the tips, falcate-lanceolate, c. 10 mm long; petals about the same length, but much narrower, falcate-lanceolate, generally spreading; labellum sessile, not bulging at the base, ovate, c. 8 mm long and 6.5 mm wide, slightly recurved from about the middle; basal margins entire, those in front corrugated; callous part ovate, occupying most of the lamina and ending about midway between the bend and the tip, with free crenulated lateral margins united anteriorly; anther erect, 2-celled, with a short acute point, of varying height but usually at the same level as the rostellum; rostellum long and narrow, with a large ovate disk; pollinia 2, deeply bilobed, attached to the disk by a rather long caudicle; column appendages bluntly linear-falcate, very long, much exceeding the rostellum, with a small thickened basal lobe, not adnate to the stigmatic-plate; stigma prominent, more or less rounded or shield-like.

Occurs in all States except N.T. Recorded in S.Aust. from the Flinders Ranges, Eyre Pen., Yorke Pen., Northern and Southern Lofty, Murray, Kangaroo I. and S.E. regions.

Flowers Oct.-Nov.

5. *P. fitzgeraldii* R. S. Rogers & Maiden in R. S. Rogers, *Trans.R.Soc.S.Aust.* 33:216 (1909). Usually a stout species, 15-45 cm high; flowers sessile or almost so, prevailing tints prune-colour and green; very fragrant; standing well out from the vertical axis; ovary turgid; expansion beginning in middle of spike, extending upwards and downwards; dorsal sepal c. 6 mm long, greenish, broadly lanceolate, flat, retracted, recurved at the very acute apex in mature flower; lateral sepals dull-green, free in mature flower, 6.5 mm long, lanceolate; petals green with dark-red longitudinal stripe, bluntly linear, c. 4.5 mm long, slightly divergent; labellum prune-coloured, sessile, slightly contracted at the base; recurved almost at right angles about the middle; erect portion with entire margins, rather bulging; recurved portion broadly triangular with much crisped borders; callous portion deep prune-coloured, not very conspicuous in basal half, becoming more raised and pubescent at the bend and ending abruptly near the tip; membranous part of lighter hue and rather smaller extent; anther reddish-brown with rather blunt point, erect, but recurved after removal of the pollinia; rostellum about same height as lateral appendages and rather higher than anther; pollinia 2, vertically bilobed; caudicle rather short; column appendages membranous, very wide, with truncate tips, quadrangular or almost so with basal lobe reaching to the middle, only adnate to the sides of stigmatic-plate at the extreme base; stigma wide, almost rectangular.

Occurs in N.S.W. and S.Aust. (Flinders Ranges, Eyre Pen., Yorke Pen., Northern and Southern Lofty and S.E. regions).

Flowers Oct-Nov.

6. *P. fuscum* R. Br., *Prod.Fl. Nov.Holl.* 318 (1810). A slender to moderately robust plant, 15-60 cm high; leaf of variable length, usually equalling spike, erect, terete, dilated at the union of the stem; flowers green, yellow or brown, in a moderately loose or slightly crowded raceme; ovary oblong-ovate to ovate, subtended by a small acute bracteole which is often pink; dorsal sepal erect, lanceolate, acute, incurved over anther, the tip usually slightly deflexed; lateral

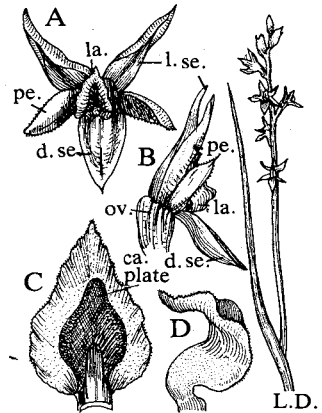


Fig. 411—*Prasophyllum fitzgeraldii*. A, flower, front; B, flower, side; C, labellum, surface; D, labellum, side.

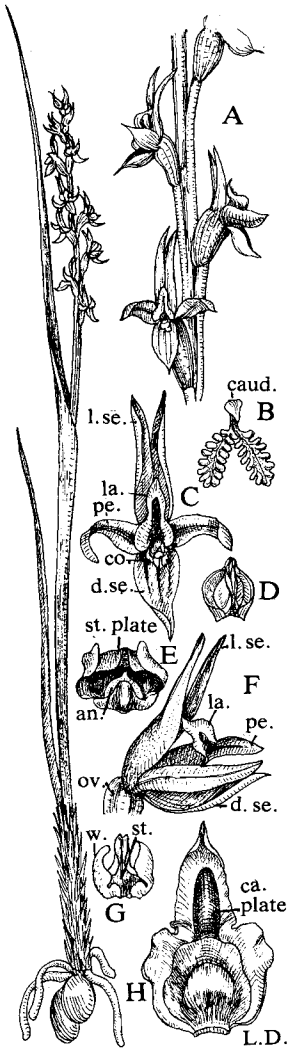


Fig. 412—*Prasophyllum fuscum* var. *fuscum*. A, raceme, enlarged; B, pollinia with caudicle; C, flower, front; D, flower, side; E, column; F, stigmatic plate; G, anther; H, labellum, surface.

raceme loose, 10-15-flowered, rarely more; dorsal sepal ovate-lanceolate, 5-6 mm long; lateral sepals little longer than dorsal sepal, slightly bidentate, connate in the freshly expanded flower, but sometimes quite free in the older flower especially in very hot weather;

sepals stout, tips bidentate, free or partly united, spreading widely when free, margins incurved; petals usually same length as the dorsal sepals, lanceolate, erect or slightly spreading; labellum oblong, recurved in its distal third, which is twice as long as wide; erect part ovate or oval; recurved part ending in an acute tip; membranous part narrow, often with a very definite constriction beyond the bend; callous portion may exceed the membranous, and not conspicuously thickened in the erect part, become increasingly thickened as it crosses the constriction and ending very abruptly near the tip, green; column very short and wide; appendages with obtuse tips, shorter than the rostellum, the basal lobes reaching to about their middle, adnate below the stigma to the sides of the stigmatic plate; stigma reniform; pollinia granular, very friable, easily removed, caudicle short.

1. Callus plate viscid, with circular cavity in basal portion (Fig. 412H) var. *fuscum* 1.
1. Callus plate not viscid, with 2 more or less parallel ridges basally.
2. Leaf greatly exceeding the inflorescence var. *occidentale* 2.
2. Leaf shorter than inflorescence or faded at flowering var. *validum* 3.

1. Var. *fuscum*. **Tawny leek-orchid.** A slender plant, 15-30 cm high; leaf lamina of variable length; flowers in a moderately loose raceme, expanding in an irregular sequence often starting from the centre of the raceme, green and brown, rarely wholly pale-green; dorsal sepal oblong-lanceolate, c. 5.5 mm long; lateral sepals bidentate; petals 4-5 mm long, linear, tips more or less obtuse; labellum on short broad claw or practically sessile, recurved usually abruptly, oblong-cuneate; callus plate viscid, green, with cavity basally in some flowers occupying almost the whole width beyond the bend, membranous part with entire margin.—*P. constrictum* R. S. Rogers, *Trans.R.Soc.S.Aust.* 33:213 (1909); *P. gracile* R. S. Rogers, *Trans.R.Soc.S.Aust.* 33:213 (1909), nom.illeg., non Lindl. (1840).

Occurs in N.S.W., Vic., Tas. and S.Aust. (Southern Lofty and S.E. regions).

Flowers Oct.-Nov.

2. Var. *occidentale* (R. S. Rogers) J. Z. Weber & R. Bates, comb. nov. Plant 12-20 cm high; fistula of leaf high on the stem, sometimes just below the inflorescence; leaf-lamina greatly exceeding the inflorescence; flowers green or purplish, more or less sessile, ovary short and turgid;

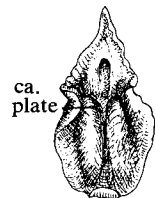


Fig. 413—*Prasophyllum fuscum* var. *occidentale*. Labellum, surface.

labellum sessile, acutely or abruptly recurved, 5-8 mm long and 2-6 mm wide, ovate-cuneate; erect portion almost orbicular with 2 ridges and entire margins; reflexed part oblong-cuneate with crisped or crenulate margins and acute tip; callus plate not prominent until beyond the bend, then contracted into a narrower and more elevated apical ridge, ending abruptly midway between the bend and the tip; membranous part about equal in extent to the callus.—*P. occidentale* R. S. Rogers, *Trans.R.Soc.S.Aust.* 32:11 (1908).

Endemic to S.Aust. (Flinders Ranges, Eyre Pen., Yorke Pen., Murray, Southern Lofty and S.E. regions).

Flowers Sept.-Oct.

R. S. Rogers distinguished *P. occidentale* from *P. fuscum* on whether the lateral sepals were connate or free. Observation has shown that although the sepals are connate at first they may separate completely in the fully open flower.

3. Var. **validum** (R. S. Rogers) J.Z. Weber & R. Bates, comb.nov. **Graceful leek-orchid.** A slender to robust plant to 60 cm high; leaf shorter than inflorescence or faded at flowering; flowers c. 30, green-yellowish, large sessile subtended by a small, narrow, acute depressed bracteole; dorsal sepal ovate, 8-12 mm long, c. 4-5 mm wide; lateral sepals arched, more or less connate, 11-13 mm long and c. 5 mm wide, acute; petals incurved, narrower and shorter than the sepals; labellum oblong-ovate, on a short or well-marked claw, not acutely or abruptly reflexed; erect part deeply concave with 2 ridges and entire margins; the part in the front of the bend narrow-triangular with a sharp point, membranous part with slightly undulate and crenulate margins, white, callus plate conspicuous, triangular from the base, elevated, ending abruptly in front of the bend near the apex.—*P. validum* R. S. Rogers, *Trans.R.Soc.S.Aust.* 51:7 (1927).

Endemic to S.Aust. (Mount Remarkable in the Flinders Ranges region).

Flowers Nov.-Dec.

7. ***P. goldsackii*** J. Z. Weber & R. Bates, *J.Adelaide Bot.Gard.* 1:167 (1978). Plant slender, 10-30 cm high, tuber globose, stem erect, more or less fleshy, basally invested in a dense fibrous sheath; leaf exceeding raceme, narrow, conduplicate, 1-2 mm wide, green, sheathing above the middle of the stem; raceme loose, 5-12-flowered, flowers shortly stalked, cleistogamous, subtended by ovate, acute bracts, c. 2 mm long and wide, spreading; perianth dark purple, ovary green, short, turgid, 4-7 × 2-3 mm; dorsal sepal ovate, acute, hooded, 3-4 mm long, c. 2-5 mm broad, decurved apically, green, purple towards apex; lateral sepals eventually free, 4-5 mm long, c. 1-5 mm broad, falcate, incurved, green with purple central stripe and apex; petals triangular, acute, c. 3 mm long, c. 1.5 mm broad, green and purple toward apex, sometimes completely hidden by dorsal sepals; labellum triangular, subacute, c. 4 mm long, 1-5-2 mm broad, widest at the base, recurved and keeled distally with inflexed apex, green with pale-prune coloured edges and apex, callus plate green, brownish or purple, concave at base, increasingly thickened and convex distally, terminating as 2 prominent ridges in the bend of the labellum, margins entire, slightly undulate; column short, erect, c. 1-7 × 1-5 mm, appendages erect, lanceolate with obtuse tips, shorter than rostellum, basally adnate to stigmatic plate; stigma obcordate; anther

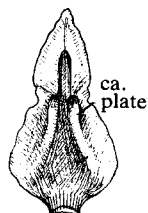


Fig. 414—*Prasophyllum fuscum* var. *validum*. Labellum, surface.

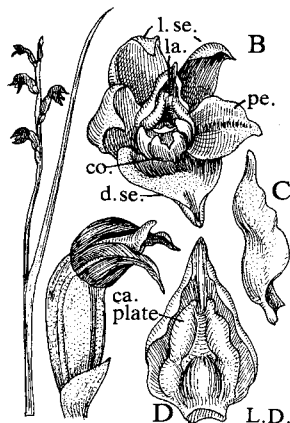


Fig. 415—*Prasophyllum goldsackii*. A, flower, side; B, flower, front; C, labellum, side; D, labellum, surface.

triangular, c. 1.2 mm long; pollinia 2, granular, friable, easily removed; caudicle short; seed oblong c. 0.2×0.1 mm.

Endemic to S.Aust. in the Eyre Pen. and Yorke Pen. regions.

Flowers Oct.

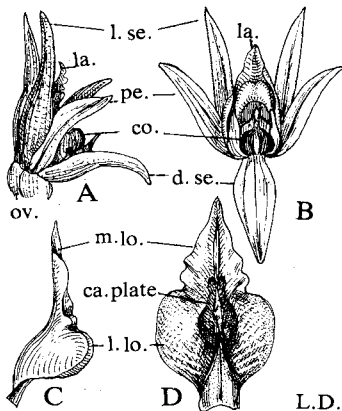


Fig. 416—*Prasophyllum hartii*. A, flower, side; B, flower, front; C, labellum, side; D, labellum, surface.

apices truncate, notched or lacerated, with a small subulate tooth posteriorly; basal lobe rounded, small; rostellum erect, bifid; caudicle slender, of medium length.

Occurs in Vic. and S.Aust. (Southern Lofty and S.E. regions).

Flowers Oct.-Dec.

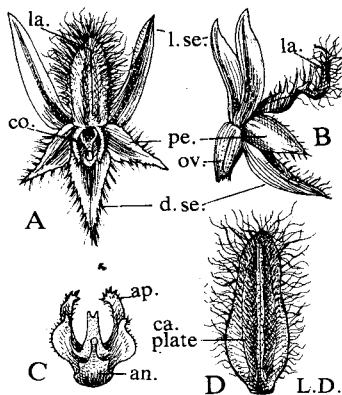


Fig. 417—*Prasophyllum morrisii*. A, flower, front; B, flower, side; C, column; D, labellum, surface.

8. *P. hartii* R. S. Rogers, *Trans.R.Soc.S.Aust.* 51:8 (1927). **Maroon leek-orchid.** Often of robust habit, to 60 cm high; leaf lamina exceeding the inflorescence; flowers numerous, more or less crowded, greenish to green with brown or red markings or prune-coloured; flowers subsessile, spreading, subtended at the base by a short very obtuse bracteole; ovary relatively large, green and turgid; dorsal sepal erect, but curved at the apex, ovate, acute, concave, glandular on the outside, 5-8 mm long; lateral sepals elliptic-falcate, acuminate, free, 6-10 mm long, concave, spreading, parallel; petals erect, elliptic-falcate, rather blunt, c. 8 mm long; labellum shortly and broadly clawed, 4-7 mm long, the basal two-thirds more or less erect, voluminous, ventricose, concave, the margins wide, rounded and entire; thereafter recurved at right angles into a triangular acute tip with crenulate narrow margins, callus plate conspicuously raised, hastate, with thickened very glandular margins, extending just beyond the bend; column short and wide; anther dark red or brown, ovate, erect, flat, not apiculate, distinctly shorter than the rostellum and lateral appendages; lateral appendages widely oblong, erect or incurved;

9. *P. morrisii* Nicholls, *Victorian Nat.* 48:108 (1931). **Bearded midge-orchid.** Slender plant, leafless, 3-20-flowered; flowers green to very dark purple, spreading; sepals and labellum pubescent; column anterior appendage acuminate and ciliate; posterior lobe smooth, obtuse or acuminate, pale-coloured.

Occurs in N.S.W., Tas. and Vic., where it extends almost to the S.Aust. border. However, it has not yet been collected in S.Aust.

Flowers Dec.-May.

10. *P. nigricans* R. Br., *Prod.Fl.Nov.Holl.* 319 (1810). **Midge orchid.** Plant slender, 5-25 cm high, tuber short, ovoid; stem erect, more or less fleshy, basally encased in a dense fibrous sheath; leaf absent at flowering, a small sheathing bract some distance below the inflorescence; raceme of 3-35 evenly spaced flowers, pyramidal, owing to the very regular expansion of the flowers from below upwards; flowers on short pedicels, the ovary usually oblong, curved, with a minute bracteole at the base; dorsal sepal c.

2.5 mm long, broadly hooded, the tip recurved, green or wholly purplish; lateral sepals free or united at the extreme base which is slightly gibbous, 3.3-5 mm long, triangular-lanceolate or lanceolate, cylindrical, often very divergent, the tips erect, greenish; petals triangular-lanceolate, often gland-tipped, equal to or shorter than the dorsal sepal and of same colour; labellum articulate on a narrow claw from the extreme base of column, c. 2.5 mm long, ovate-oblong or oblong, apex acute or blunt, the margins entire, lamina dark purple, glandular; callus plate oblong, slightly raised and reaching to the extreme tip in some flowers, more or less channelled, darker than the narrow membranous lamina; column appendages triangular, chelate, the lobes sometimes almost equal in length, anterior lobe darker, usually larger, crenulate, posterior usually smaller, acuminate; anther point very short, incurved; pollinia 2, bilobed, disk viscid, caudicle short; rostellum shorter than anther, the depression in the apex cup-shaped; stigma ovate or oval.—*P. fuscoviride* Reader, *Victorian Nat.* 14:163 (1898).

Occurs in Qld, N.S.W., Vic., Tas. and S.Aust. (Eyre Pen., Yorke Pen., Murray, Kangaroo I. and S.E. regions).

Flowers March-May.

Black (1943) called this species *P. fuscoviride*; his *P. nigricans* is *P. rufum*.

11. *P. pallidum* Nicholls, *Proc. R. Soc. Vic.* n.s. 46:33 (1933). **Pale leek-orchid.** Of slender habit, 15-30 cm high; flowers green, sometimes yellowish-green, standing well out from axis of spike; ovary turgid, relatively large in comparison with the rest of the flower; spike not very crowded; dorsal sepal nearly 6 mm long, ovate-lanceolate, generally erect, rarely recurved; lateral sepals rather longer, c. 6.5 mm, quite free, parallel, lanceolate, with usually cylindrical bidentate points; petals c. 6.5 mm long, bluntly linear, erect; labellum sessile, ovate-cuneate, recurved very nearly at a right angle about the middle; erect part bulging, with entire margins; recurved part acute, with crisped margins; callus plate occupying relatively large part of the lamina, not well marked near the base, increasing in thickness beyond the bend, and almost reaching to the extreme tip; lamina with a tooth-like lanceolate appendage reaching to the lower border of the stigma; anther erect, without a point, about same height as rostellum; lateral appendages very wide and blunt, oblong or almost quadrate, about as high as anther, free from stigmatic-plate, with relatively large basal lobes reaching beyond the middle; stigma reniform just below the short rostellum.

Occurs in Vic. and S.Aust. (Flinders Ranges, Murray, Northern Lofty, Southern Lofty and S.E. regions).

Flowers Sept.-Nov.

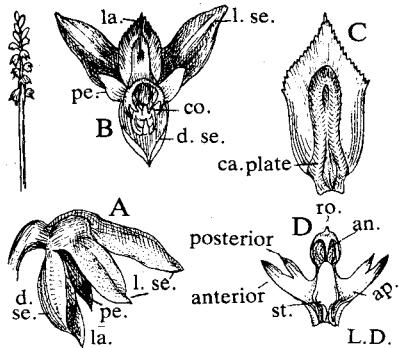


Fig. 418—*Prasophyllum nigricans*. A, flower, side; B, flower, front; C, labellum, surface; D, column.

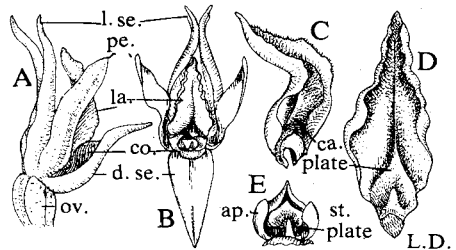


Fig. 419—*Prasophyllum pallidum*. A, flower, side; B, flower, front; C, labellum, side; D, labellum, surface; E, column, stigmatic plate.

12. *P. patens* R. Br., *Prod.Fl.Nov.Holl.* 318 (1810). Plant 10-90 cm high; leaf erect, terete, varying in length, the base sheathing, often exceeding the spike; flowers sessile or almost so, often numerous, in a loose or crowded spike; ovary turgid, dorsal sepal ovate-lanceolate, c. 7 mm long more or less recurved, green with brown markings; lateral sepals lanceolate, 7-8 mm long, conical or acute or slightly bidentate, not inflated at the base, free, green; petals linear, subacute, 5-6 mm long, spreading in the mature flower; labellum almost sessile, ovate-lanceolate; margins crenulate to crenate; callus plate green, not prominent, hardly channelled; anther dark red-brown with a short point, shorter than rostellum; pollinia 2, caudicle short, linear, attached to a narrow triangular disk; column appendages narrow-oblong with smooth blunt or notched tips and small rounded basal lobes, shorter than the rostellum; rostellum erect, bifid at the tip; stigma reniform,

1. Labellum acutely reflexed (up to 180°) var. *patens* 1.
 1. Labellum not acutely or abruptly reflexed (up to 90°) var. *pruinorum* 2.

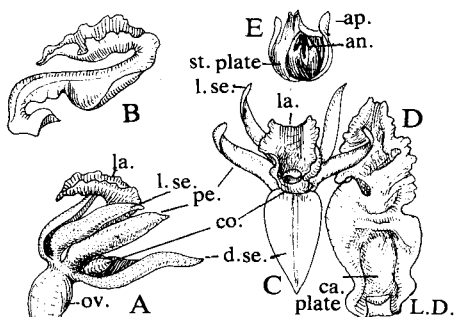


Fig. 420—*Prasophyllum patens* var. *patens*. A, flower, side; B, labellum, side; C, flower, front; D, labellum, surface; E, column, front.

odoratum var. *album* (R. S. Rogers) R. S. Rogers in J. M. Black, *Fl.S.Aust.* 126 (1922); *P. rotundiflorum* R. S. Rogers, *Trans. R.Soc.S.Aust.* 33:210 (1909).

Occurs in New Zealand, Old, N.S.W., Vic., Tas. and S.Aust. (Flinders Ranges, Eyre Pen., Yorke Pen., Northern and Southern Lofty, Murray, Kangaroo I. and S.E. regions).

Flowers Aug.-Jan.

2. Var. *pruinorum* (R. S. Rogers) J. M. Black, *Fl. S.Aust.* 126 (1922). Usually slender, 10-30 cm high; flowers generally greenish or brownish, in a dense spike; perianth-segments spreading; lateral sepals almost parallel and usually bidentate; labellum varying also in degree of flexion, but not abruptly bent, membranous border often whitish (but never pure white), greenish-yellow or light prune, greater in extent than callous portion, but not markedly so; the callus plate terminating some distance from the tip, but well beyond the

1. Var. *patens*. Broad-lip leek-orchid.

Plant slender to robust, 15-60 cm sometimes 90 cm high; flowers greenish-brown or pink and white, often perfumed; sepals incurved in younger flowers, in mature decurved; labellum conspicuously white, or bordered pink or light prune, acutely reflexed about the middle, tip showing between the lateral sepals; erect part rather bulging, margins entire; reflexed part bluntly triangular with very crenulate margins; lamina with large pyramidal green callus at its base; the callus plate not very thick in the erect part but more prominent towards its termination just beyond the bend; membranous portion very voluminous and exceeding the callus.—*P. album* R. S. Rogers, *Trans.R.Soc.S.Aust.* 33:211 (1909); *P. odoratum* R. S. Rogers, *Trans.R.Soc.S.Aust.* 33:209 (1909); *P.*

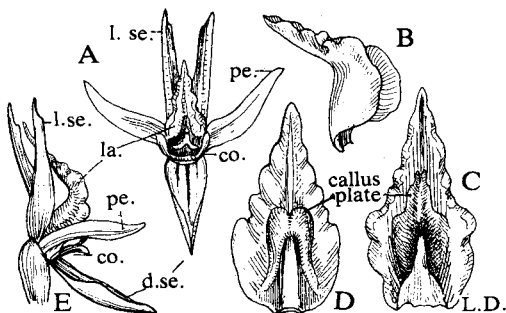


Fig. 421—*Prasophyllum patens* var. *pruinorum*. A, flower, front; B, labellum, side; C & D, labellum, surfaces, showing different forms of callus plate.

bend.—*P. pruinosa* R. S. Rogers, *Trans.R.Soc.S.Aust.* 33:211 (1909).

Occurs in ?Vic. and S.Aust. in the Southern Lofty region.

Flowers Oct.-Nov.

R. S. Rogers (1909) did not comment on the similarity of *P. pruinosa* with *P. patens*, but in his key they were distinguished on the angle of reflection of the labellum.

13. *P. rufum* R. Br., *Prod.Fl.Nov.Holl.* 319 (1810). **Red midge-orchid.** Plant slender, 4-30 cm high, variable, stem green, erect, more or less fleshy, basally encased in a dense fibrous sheath; leaf absent at flowering; stem bract below the inflorescence, 1-3 cm long, closely sheathing or with a free lamina; raceme 2-6 cm long, 3-20-flowered; flowers in mature specimens deflexed; sepals green and reddish-brown to dark purplish-red, sometimes grey-green and red; dorsal sepal 2-3 mm long, broad-ovate, acute, deeply hooded; lateral sepals longer than dorsal sepal, broad-lanceolate, widely diverging, often gland-tipped, greenish; petals about same length and colour as dorsal sepal, or shorter, lanceolate to triangular, the anterior margin sometimes irregular; labellum obovate, cuneate, the anterior margins denticulate, shortly serrate, or sometimes almost ciliate, apex shortly acuminate; posterior margins entire; callus plate prominently raised, very dark purplish, extending from the shortly channelled base to the apex, membranous part narrow, purple; column appendages chelate, triangular, anterior lobe acute, purple, minutely serrate, posterior obtuse, to rounded, very light coloured; anther incurved, commonly with a long point; pollinia 2, bilobed, caudicle sometimes purple; stigma prominent, oval.—*P. nigricans* non R.Br. sensu J. M. Black *Fl.S.Aust.* 222 (1943).

Occurs in Qld, N.S.W., Vic., Tas. and S.Aust. (Flinders Ranges, Northern and Southern Lofty, Murray and S.E. regions).

P. nudum Hook.f., which was described from New Zealand, may be synonymous.

Flowers Jan.-May.

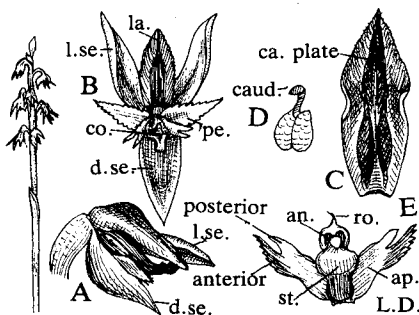


Fig. 422—*Prasophyllum rufum*. A, flower, side; B, flower, front; C, labellum, surface; D, pollinia; E, column, front.

19. *PTEROSTYLIS* R. Br.

Prod.Fl.Nov.Holl. 326 (1810).

(Greek *pteron*, a wing; *stylos*, column.)

Plants terrestrial, usually glabrous; tubers ovoid to globose, produced close to or at some distance from parent plant; leaves several, rosette-forming or distributed up flowering stem, almost orbicular to linear; peduncle in some species elongating after fertilisation as capsule matures; flower solitary or more rarely a few-flowered raceme; floral bract often not differentiated; perianth glabrous or minutely scabrid, mostly green, sometimes with rufous tints; dorsal sepal uppermost, deeply concave and curved, its lateral margins dovetailed into petals to form with them a hood or galea over the column; lateral sepals (lower lip) connate for part or most of their length, the free lobes diverging widely or narrowly, their tips short or long, acuminate to almost filiform, erect in front of the galea (e.g. fig. 424) or reflexed against the ovary (e.g. fig. 425), adnate to the foot of the column; petals falcate, with anterior margins shortly adnate to base of lateral sepals (e.g. fig. 426), posterior margins free under dorsal sepal,

outer surface with median longitudinal groove into which the slightly involute margin of the dorsal sepal locks; labellum the smallest of the perianth-segments (e.g. fig. 426), usually included for most of its length, mobile on claw attached to column-foot, irritable, projecting from the foot of the column; lamina usually undivided, sometimes with hairs but usually without calli, produced at line of junction with claw into an appendage that is usually strap-shaped and more or less lacinate at its free end (e.g. fig. 423 C); column elongate, its foot more or less adnate to the base of dorsal sepal (e.g. fig. 428 A), bearing on either side of rostellum a more or less quadrangular partly twisted wing, sometimes narrowly winged below; its base more or less produced into a horizontal foot; anther terminal (e.g. fig. 438 C), pollinia 2 per cell, crescentic, soft but coherent, inclined over the rostellum, with a movable attachment within a cavity in the column, pointless; pollinia powdery, elongated, free; stigma of 2 lobes, usually vertically elongated and occupying middle of the column (e.g. fig. 440 D); rostellum immediately below the anther and high above stigma with which it is connected by a narrow groove. About 70 species mainly Australian, represented also in New Zealand, New Guinea and New Caledonia. Of 19 species in New Zealand 6 are common with S.Aust. Commonly known as **green-hoods**.

1. Labellum flattened, at least below.
2. Lateral sepals erect, their filiform tips embracing the galea (e.g. fig. 423).
 3. Flowers several *P. parviflora* 17.
 3. Flower one, occasionally two.
 4. Leaves mostly crowded at the base at flowering (e.g. fig. 427).
 5. Labellum bifid at the tip *P. concinna* 4.
 5. Labellum entire at the tip.
 6. Flower nodding (facing downwards) *P. nutans* 15.
 6. Flower erect.
 7. Labellum twisted *P. curta* 6.
 7. Labellum not twisted, straight or curved only.
 8. Inflexed tooth in the sinus formed by lateral sepals . *P. nana* 14.
 8. No inflexed tooth in the sinus formed by lateral sepals.
 9. Galea 1-3 cm high.
 10. Labellum linear-oblong, curved forward; stem bracts leaf-like *P. foliata* 9.
 10. Labellum ovate, not curved forward; stem leaves inconspicuous *P. pedunculata* 18.
 9. Galea 4-6 cm high.
 11. Labellum oblong; sepals with at least 15 mm long filiform tips *P. falcata* 8.
 11. Labellum narrow-ovate; sepals shortly acuminate, filiform tips less than 10 mm long *P. cucullata* 5.
 4. Leaves all cauline at flowering.
 12. Dorsal sepal with 8-10 mm long filiform tip *P. tenuissima* 21.
 12. Dorsal sepal shortly acuminate, filiform tip less than 5 mm.
 13. Labellum tip acuminate; sinus of lateral sepals not bulging nor protruding *P. alata* 1.
 13. Labellum tip obtuse; sinus of lateral sepals bulging and protruding forwards *P. obtusa* 16.
 2. Lateral sepals reflexed against ovary, spreading or recurved (e.g. fig. 425).
 14. Leaves all cauline at flowering.
 15. Labellum tip trifid; lateral sepals narrow *P. longifolia* 11.
 15. Labellum tip bifid; lateral sepals wide *P. vittata* 22.

14. Leaves in basal rosette at flowering.
16. Labellum glabrous.
 17. Basal appendage of labellum bent forward (as letter C)... *P. cynocephala* 7.
 17. Basal appendage of labellum bent backwards (as letter S) *P. mutica* 13.
16. Labellum pubescent.
18. Labellum membranous.
 19. Basal appendage of labellum beset with setae *P. mitchellii* 12.
 19. Basal appendage of labellum glabrous *P. biseta* 2.
18. Labellum fleshy.
 20. Lateral sepals shortly acuminate; galea 1-2 cm high *P. rufa* 20.
 20. Lateral sepals produced into long filiform points; galea more than 2 cm high.
 21. Base of lateral sepals narrow; labellum tip usually upturned..... *P. hamata* 10.
 21. Base of lateral sepals wide; labellum tip straight or depressed.
 22. Hairs not coloured; labellum tip depressed *P. boormanii* 3.
 22. Hairs yellow; labellum tip straight..... *P. sp.* 23.
1. Labellum filiform (beset with long yellow hairs) *P. plumosa* 19.

1. ***P. alata*** (Labill.) Reichb.f., *Beitr.Syst.Pfl.* 70 (1871). Slender, glabrous, 5-20 cm high; no rosulate leaves at flowering; stem leaves gradually increasing in size from below upwards, lanceolate, acuminate, stem-clasping, the longer ones often attaining a length of 4-5 cm; flower regularly one, large, green with greyish, white or reddish-brown longitudinal striae; galea erect, gradually incurved, apex rather blunt; dorsal sepal usually ending in a fine point, 2-5 mm long; petals blunt; lateral sepals (lower lip) erect; the lobes separated by a very wide truncate sinus with a notch in the middle, not bulging, the tips produced into long filiform points, embracing the galea and greatly exceeding it; labellum on a movable claw, lanceolate, tapering to a more or less acute point, when erect slightly exceeding the column, reddish-brown, traversed usually by a central raised line; basal appendage narrow-linear, much curved, penicillate; column erect, winged, tip of wings falcate acute, lower lobe oblong, blunt with inturned ciliate margins; stigma prominent, bilobed, elliptical, centrally placed on column.—*Disperis alata* Labill., *Nov.Holl.Pl.Sp.* 2:59 (1806).

1. Labellum 8-10 mm long, never protruding beyond the sinus, equalling column; galea up to 2-5 cm high var. *alata* 1.

1. Labellum more than 10 mm long, sometimes protruding beyond the sinus; galea more than 2-5 cm high .. var. *robusta* 2.

1. Var. ***alata***. **Striped green-hood**. Plant slender, rarely exceeding 20 cm in height, with small flowers; leaves bract-like, 2-3 cm long and 3-5 mm wide; galea 20-25 mm high; dorsal sepal ending in a short point c. 2 mm long; labellum almost straight, narrow-lanceolate, 8-10 mm long, tapering gradually to an acute tip; stigma cordate-elliptical.—*P. praecox* Lindl., *Gen. & Sp. Orchid.Pl.* 388 (1840).

Occurs in N.S.W., Vic., Tas. and S.Aust. (S.E. region).

Flowers May-July.

2. Var. ***robusta*** (R. S. Rogers) J. Z. Weber & R. Bates, comb. nov. **Larger striped green-hood**. Plant more robust; stem to 20 cm high or more, sometimes dwarfed; leaves 4-6, often 4-5 cm long and to 8 mm wide; galea 25-40 mm high; dorsal sepal usually

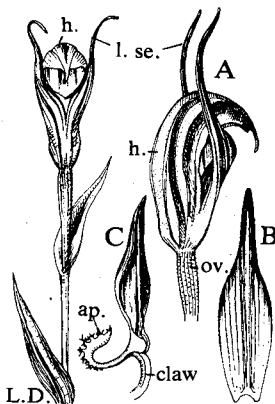


Fig. 423—*Pterostylis alata* var. *alata*. A, flower, side, B, labellum, surface; C, labellum, side.

ending in a long fine point to 5 mm long; labellum nearly straight, 10-17 mm long, lanceolate, gradually tapering into an acute long tip, sometimes protruding beyond the sinus; stigma obcordate to elliptical.—*P. robusta* R. S. Rogers, *Trans.R.Soc.S.Aust.* 51:296 (1927); *P. praecox* var. *robusta* Ewart & Sharman, *Proc.R.Soc.Vic.* n.s. 28:234 (1915), nom. nud.; *P. scabra* var. *robusta* (R. S. Rogers) George, *Nuytsia* 1:191 (1971); *P. hamiltonii* non Nicholls, sensu J. M. Black, *Fl.S.Aust* 246 (1943).

Occurs in W.Aust., Vic. and S.Aust. (Flinders Ranges, Eyre Pen., Yorke Pen., Northern Lofty, Southern Lofty, Murray, Kangaroo I. and S.E. regions).

Flowers May-Aug.

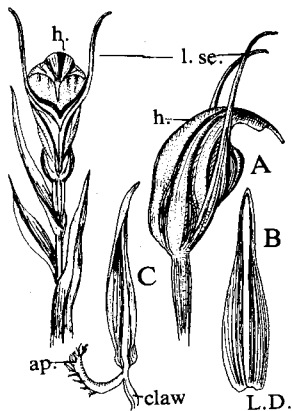


Fig. 424—*Pterostylis alata* var. *robusta*. A, flower, side; B, labellum, surface; C, labellum, side.

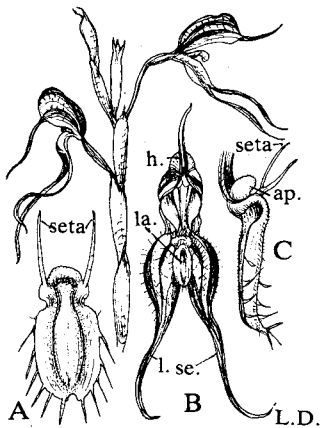


Fig. 425—*Pterostylis biseta*. A, labellum, front; B, flower, front; C, labellum, side.

2. *P. biseta* Blackmore & Clemesha, *Orchadian* 2:150 (1968). **Rusty-hood.** Moderately robust, usually 10-35 cm high; leaves in a withered basal rosette at the time of flowering, shortly petiolate; lamina 1-2 cm long, moderately acute and usually ovate or oblong; stem-bracts 2-5, scarious, acute, loosely sheathing, and one subtending each pedicel; flowers rather large, usually 2-6, rarely 1, on long slender pedicels in raceme, green with rufous markings; galea from base to crest 10-20 mm long, broad, incurved, the apex produced into a fine point usually 10-15 mm; lateral sepals (lower lip) recurved or reflexed, about as long as the galea; the lobes elliptical, produced into fine points or caudae of varying length, 25-45 mm; labellum attached by rather a long claw to the foot of the column, membranous, rather narrow-oblong, the tip entire, blunt and turned upwards; the lamina 6 mm long, the posterior margin thickened and forming a transverse ridge in front of the claw, a central longitudinal ridge on the upper surface of the lamina, deeply channelled below; generally 2 long setae on the basal swelling, the lateral margins and tip sparsely ciliate; appendage almost obsolete, represented by thickened posterior margin; column incurved, 8-15 mm long, reaching to top of galea; wings almost square; upper angle acute, ciliate, anterior margins inturned, ciliate, lower lobe rather blunt, ciliate; stigma narrow-elliptical.—*P. rufa* non R.Br., sensu J. M. Black, *Fl.S.Aust.* 248 (1943).

Occurs in N.S.W., Vic. and in S.Aust. (Flinders Ranges, Eyre Pen., Yorke Pen., Northern Lofty, Murray and Southern Lofty regions).

Flowers Sept.-Dec.

3. *P. boormanii* Rupp, *Orchids N.S.W.* (1943). **Sikh's whiskers**. Rather slender, 7-15 cm high; leaves in a green or withered basal rosette, very shortly petiolate, not very acute; lamina 20-30 mm long, elliptical; stem-bracts 2-4, closely sheathing and one subtending each pedicel; flowers 3-6, in a loose raceme, rather large, greenish with reddish tints on lower lip and margins of galea or wholly red; galea from base to crest c. 12 mm long, the apex produced into a fine recurved 8-10 mm long point; lateral sepals (lower lip) reflexed, the lobes ovate, including an acute sinus, prolonged into fine diverging tails 15-17 mm long; labellum thick and fleshy, glandular, on a movable semi-circular claw, very irritable, tip slightly cleft below and turning a little downwards, contracted near the base; lamina c. 3.5 mm long, the basal margin thickened and slightly raised, usually without hairs, in front of this hollowed out for the greater part of its length; under-surface deeply channelled from base to tip; lateral margins ciliate; appendage almost obsolete, represented by the raised basal margin; column c. 9 mm long, incurved, reaching nearly to the top of the galea; wings quadrangular, upper angle rather acute and ciliate, the lower one quite blunt and ciliate, anterior margins with inturned hairs; stigma semi-elliptical, upper margin notched or toothed.—*P. mitchellii* non Lindl., sensu J. M. Black, *Fl. S.Aust.* 248 (1943).

Occurs in N.S.W., Vic. and S.Aust. (Eyre Pen., Yorke Pen., Flinders Ranges, Northern Lofty, Murray and Southern Lofty regions).

Flowers Aug.-Nov.

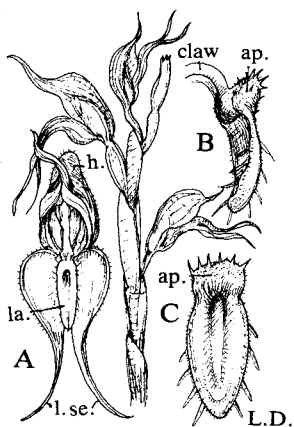


Fig. 426—*Pterostylis boormanii*. A, flower, front; B, labellum, side; C, labellum, surface.

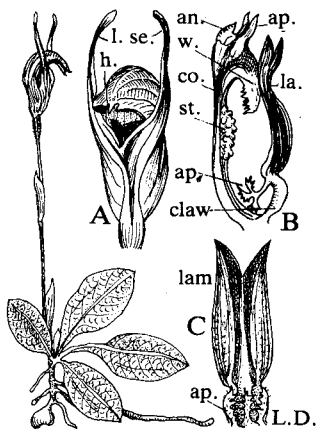


Fig. 427—*Pterostylis concinna*. A, flower, front; B, column and labellum, side; C, labellum, from above.

4. *P. concinna* R. Br., *Prod. Fl. Nov. Holl.* 326 (1810). **Trim green-hood**. Slender, glabrous, 4-15 cm high; leaves in a basal rosette, on fairly long petioles; lamina ovate or oblong-ovate, 1.5-2.5 cm long; flower solitary, green with brown points sinus and labellum; galea light-green with darker longitudinal stripes, c. 15 mm long, at first erect, then curved horizontally forward, its tip acute, depressed; lateral sepals (lower lip) erect, their lobes including a very wide sinus and produced into erect fine points c. 15 mm long on each side of galea; labellum on a linear claw attached to the projecting foot of the column, oblong, acutely emarginate, c. 8 mm long (including claw); penicillate appendage slender, curved forward, the tip multipartite; lamina almost straight, with a rather broad longitudinal raised line down the centre; column erect, c. 10 mm long, the upper angles of the wings very acute and higher than the anther, lower lobes broad, rounded, with ciliated margins; stigma tubid, oval.

Occurs in Qld, N.S.W., Vic., Tas. and S.Aust. (S.E. region).

Flowers June-Oct.

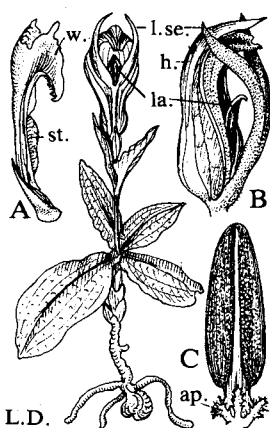


Fig. 428—*Pterostylis cucullata*. A, column, side; B, flower, side; C, labellum, from above.

5. *P. cucullata* R. Br., *Prod.Fl.Nov.Holl.* 327 (1810). **Leafy green-hood.** Stout, glabrous, often dwarfed, 5-25 cm high; leaves crowded at base of scape, sessile or almost so; oblong, elliptical or obovate, often 7-9 cm long; passing into 2 or 3 large leaf-like bracts, the uppermost one subtending the floral pedicel, and usually including the ovary and sometimes part of the perianth; flower large, solitary, glandular-pubescent, the dorsal sepal generally green, the petals labellum and lower lip chocolate; galea upwards of 3 cm long; the tip abruptly decurved in the living plant, very short and acute; lateral sepals (lower lip) erect; the lobes including an acute sinus, shortly acuminate, curved backwards against the sides of the galea but not exceeding the latter; labellum oblong-elliptical or narrow-elliptical; the tip very blunt, slightly recurved, on a linear movable claw; lamina c. 14 mm long, traversed throughout by a central raised line; basal appendage curved, linear, densely penicillate; column erect, c. 22 mm long; upper margin of wings rounded, with a short acute tooth; lower lobe somewhat oblong with blunt tip; stigma broad, short, ovate-lanceolate or elliptical.

Occurs in Vic., Tas. and S.Aust. in the Southern Lofty region.

Flowers Sept.-Oct.

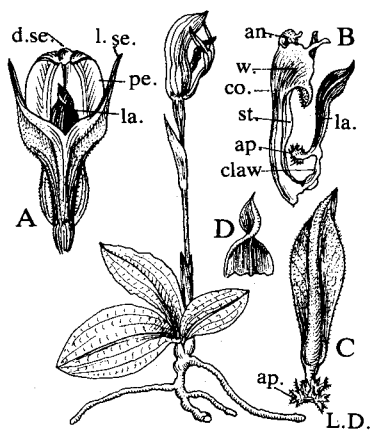


Fig. 429—*Pterostylis curta*. A, flower, front; B, column and labellum, side; C, labellum, from above; D, labellum tip twisted.

6. *P. curta* R. Br., *Prod.Fl.Nov.Holl.* 326 (1810). **Blunt green-hood.** Slender, glabrous, 10-20- cm high; leaves on rather long petioles, in a radical rosette, 3-6 cm long, lamina elliptical to oblong-elliptical; stem-bracts usually 2, loosely sheathing; also a very loose bract subtending the pedicel; flower solitary, green, with rusty-coloured label- lum; galea 3-3.5 cm long, erect; dorsal sepal acute but not acuminate; lateral sepals (lower lip) erect with a wide sinus, the lobes shortly acuminate, not as long as the galea; labellum on a movable claw attached to the projecting foot of the column, c. 14 mm long (without the claw), entire, somewhat oblong-linear but twisted and wider towards the tip, only slightly recurved, the tip blunt and showing through the sinus; lamina traversed throughout by a raised longitudinal line; appendage linear, curved, multifimbriate; column vertical, c. 20 mm long, adnate posteriorly to the dorsal sepal; wings prolonged at the upper angles into fine linear points, the lower lobe oblong with ciliate internal margins; anther horizontal or almost so, quite blunt; stigma elliptical or ovate-elliptical, situated in the middle of the column, not viscid; rostellum very viscid.

Occurs in all States except W.Aust. and N.T., also in New Caledonia; in S.Aust. (Flinders Ranges, Southern Lofty and S.E. regions).

Flowers Aug-Oct.

7. *P. cynocephala* Fitzg., *Aust. Orchids* 1(2) (1876). **Swan green-hood.** Rather stout, 3-15 cm high, leaves 7-9, petiolate, in a crowded basal rosette, oval-elliptical; lamina 10-15 mm long; stem-bracts generally 1 or 2, leafy near the base, also a loose one subtending each pedicel; flowers small, green, 2-6 in a raceme (often spiral) usually crowded; galea incurved, blunt, broad, a little more than 7 mm long; lateral sepals (lower lip) shorter than the galea, reflexed; lobes only separated at the extreme tips, latter hardly acute; labellum on a short broad claw (c. 1 mm), quadrate, tip broadly rounded and slightly emarginate; lamina 4-4.5 mm long, traversed by a central raised line; appendage highly irritable, as wide at the base as the labellum, flat and narrowing towards its apex, ending in a dark green conical process looking towards the tip of labellum, (bent as letter C); column nearly 7 mm long, not quite reaching top of galea; wings quite rounded; the anterior margin almost semi-circular, ciliate, without any tooth, lower lobe broad, triangular, blunt, ciliate; stigma ovate-lanceolate.

Occurs in New Zealand, N.S.W., Vic., Tas. and S.Aust. (Flinders Ranges, Eyre Pen., Yorke Pen., Murray, Southern Lofty and S.E. regions).

Flowers Sept.-Oct.

8. *P. falcata* R. S. Rogers, *Proc. R. Soc. Vic.* n.s. 28:106 (1915). **Sickle green-hood.** Plant rather slender, glabrous, 15-30 cm high; leaves 4 or 5, basal, occasionally absent, 2-6 cm or more in length, ovate-lanceolate to oblong-lanceolate, shortly petiolate, passing gradually into stem-bracts; stem-bracts 2-4, large and leaf-like, lanceolate, sheathing; flower 1, green, very large, to 8 cm from top of ovary to tip of galea, erect, very acuminate and boldly sickle-shaped; galea with white and green lines and light brown markings toward the apex; lateral sepals (lower lip) cuneate, erect; the lobes separated by a wide sinus, produced into long filiform points of about the same length as the galea, curving forward high above it, each one sometimes bifid at the tip; labellum considerably longer than column, 20-25 mm long, dark green, lanceolate to lanceolate-spathulate, curved forward in its distal quarter so as to protrude through the sinus of the sepals, rather blunt at tip; on the upper surface of lamina is a prominent longitudinally raised ridge along the centre, with a corresponding narrow groove on the underside; upper surface of lamina convex in section; appendage linear, curved, densely penicillate at the end; column c. 15 mm, not much incurved; wings hatchet-shaped, upper lobe toothed and ciliate, lower lobe obtuse and ciliate; stigma rather long and narrow, oblong-lanceolate, pointed at the upper angle and rounded below.

Occurs in N.S.W., Vic., Tas. and S.Aust. (Kangaroo I. and S.E. regions).

Flowers Sept.-Jan.

P. ingens (Rupp) D. L. Jones, *Orchadian* 5(5):54 (1976). Leaves basal, 5-8 in rosette, petiolate; flower solitary, c. 3 cm long, (4 cm in type) slightly inclined forward, dorsal sepal erect for half its length, becoming horizontal, ending in acuminate point; lower sepals erect, the free

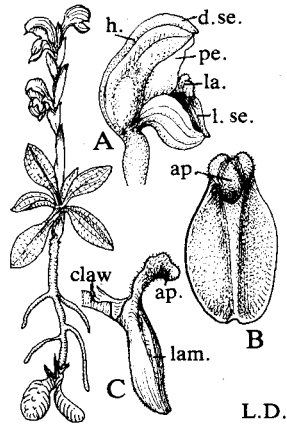


Fig. 430—*Pterostylis cynocephala*. A, flower, side; B, labellum, surface; C, labellum, side.

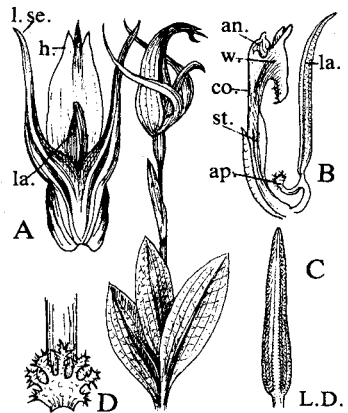


Fig. 431—*Pterostylis falcata*. A, flower, front; B, column and labellum side; C, labellum, surface; D, labellum, appendage.

portions prolonged into filiform points above the galea; labellum broad linear, acuminate, recurved or reflexed in front.—*P. acuminata* var. *ingens* Rupp, *Proc.Linn.Soc.N.S.W.* 53:552 (1928).

Occurs in N.S.W., Vic., Tas. and in S.Aust. is represented by a single collection from the Southern Lofty region near Port Elliot (J. L. Hussey, 1895).

Flowers Sept.-Nov.

D. L. Jones (1976) identified this as a natural hybrid between *P. falcata* and *P. nutans*. The specimen from S.Aust. (in the National Herbarium of Victoria) shows most similarity with *P. nutans* which is common in the area. *P. falcata* although apparently a parent, has never been recorded closer than Kangaroo I.

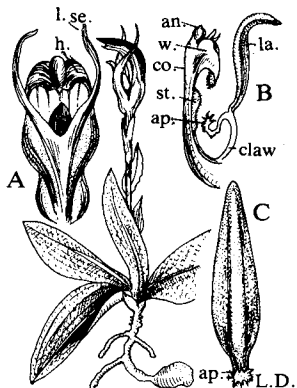


Fig. 432—*Pterostylis foliata*. A, flower, front; B, column and labellum, side; C, labellum, from above.

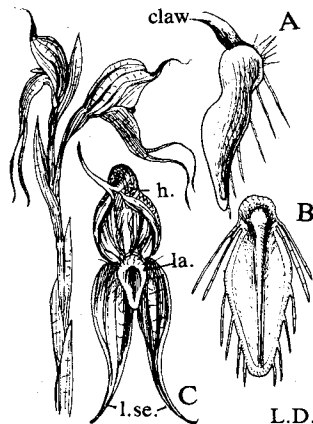


Fig. 433—*Pterostylis hamata*. A, label, side; B, labellum, from above; C, flower, front.

9. *P. foliata* Hook.f., *Fl.Nov.Zel.* 1:249 (1853). **Slender green-hood.** Rather slender, glabrous, 10-30 cm high; leaves mostly crowded at the base, usually sessile but sometimes shortly petiolate, ovate-lanceolate or elliptical; a very large leaf-like bract near the base of the stem and a similar one subtending the pedicel, both broadly lanceolate and sheathing at their bases, 2-4 cm long; flower 1, rather small, green; galea c. 20 mm long, erect, incurved, the apices of dorsal sepal and petals about equal in length, shortly acuminate; lateral sepals (lower lip) erect, sinus acute, without an inflexed tooth, its points produced into fine filiform points, embracing the galea and exceeding the latter in length by c. 8 mm; labellum on a movable claw, oblong to linear-oblong with a very blunt and moderately recurved tip protruding from the sinus; lamina c. 10 mm long; upper surface concave toward the base, and traversed by a raised longitudinal ridge with corresponding narrow furrow beneath; basal appendage linear-stout, curved, trifid at the end; thickly and shortly penicillate; column a little shorter than labellum, wings hatchet-shaped, upper lobe toothed, lower lobe blunt, ciliate; stigma occupying middle third of column, its upper angle toothed.—*P. vereenae* R. S. Rogers, *Trans.R.Soc.S.Aust.* 38:360 (1914).

Occurs in New Zealand, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty and S.E. regions).

Flowers Sept.-Oct.

10. *P. hamata* Blackmore & Clemesha, *Orchadian* 2:154 (1968). **Scaly orchid.** Stout, glabrous, c. 15 cm high; leaves in a withered basal rosette at time of flowering; stem-bracts 6-8, acute, sheathing, closely appressed, and one at the base of each pedicel, the lower ones partially imbricate, the distance between them increasing in the upper part of the stem but always short; flowers greenish with rufous margins, 2 or 3, occasionally many, on rather long pedicels; galea from base to crest 10-18 mm long, the apex produced into a fine point c. 6 mm long; lateral sepals (lower lip) reflexed, about as long as the galea, the lobes produced into fine points c. 10 mm long; labellum ovate-oblong thick and fleshy, conspicuously glandular, very irritable, on a wide movable claw, tip straight, bifid, contracted towards the base; lamina c. 5 mm long, hollowed out to within a short distance of the tip, a low wide rounded or somewhat triangular eminence at the base with a long bristle on each

side; lateral margins sparsely ciliate with long hairs; under-surface deeply and narrowly channelled; appendage almost obsolete, represented by the basal eminence; column incurved, reaching to top of galea; wings almost quadrangular, upper angles not toothed or ciliate, lower lobes blunt and ciliate, anterior margin with inturned hairs or fringe; stigma oblong-elliptical.—*P. squamata* non R.Br., sensu J. M. Black, *Fl.S.Aust.* 248 (1943).

Occurs in ?Qld, N.S.W., Vic., Tas. and S.Aust. (Nullarbor, Eyre Pen., Yorke Pen., Flinders Ranges, Eastern, Northern Lofty and Murray regions).

Flowers Sept.-Nov.

A polymorphic species, often hybridises with *P. biseta*.

11. *P. longifolia* R.Br., *Prod.Fl.Nov.Holl.* 327 (1810). **Tall green-hood.** Rather rigid, 10-30 cm high; basal rosette not present at the time of flowering; stem-leaves reduced to small scales near the base, acute, clasping, narrow-lanceolate, 1-4 cm long above the middle; very rarely a lateral basal tuft present in addition to the stem-leaves; flowers usually 3-8 in a raceme, rarely 1, green, an acute bract subtending each pedicel, galea c. 15 mm or less from base to crest, gradually incurved, apex acute but not prolonged into a fine point; lateral sepals (lower lip) reflexed in the mature flower, rather narrow, the lobes with short acuminate tips; labellum on a short movable claw, very irritable, oblong, slightly 3-lobed towards the end; the lateral lobes very small; the tip or middle lobe upturned, bifid; lamina c. 8 mm long, papillose-glandular, convex and much thickened at the base with a short pyramidal appendage, thereafter concave; channelled below; column incurved, reaching to top of galea; wings nearly square, upper margin crescentic with a short rather blunt tooth about the middle, upper angle blunt and rounded, front margins with inturned hairs; stigma lanceolate.

Occurs in Qld, N.S.W., Vic., Tas. and S.Aust. (Eyre Pen., Yorke Pen., Murray, Flinders Ranges, Southern Lofty, Kangaroo I. and S.E. regions).

Flowers June-Oct.

12. *P. mitchellii* Lindl. in T. L. Mitchell, *J.Trop.Austral.* 365 (1848). **Mitchell green-hood.** Rather slender, 10-30 cm high, glabrous; leaves in a green or withered basal rosette, shortly petiolate, ovate to oblong; stem-bracts 2-5 or more, acute, closely sheathing and one subtending each pedicel; flowers 1-5 in a loose raceme; galea c. 25 mm long, curved, ending in a filiform point c. 7 mm long, recurved; lateral sepals (lower lip) reflexed, ovate lobes ciliate outside, producing an acute sinus, prolonged into fine diverging filiform points, 10-18 mm long, light brown to red-brown; labellum irritable on movable claw, membranous, oblong-obovate, 6-8 mm long, the margin upturned and beset with 12-14 setae, a slight ridge only on lamina; appendage an obsolete swelling at the base of the labellum, beset with shorter setae; column incurved, 10-18 mm long; wings hatchet-shaped, upper lobe toothed, ciliate, lower lobe blunt, ciliate; stigma lanceolate.—*P. gibbosa* subsp. *mitchellii* (Lindl.) Blackmore & Clemesha, *Orchadian* 2:161 (1968).

Occurs in Qld, N.S.W., Vic. and S.Aust. (Gairdner-Torrens and Eyre Pen. regions).

Flowers Sept.-Nov.

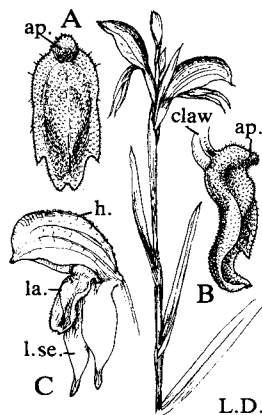


Fig. 434—*Pterostylis longifolia*. A, labellum, side; B, flower, side; C, labellum, side.

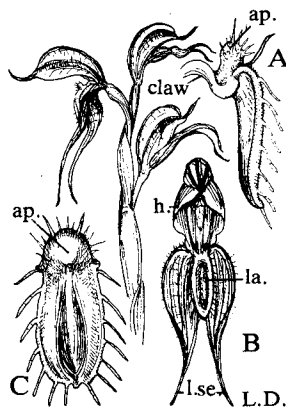


Fig. 435—*Pterostylis mitchellii*. A, labellum, surface; B, labellum, front; C, labellum, surface.

13. *P. mutica* R.Br., *Prod.Fl.Nov.Holl.* 328 (1810).

Midget green-hood. A small slender, glabrous species, usually 7-10 cm high; leaves 4 or 5, in a radical rosette, ovate to elliptical, on very short petioles; lamina 15-20 mm long; stem-bracts acute, sheathing, often withered at flowering time, 1-9, variable in size and often rather large and 1 subtending each pedicel; flowers green, 2-8, in a slightly spiral spike; galea nearly 7 mm long, incurved, broad, blunt; lateral sepals (lower lip) reflexed or spreading, shorter than galea, the lobes short, broad, hardly acute; labellum attached by a wide and moderately long claw (1 mm) to the foot of column, quadrate, tip broadly rounded and slightly emarginate; lamina c. 2.5 mm long, traversed by a raised central line; appendages large, c. 1.25 mm long, oblong, fleshy, the tip turned backwards (as letter S); column c. 6 mm long, reaching almost to top of galea; wings quite rounded, anterior margin ciliate, almost semi-circular, without any tooth, the lower lobe bluntly triangular, ciliate; stigma narrow-elliptical.

Occurs in New Zealand and all Australian States except N.T. Recorded in S.Aust. from the Nullarbor, Flinders Ranges, Eastern, Northern Lofty, Murray, Eyre Pen., Yorke Pen., Southern Lofty and S.E. regions).

Flowers July-Sept.

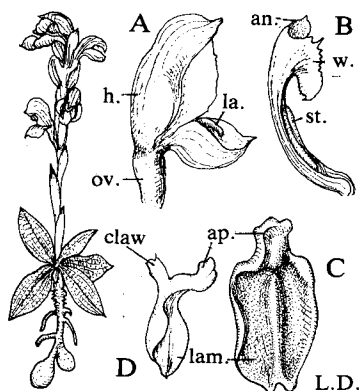


Fig. 436—*Pterostylis mutica*. A, flower, side; B, column, side; C, labellum, from above; D, labellum, side, showing sigmoid appendage.

14. *P. nana* R.Br., *Prod.Fl.Nov.Holl.* 327 (1810).

Dwarf green-hood. A rather diminutive species, usually 5-10 cm high; leaves rosulate at the base of stem, petiolate; lamina ovate, elliptical or oblong-elliptical, 10-15 mm long; stem-bracts usually loose, acute, sheathing; a similar bract subtending the floral pedicel; flower solitary, green; galea erect, 12-15 mm long, broad and obtuse at the apex; lateral sepals (lower lip) erect; lobes separated by a broad truncate sinus with an inflexed central tooth, produced into long erect linear points embracing the galea and much exceeding it; labellum oblong, with a very blunt and slightly recurved tip, attached to a short linear movable claw; lamina 4.5 mm long, traversed by a central longitudinal ridge bearing at its base a curved linear appendage with a trifid tip; column erect, c. 8 mm long, adnate posteriorly at the base to the dorsal sepal; the wings with an acute upper angle, the lower lobe oblong, obtuse, with inturned hairs; rostellum forming a viscid cushion in front of the clinandrium between the 2 pairs of pollinia; stigma elliptical, not glutinous.

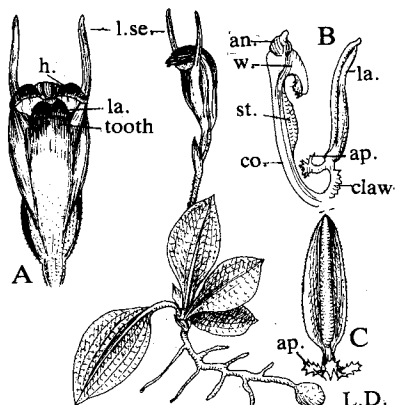


Fig. 437—*Pterostylis nana*. A, flower, front; B, column and labellum, side; C, labellum, from above.

Occurs in New Zealand. W.Aust., N.S.W., Vic., Tas. and S.Aust. (Flinders Ranges, Eyre Pen., Yorke Pen., Murray, Northern Lofty, Southern Lofty, Kangaroo I. and S.E. regions).

Flowers July-Oct.

15. *P. nutans* R.Br., *Prod.Fl.Nov.Holl.* 327 (1810). **Nodding green-hood.** Slender, glabrous, 7-20 cm high; leaves rosulate on rather long petioles; lamina oblong-lanceolate to ovate, 1.5-2.5 cm long; stem-bracts loosely sheathing, usually 3, in addition to that subtending the floral pedicel; flower solitary, green, deflexed or nodding; galea 12-14 mm long, erect at base but abruptly curved downwards towards the apex, terminating in an acute point or frequently with the tip of the dorsal sepal recurved exposing the tips of the petals; lateral sepals (lower lip) erect, the lobes with short acuminate points embracing the tip of the galea; labellum projecting through the sinus of the lateral sepals, on a movable claw attached to the foot of the column, c. 15 mm long (including claw), oblong-linear, semi-circularly recurved, with blunt tip; lamina pubescent, green, with a rather broad raised brown central line extending to the tip; appendage linear, curved, penicillate; column very much incurved, c. 15 mm long; upper angles of wings rounded, with a linear tooth; lower lobes of wings bluntly oblong-falcate, the anterior margins inturned and ciliate; anther incumbent, very blunt; stigma very long and narrow, pointed at both ends, not viscid; rostellum very viscid.

Occurs in New Zealand, Qld, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Sept.-Oct.

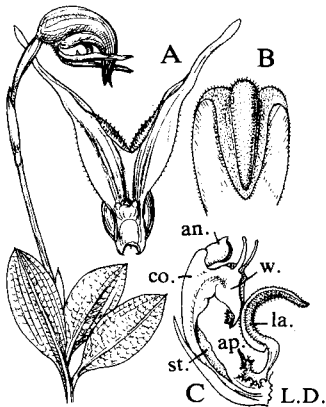


Fig. 438—*Pterostylis nutans*. A, lateral sepals, from inside; B, labellum, front; C, column and labellum, side.

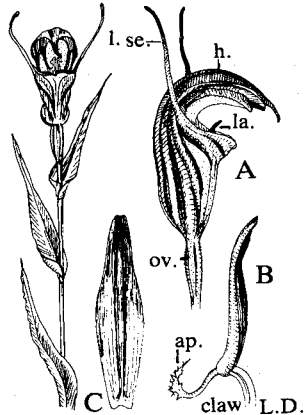


Fig. 439—*Pterostylis obtusa*. A, flower, side; B, labellum, side; C, labellum, surface.

16. *P. obtusa* R.Br., *Prod.Fl.Nov.Holl.* 327 (1810). **Blunt-tongue green-hood.** Very slender, glabrous, 12-25 cm high; no rosette at the time of flowering; stem-leaves usually small and bract-like, 3-5 including the one subtending the floral pedicel, lanceolate, clasping at the base, the upper ones longer than those below; flower solitary, green; galea (including the point) 20-25 mm long, at first erect, then gradually incurved, the apex ending in a fine point c. 5 mm long; lateral sepals (lower lip) erect, cuneate; lobes separated by a broad bulging sinus with the notch protruding forwards, produced into long fine points embracing the galea and much exceeding it; labellum slightly exceeding the column, reddish-brown, oblong-linear, tip very obtuse and slightly recurved; lamina c. 9 mm long, with a raised longitudinal line down the centre; appendage linear, curved, penicillate; column erect, c. 10 mm long; upper angle of wings produced into an acute tooth, lower lobe blunt, oblong; stigma lanceolate, tumid.

Occurs in Qld, N.S.W., Vic. and Tas. Recorded in S.Aust. in the Southern Lofty region.

Flowers April-May.

17. *P. parviflora* R.Br., *Prod.Fl.Nov.Holl.* 327 (1810). **Tiny green-hood.** A small, slender species, 5-15 cm high; radical leaves not developed during the flowering stage or sometimes represented by a small lateral tuft at base of scape; no stem-leaves except several small acute bracts; flowers 1-5, very small, green, racemose; galea much incurved, apex rather blunt in the living plant, not produced into a fine point, c. 8 mm long; lateral sepals (lower lip) cuneate, erect; lobes including a very wide sinus with a notch in the middle, shortly acuminate, embracing the galea but always shorter than it; labellum oblong or linear-oblong, on a movable claw; the tip slightly recurved, obtuse; lamina c. 2.5 mm long, traversed by a broad red raised central line with a narrow red line on either side of it; basal appendage linear, curved, 3-partite; column c. 5 mm long, erect, slightly longer than the labellum; upper angle of wings produced into an acute tooth, the lower lobe oblong, ciliate; stigma relatively large and prominent, cordate.

Occurs in Qld, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty and S.E. regions).

Flowers Feb.-May.

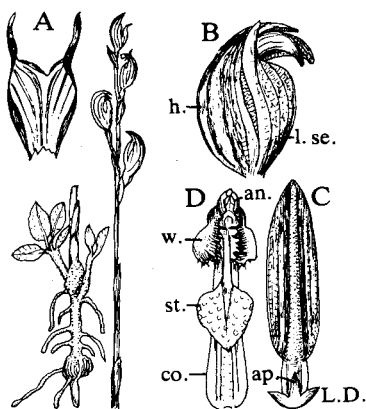


Fig. 440—*Pterostylis parviflora*. A, lateral sepals, from inside; B, flower, side; C, labellum, from above; D, column, front.

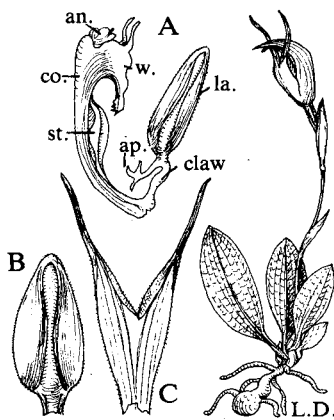


Fig. 441—*Pterostylis pedunculata*. A, column and labellum, side; B, labellum, surface; C, lateral sepals, from inside.

18. *P. pedunculata* R.Br., *Prod.Fl.Nov.Holl.* 327 (1810). **Maroon-hood.** Very slender, 10-22 cm, high; leaves basal, rosulate, ovate or oblong, on long petioles, lamina 1.5-2.5 cm long; stem-bracts small, usually 2 or 3 besides that subtending the floral pedicel; flower solitary, green, with dark brown colouration about the sinus of the lower lip and apex of the galea; galea c. 13 mm long, erect, then curved horizontally forward to the tip, terminating in a short acute point; lateral sepals (lower lip) erect, the lateral lobes enclosing a rather acute sinus without an inflexed tooth, produced into long slender diverging subulate points on each side of the galea and exceeding the latter; labellum dark brown, bluntly ovate on a movable claw, shorter than the column; lamina c. 5.5 mm long, traversed by a raised central line; basal appendage rather long, linear, curved, trifid at the end; column erect, c. 11 mm long; upper angle of wings produced into a filiform process; lower lobe lanceolate with obtuse point and inturned ciliate margin; stigma elliptical, not viscid.

Occurs in Qld, N.S.W., Vic., Tas. and S.Aust. (Yorke Pen., Southern Lofty and S.E. regions).

Flowers July-Oct.

19. ***P. plumosa*** Cady, *Austral. Pl.* 5:138 (1969). **Bearded green-hood.** Moderately robust, 12-30 cm high; leaves sessile, generally numerous, crowded at or near the base, lanceolate or oblong-lanceolate, 1.5-5 cm long, often extending half-way up the stem, sometimes fewer and more distant, passing into acute sheathing bracts, often imbricate; flower green, usually solitary; galea erect, somewhat oblong, c. 30 mm from base to crest, ending in a rather short subulate point, inflated in its lower half, the margins pinched laterally about the middle; lateral sepals (lower lip) linear, reflexed or recurved in mature flower, the lobes almost parallel, linear, acute, c. 30 mm long; labellum c. 20 mm long, on a narrow-oblong irritable claw, filiform except at the extremities, narrowly channelled below; base dilated into an elongated somewhat boat-shaped process, glabrous and transversely corrugated above, ciliate on the margins and produced posteriorly beyond the insertion of the claw; tip brown, carunculate, with 2 small oblong depressed wings; filiform portion with long oblique yellow hairs; column erect, c. 20 mm long, rather broadly winged; upper border of wings rounded with a prominent straight narrow-linear process, lower lobes blunt falcate-oblong; anterior borders turned and ciliate; stigma considerably wider than the column, bilobed, narrowly obovate, not viscid until after pollination.—*P. barbata* non Lindl., sensu J. M. Black, *Fl.S.Aust.* 247 (1943).

Occurs in New Zealand, N.S.W., Vic., Tas. and S.Aust. (Flinders Ranges, Northern and Southern Lofty, Murray, Eyre Pen., Kangaroo I. and S.E. regions).

Flowers Sept.-Nov.

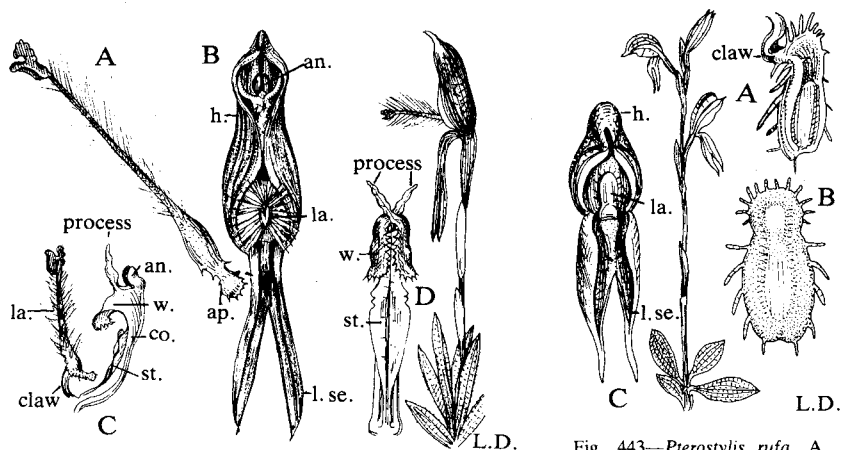


Fig. 442—*Pterostylis plumosa*. A, labellum, from above; B, flower, front; C, column and labellum, side; D, column, front.

Fig. 443—*Pterostylis rufa*. A, labellum, side; B, labellum, surface; C, flower, front, showing triggered labellum (upward directed).

20. ***P. rufa*** R.Br., *Prod.Fl.Nov.Holl.* 327 (1810). **Rusty-hood.** A slender rather diminutive species, 6-15 cm high; leaves in a green radical rosette, shortly petiolate; lamina c. 13 mm long, oblong-lanceolate; stem-bracts 2-6, closely sheathing, and one subtending each floral pedicel; flowers 1-4, racemose, on slender pedicels, green, with reddish tints on lower labellum and margins of galea; galea c. 10 mm long from base to crest, with short recurved subulate point; lateral sepals (lower lip) recurved or reflexed, concave, margins involute, about same length as galea; lobes shortly acuminate; labellum oblong, fleshy and very irritable, 5 mm long, on a long wide claw, concave on its upper surface, tip straight very blunt and rounded, posterior margin thickened; under surface with a deep central channel running from base to tip between 2 pear-shaped swellings, the apices of which are directed forwards; lateral margins with a few long hairs,

posterior margins and tip shortly ciliate, channel on lower surface beset with stiff transverse hairs; appendage almost obsolete, represented by the thickened posterior margin; column incurved, c. 5 mm long; wings wide, roughly quadrangular with upper and lower angles rounded and ciliate, no tooth present, anterior margins with turned ciliate edges; stigma obovate, membranously expanded, wider than the column.—*P. pusilla* R. S. Rogers, *Trans. R. Soc. S. Aust.* 42:26 (1918).

Occurs in all Australian States except N.T.; recorded in S.Aust. from the Eyre Pen., Yorke Pen., Flinders Ranges, Northern Lofty, Southern Lofty, Murray and S.E. regions.

Flowers Sept-Nov.

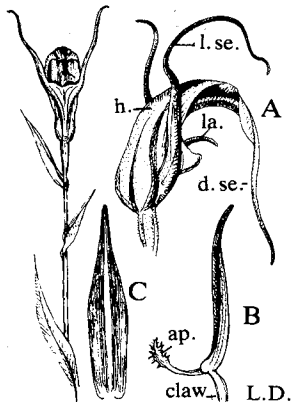


Fig. 444—*Pterostylis tenuissima*. A, flower, side; B, labellum, side; C, labellum, surface.

21. *P. tenuissima* Nicholls, *Victorian Nat.* 67:46 (1950). **Swamp green-hood.** Slender, often attenuated, glabrous plant, 5-28 cm high; no rosulate leaves at the time of flowering; stem-bracts 5-7, alternate and widely spaced; the upper ones leaf-like and broadly lanceolate, stem-clasping at the base, 1-3 cm long; the lower ones small and sheathing; flower solitary, small, greenish-white with green and some darker longitudinal striae; galea 13-25 mm long, erect, then gradually curved forward in a semi-circle, the apex produced into a long filiform point 8-10 mm long; lateral sepals (lower lip) erect; the lobes separated by a V-shaped sinus, produced into filiform c. 20 mm long, erect points, embracing the galea and exceeding it by c. 15 mm; labellum on a broad mobile claw, lanceolate, curved apex not very acute; lamina c. 8 mm long with a raised longitudinal ridge throughout; basal appendage curved, densely penicillate at the apex; column erect, incurved, c. 10 mm long, only slightly longer than labellum; upper angle of wings with a short point, acute, lower lobes rounded, with ciliate margins; anther shortly pointed; stigma lanceolate.

Occurs in Vic. and S.Aust. in the S.E. region.

Flowers Oct.-March.

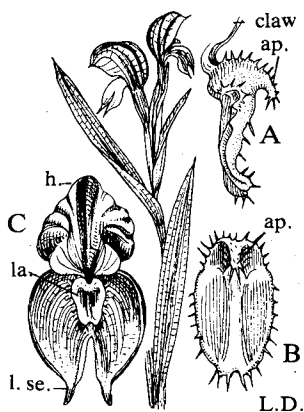


Fig. 445—*Pterostylis vittata*. A, labellum, side; B, labellum, from above; C, flower, front.

22. *P. vittata* Lindl., *Sketch Veg. Swan Riv. Col.* 53 (1840). **Banded green-hood.** Plant 8-35 cm high; generally without basal leaves but in occasional specimens a lateral tuft is present; stem-leaves well-developed, lanceolate, clasping at the base, variable in length, 6-8 cm long and 1-1.5 cm wide, the longest leaves in the middle of stem; leaves within the raceme well developed, while those at the base are small and scale-like; radical leaves ovate or obovate on very short petioles; flowers nodding, greenish with many red tints and stripes, sometimes solitary, more frequently several in a compact terminal raceme; galea broad, c. 14 mm long from base to crest, its aperture directed downwards, the apex ending in a very short acute point, greenish with dark-green or dark-red longitudinal stripes, the petals more or less completely red; lateral sepals (lower lip) reddish, reflexed or recurved, very wide, usually ovate-orbicular, c. 14 mm long and 11 mm wide, the lobes with short acute points; labellum on a rather long and very irritable claw, broadly oblong, contracting somewhat abruptly to a blunt point; tip bifid and upturned; margins otherwise entire; lamina c. 5 mm long, glandular, margins hairy, the base much thickened and raised into an eminence furnished with a free hairy linear process

directed forwards and upwards, the upper surface thereafter concave with a broad raised line down the centre; lower surface longitudinally channelled; column reaching to crest of galea, greatly incurved; wings with a small blunt tooth at upper angle, lower lobe narrow, elongate, almost acute, ciliate, front margins with long inturned hairs; stigma membranous, obovate, not prominent, much expanded laterally, exceeding the column in breadth.

Occurs in W.Aust., Vic., Tas. and S.Aust. (Flinders Ranges, Northern Lofty, Eyre Pen., Yorke Pen., Southern Lofty, Murray, Kangaroo I. and S.E. regions).

Flowers May-July.

23. *P. sp.*, undescribed.

Collected in S.Aust. (Murray region) near the N.S.W. border.

Flowers Oct. (1 record).

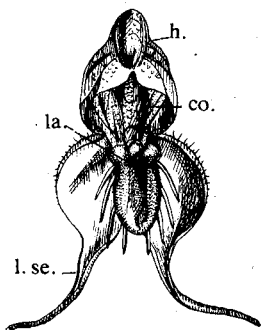


Fig. 446—*Pterostylis* sp.

20. *SPIRANTHES* L. C. Rich.

Mem.Mus.Par. 4:50 (1818).

(Greek *speira*, a coil; *anthos*, a flower.)

Terrestrial herbs with elongated underground tubers; flowers small, sessile in a spiral spike; leaves narrow or linear, several, basal or nearly so; perianth-segments subequal; dorsal sepal erect or incurved over the column, ovate, concave; lateral sepals free, ovate-lanceolate, erect or spreading; petals truncate, erect, their posterior margins concealed by the dorsal sepal and forming with that segment a hood; labellum about as long as the sepals, on a very short claw, undivided; the lower half erect with entire margins embracing the column; the tip recurved; the lamina with 2 rounded glandular bodies at the base; column erect, very short, contracted in the lower half, clinandrium expanded; anther blunt or very minutely apiculate, incumbent against the back of the stigma, valvate, 2-celled; column wings membranous, stretching between the anther filament and the stigmatic-plate, adnate to the pedicel (style) of the latter and also to the margins of the stigma itself, forming a pouch between the male and female elements; stigmatic surface large, about the same length as the rostellum; rostellum forming with the viscid disk a long membranous structure much exceeding the anther in height; the disk accommodated in a fork of the rostellum and covered by a membranous capsule; pollinia in 2 pairs, granular, the apices of the pairs lightly united, exposed above the anther and attached by a short caudicle to the back of the disk. Cosmopolitan, with c. 50 species. Represented in Australia by a single species, which extends to New Zealand and also has a wide range over Asia and a portion of Europe.

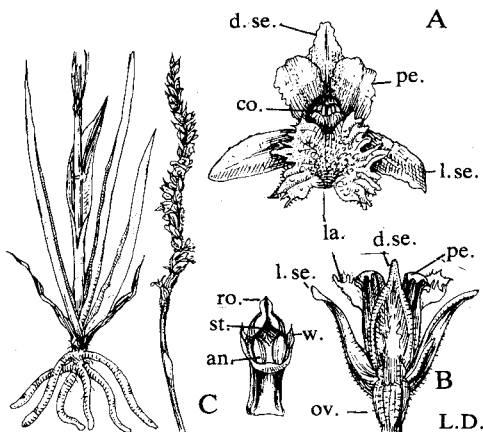


Fig. 447—*Spiranthes sinensis*. A, flower, front; B, flower, side; C, column.

shaped), covered by a membranous capsule derived from the rostellum; pollinia lamellate, pear-shaped.—*Neottia sinensis* Pers., *Syn.Pl.* 2:511 (1807); *Neottia australis* R.Br., *Prod.Fl.Nov.Holl.* 319 (1810); *Spiranthes australis* (R.Br.)Lindl., *Edward's Bot.Reg.* 10:sub t.823 (1824).

Occurs in Qld, N.S.W., Vic., Tas. and S.Aust. (Southern Lofty and S.E. regions).

Flowers Jan.-Feb.

The change to *Spiranthes lancea* (Thunb.ex Sw.) Backer, Bakh.f. & Steenis, *Blumea* 6:361 (1950), was shown to be erroneous by J. Vuijk in *Blumea* 11:226-228 (1961).

21. THELYMITRA Forst. & Forst.f.

Char.Gen.Pl. 97:t.49 (1776).

(Greek *thēlys*, feminine; *mitra*, a turban; referring to the hood of the column in several species.)

Plants terrestrial, glabrous, very rarely with hairy leaves; tubers ovoid, new one produced at the base of parent plant; leaf solitary, sheathing at the base, linear to lanceolate, rarely ovate-lanceolate or terete, generally much elongated and fluted, often thick and fleshy; cauline bracts 1-2, foliaceous; floral bracts large, usually exceeding ovary; raceme usually of few to 20 flowers, rarely flower solitary; perianth glabrous, usually opening widely in sun, colourful, albino forms not infrequent; dorsal sepal uppermost, similar to lateral sepals and petals, the labellum undifferentiated from the others in colour, sometimes differing slightly in shape; column erect, widely winged; wings joined in front at base and variously lobed and ornamented at sides (e.g. fig. 448) commonly produced behind and over the anther so as to form a more or less complete often bilobed hood which is entire or plumed or decorated with various excrescences; anther 2-celled, erect or incumbent, usually partly or wholly hidden by wings, its connective often produced into an appendage (anther point) which may be short or long, entire or bifid; pollinia 2 per cell, each deeply bilobed or in pairs, attached directly or by means of a short caudicle to the disk of the rostellum or sometimes quite unconnected with it; pollen mealy or finely granular; stigma borne on an erect plate-like style either in front of the anther more or less concealing it or below the anther, cleft on top to varying degrees; viscid disk well developed and situated in slot or depression in the upper border of the stigma; rostellum small and narrow.

1. *S. sinensis* (Pers.) Ames, *Orchidaceae* 2:53 (1818). **Austral ladies tresses.** A slender marsh-plant with the characters of the genus; arising from several (often 6) elongated conical or terete tubers; 15-45 cm high; leaves usually 3, 4-10 cm long; stem-bracts usually 3; flowers white or pink, the subtending bracts ovate, pubescent on the outside, about as long as the ovary; ovary pubescent, shortly ovoid; perianth-segments 4.5-5 mm long; the petals rather wider at the tips than at the base; labellum white, more or less rectangular, the lower half bulging at the base; the tip truncate, the margins fringed or glandularly dentate; a large ovoid body on each side of the lamina at the base; column c. 3 mm long, fleshy; anther reaching to about the base of the rostellum; stigmatic surface U-shaped, slightly sloping downwards; the disk of the rostellum slate-coloured, long, narrow-elliptical (boat-

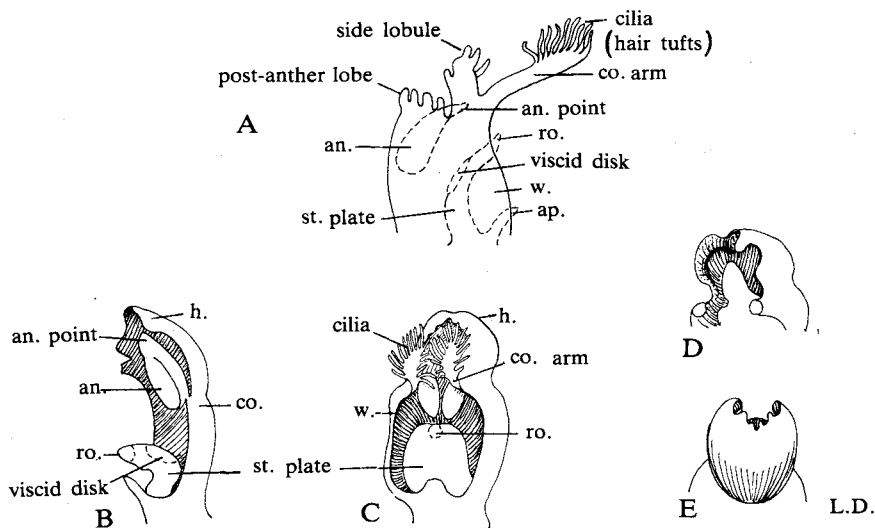


Fig. 448—*Thelymitra ixioides*. A, column, bisected longitudinally. *Thelymitra longifolia*. B, column, bisected longitudinally; C, column, front; D, hood, (column arms removed); E, hood from rear.

About 45 species mostly Australian, extending also to Indonesia, the Philippines and New Caledonia, with 12 species in New Zealand of which 7 also occur in S.Aust.

The column offers the best characters for identifying species, though habitat, leaf form, shape and colour of perianth-segments are also useful. For purpose of description the structures associated with the column and included in the general term "wings" are treated as follows (Fig. 448):—

Column-arm: ("Lateral lobes" of J. M. Black (1943), *Fl.S.Aust.*) is applied to 2 small processes, one on each side of the anther, and each supplied by a single unbranched vascular bundle; these are thought to represent staminodes. They are of different forms: (a) ribbon-like to more or less thickened and clavate, plain or ornamented with teeth or tubercles; (b) each consisting of a more or less terete stem bearing on sides, back and top numerous *cilia* ("Hair-tufts" of J. M. Black, l.c.), hair-like structures 1-2 cells wide, throughout their length; (c) the stem partly to quite flattened, bearing on its lower margins teeth, lacinae or fimbriae which are relatively few, mostly several cells wide at their bases and tapering to their tips, the top of such column-arms sometimes occupied by more cilia-like structures. **Post-anther lobe** ("Mid-lobe" of J. M. Black, l.c.) lies between the column-arms and mostly behind the anther; it has a more or less complex vascular supply, always closely associated with that of the functional anther, and may be thought of as an outgrowth of the filament. In a few species (e.g. *T. venosa*) it is represented only by a band of small calli crowded across the back of the anther; in most species it stands erect with a free margin and may be short or tall, plain or ornamented with fleshy tubercles, truncate or cucullate, and is often distinctively coloured. At its maximum development the post-anther lobe forms a somewhat fleshy, well-vascularized hood that overhangs and quite hides the anther (e.g. fig. 461). **Side lobule** ("Adjacent divisions" of J. M. Black, l.c.) stands in a few species immediately behind the column-arm and is more or less distinct from the middle part of the post-anther lobe (e.g. fig. 451); it tends to be fleshy with irregularly jagged margins and occasionally

sharp surface tubercles, but it includes no vascular strand. Species with distinct side lobules have sometimes been described as having a tripartite mid-lobe.

(The above discussion of terminology is adapted from L. B. Moore & E. Edgar (1970), *Fl.N.Z.2.*)

1. Leaf straight.
2. Leaf less than four times as long as wide. *T. fuscolutea* 9.
2. Leaf more than five times as long as wide.
3. Column-arms (fig. 448) with hair-tufts (cilia, fimbriae).
4. Hair-tufts always yellow.
5. Post-anther lobe produced into a fleshy hood *T. chasmogama* 5.
5. Post-anther lobe not produced into a fleshy hood.
6. Perianth-segments spotted *T. irregularis* 10.
6. Perianth-segments not spotted.
7. Post-anther lobe short, abrupt *T. luteocillium* 13.
7. Post-anther lobe bifid, lobes shell-like *T. mucida* 17.
4. Hair-tufts white or pink, drying brown.
8. Column consisting of a post-anther lobe and 2 column-arms.
9. Post-anther lobe not expanded into a hood (not cucullate).
10. Post-anther lobe bifid, tips concave shell-like, fleshy, smooth *T. mucida* 17.
10. Post-anther lobe denticulate.
11. Post-anther lobe incurved, globose, smooth outside, margins denticulate *T. aristata* 2.
11. Post-anther lobe straight, narrow, tuberculate, finely crested *T. decora* 6.
9. Post-anther lobe expanded into a fleshy hood.
12. Hood not cleft.
13. Cilia pink; post-anther lobe densely crested, entire, conspicuously truncate, exceeded by cilia *T. decora* 6.
13. Cilia pink or white; post-anther lobe margin smooth, exceeding the cilia *T. longifolia* 12.
12. Hood cleft.
14. Column-arms more or less vertical (including cilia conspicuously exceeding the hood) *T. pauciflora* 18.
14. Column-arms more or less horizontal.
15. Only basal portion of anther concealed by stigma; narrow hood halves deeply and widely separated *T. mucida* 17.
15. Whole anther concealed by stigma; hood halves meeting along mid line.
16. Hood halves deeply denticulate; leaf widely lanceolate *T. aristata* 2.
16. Hood halves smooth, shallowly or deeply separated; leaf lanceolate *T. longifolia* 12.
8. Column consisting of a post-anther lobe, 2 side lobules and 2 column-arms.
17. Leaf more than 1.5 cm wide *T. epipactoides* 7.
17. Leaf less than 1 cm wide.
18. Perianth-segments (petals) spotted *T. ixioides* 11.
18. Perianth-segments not spotted *T. canaliculata* 3.

3. Column-arms without hair-tufts.
 19. Column-arms rudimentary or absent *T. flexuosa* 8.
 19. Column-arms produced into distinct appendages.
 20. Column-arms ribbon-like, more or less spirally twisted inwards *T. venosa* 19.
 20. Column-arms fleshy, suberect.
 21. Column-arms c. $\frac{3}{4}$ as wide as long; post-anther lobe prominent, crenulate *T. carnea* 4.
 21. Column-arms two times longer than wide; post-anther lobe lacking, or replaced by deep sinus and side lobules.
 22. Column-arms smooth, reddish-brown, emarginate; flower yellow *T. antennifera* 1.
 22. Column-arms crenulate to rugulose, yellow to pink; flowers pink or reddish to deep violet.
 23. Flowers bright pink to deep violet, usually striated; column-arms ovoid, beset with finger-like papillae *T. mackibbinii* 14.
 23. Flowers salmon-pink, reddish to crimson; column-arms oblong-lanceolate, from slightly crenulate to rugulose with gland-like folds *T. macmillanii* 15.
 1. Leaf flexuose or spirally twisted round stem *T. matthewsii* 16.

1. *T. antennifera* (Lindl.) Hook. f., *Fl. Tasm.* 2:4 (1858). **Rabbit ears.** Slender, generally 12-20 cm high; leaf terete and rather long, stem wiry, zig zag; stem-bracts 2, situated at angles of flexion; flowers large, 1-3, yellow, opening freely, sweet-scented; perianth-segments yellow on the inside; sepals with wide reddish-brown stripe externally, elliptical or oblong-elliptical, 15-16 mm long; column erect and rather wide, not hooded, broadly winged; the column arms produced laterally into 2 erect dark-or red-brown smooth spatulate usually bilobed appendages, much longer than the anther, the post-anther lobe between the column-arms not produced behind the anther; anther 2-celled, situated wholly above the stigma, its apex produced into a broad thick yellow curved pubescent blunt process (anther point); stigma transversely oval, situated low down on the column; rostellum conspicuous; pollinia 2, each bilobed, attached directly or by a very short caudicle to the viscid disk.—*Macdonaldia antennifera* Lindl., *Sketch Veg. Swan Riv. Col.* 50 (1840).

Occurs in W.Aust., N.S.W., Vic., Tas. and S.Aust. (Eyre Pen., Northern Lofty, Murray, Yorke Pen., Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Sept.-Oct.

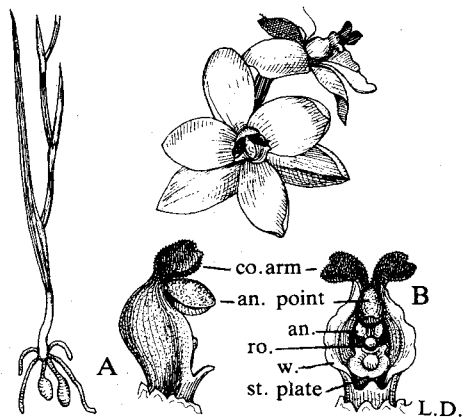


Fig. 449—*Thelymitra antennifera*. A, column, side; B, column, front.

2. *T. aristata* Lindl., *Gen. & Sp. Orchid. Pl.* 521 (1840). **Scented sun-orchid.** The most robust member of the genus, 35-75 cm high; leaf widely lanceolate, sheathing for 5-15 cm at the base, thick, generally enclosing base of lowest bract; stem-bracts 3 or 4, large, acute, lower ones leafy; flowers purple-blue, usually numerous in a long raceme, 3 cm diam.; perianth-segments rather acute, concave, oblong-lanceolate, 13-15 mm long, the labellum narrower than other segments; column erect, 6-7 mm high, hooded; wings wide and inflated, hair-tufts, white, horizontal; post-anther lobe arched, bifid, the halves deeply denticulate, the crest higher than the hair-tufts, the profile falcate; anther wholly concealed behind the stigma; pollinia 4 (in 2 pairs), lamellar (plate-like), connected directly with the viscid disk, no caudicle; stigma ovate, situated unusually low down in the concavity of the column below the middle; rostellum prominent, viscid.—*T. grandiflora* Fitzg., *Gdnrs' Chron.* n.s. 17:495 (1882).

Occurs in ?New Zealand, Qld, N.S.W., Vic., Tas. and S.Aust. (Flinders Ranges, Northern Lofty, Southern Lofty and S.E. regions).

Flowers Sept.-Nov.

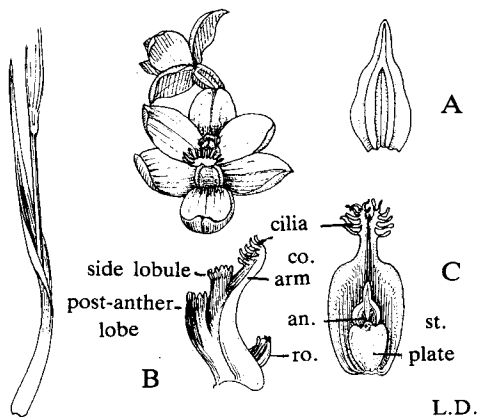


Fig. 451—*Thelymitra canaliculata*. A, anther, front; B, column, side; C, column, front.

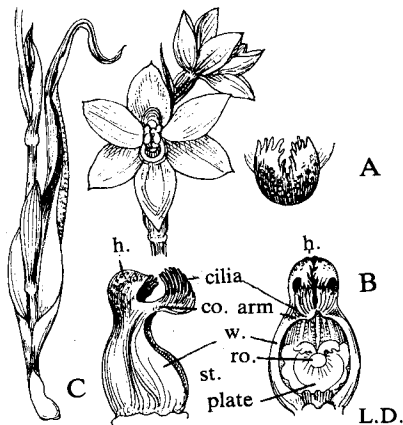


Fig. 450—*Thelymitra aristata*. A, hood, from above; B, column, front; C, column, side.

3. *T. canaliculata* R. Br., *Prod. Fl. Nov. Holl.* 314 (1810). **Azure sun-orchid.** A slender species, usually 10-50 cm high; leaf rather long, narrow-linear, often filiform; flowers a deep azure blue, 1-12; perianth-segments veined, 8-9 mm long; column rather widely winged, with purple hair-tufts directed upwards and forwards; the hood between the hair tufts purple with yellow margin and deeply 3-lobed, the post-anther lobe denticulate, shorter than and often overlapping the side lobules, the latter with smooth or denticulate upper borders; anther almost concealed behind the stigma, its point moderately long; pollinia 2, deeply bilobed, connected by short caudicle to the rostellum; stigma large, ovate; rostellum prominent.—*T. azurea* R. S. Rogers, *Trans.R.Soc.S.Aust.* 41:342 (1917).

Occurs in W.Aust., Vic., Tas. and S.Aust. (Eyre Pen., Yorke Pen., Murray, Southern Lofty and S.E. regions).

Flowers Oct.-Nov.

4. *T. carnea* R. Br., *Prod. Fl. Nov. Holl.* 314 (1810). A slender species, stem often reddish, more or less flexuose, 12-45 cm high; stem bracts 2-3, closely sheathing, the lower one longest, leaf narrow-linear, 10-15 cm long; inflorescence 1-4 (-6)-flowered; flowers from cream to reddish,

without stripes; ovary rather long; perianth-segments rather similar, broadly oblong, more or less obtuse; sepals sometimes darker in colour; column-arms thick and fleshy, more or less ovate, 1.1-1.3 mm long, without fringes or cilia, post-anther lobe 4.5 mm high, unevenly thickened to almost cucullate (hooded), margins fleshy; side lobules not developed; anther prominent, somewhat blunt, its broad and obtuse base concealed behind the stigma; anther point produced parallel with column-arms and equalling them; stigma prominent, situated in lower part.

1. Column-arms marginally crenate; post-anther lobe almost as high as anther..... var. *carnea* 1.
1. Column-arms rugulose, denticulate; post-anther lobe rather higher than anther..... var. *rubra* 2.

1. Var. *carnea*. **Tiny (pink) sun-orchid**. Leaf almost terete; perianth-segments 5-10 mm long, cream to pink; labellum sometimes slightly smaller; column-arms marginally crenate; post-anther lobe erect, almost as high as anther, more or less denticulate, yellowish; flower seldom expanding, cleistogamous, self-pollinated.

Occurs in New Zealand, W.Aust., N.S.W., Vic., Tas. and S.Aust. in the Southern Lofty region.

Flowers Sept.-Nov.

2. Var. *rubra* (Fitzg.) J. Z. Weber & R. Bates, comb. nov. **Salmon (pink) sun-orchid**. Leaves linear; perianth-segments 7-9 mm, ruby red or salmon pink, rarely pale yellow with reddish tints; column-arms produced into denticulate and more or less roughened lobes, covered with rugulose glands, rather higher than anther; post-anther lobe shortly truncate, rather broad, produced above the anther, slightly denticulate, partly reddish; flower freely expanding, but cleistogamous.—*T. rubra* Fitzg., *Gdnrs' Chron.* n.s. 17:495 (1882); *T. umalis* Fitzg., l.c.

Occurs in N.S.W., Vic., Tas. and S.Aust. (Eyre Pen., Flinders Ranges, Northern and Southern Lofty and S.E. regions).

Flowers Sept.-Nov.

5. *T. chasmogama* R. S. Rogers, *Trans. R. Soc. S. Aust.* 51:4 (1927). **Globehood sun-orchid**. Glabrous, with a scarious scale at base, 25-30 cm high; leaf with a sheathing cylindrical base, c. 5 cm long, the blade linear, 10-12 cm long; flowers 2-6, pink, opening freely, on slender pedicels, the perianth-segments 12-13 mm long; column c. 6.5 mm long, column-arms carried forwards and upwards into 2 yellow hair-tufts, the hood produced forwards into a yellow tube with smooth entire margins; stigma semi-oval, the viscid disk in a slot in its upper border.

Occurs in N.S.W., Vic. and S.Aust. (Eyre Pen., Yorke Pen., and Southern Lofty regions).

Flowers Sept.-Nov.

Closely resembles *T. luteociliium*, but the pollinarium is adapted for cross-pollination.

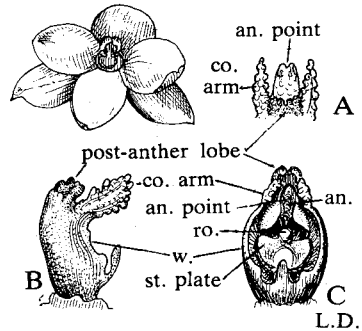


Fig. 452—*Thelymitra carnea* var. *carnea*. A, column, top; B, column, side; C, column, front.

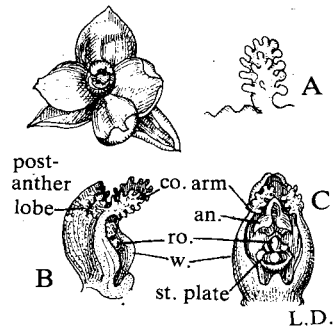


Fig. 453—*Thelymitra carnea* var. *rubra*. A, column arm, side; B, column, side; C, column, front.

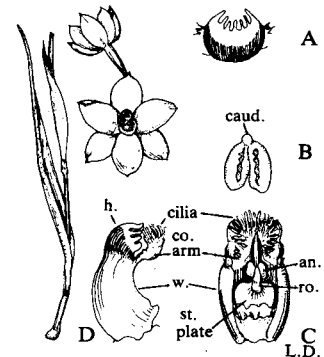


Fig. 454—*Thelymitra chasmogama*. A, hood, from above; B, pollinia; C, column, front; D, column, side.

6. *T. decora* Cheesem., *Man.N.Z.Fl.* 1151 (1906). Plant to 40 cm tall; leaf to 10 mm wide, channelled and keeled; flowers 2-6, lavender-blue with darker spots, especially on petals; perianth-segments ovate-oblong, subacute, c. 15 mm long, more or less concave giving rounded appearance to flowers; labellum slightly spatulate; column stout, c. 5 mm high, widely winged; column-arms terete to plano-convex in transverse section; hair-tufts white, dense, arising from sides back and top of arm and mostly standing higher than post-anther lobe; post-anther lobe narrow compared with maximum width of column, extending well above anther point, dark subterminal part tuberculate, margins usually yellow, finely denticulate, inclined to bend over anther though not thickened or incurved; anther with well-marked point, a considerable portion showing above the stigma; stigma large, somewhat quadrangular; the viscid disk situated in a deep depression in its upper border.—*T. truncata* R. S. Rogers, *Trans.R.Soc.S.Aust.* 41:343 (1917); *T. ixiodes* var. *truncata* (R. S. Rogers) Nicholls, *Victorian Nat.* 60:55 (1943).

Occurs in N.S.W., Vic., Tas. and S.Aust. in the Southern Lofty region.

Flowers Sept.-Nov.

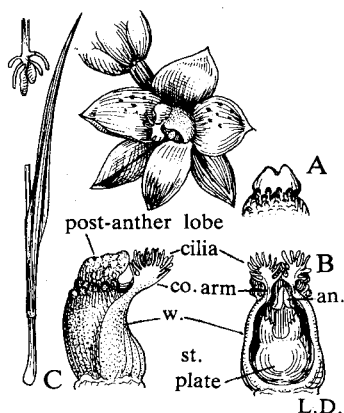


Fig. 455—*Thelymitra decora*. A, post-anther lobe, rear; B, column, front; C, column, side.

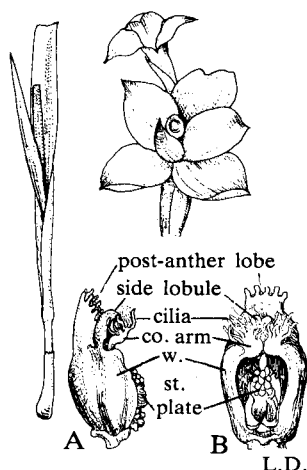


Fig. 456—*Thelymitra epipactoides*. A, column, side; B, column, front.

7. *T. epipactoides* F. Muell., *Fragm.Phyt.Aust.* 5:147 (1866). **Metallic sun-orchid.** A plant of robust habit, 21-52 cm high; leaf long, fleshy, lanceolate, tubular at the base; stem-bracts 1 or 2, leafy; flowers 6-18, large, pedicellate, usually of a peculiar iridescent greyish-green colour shot with pinkish tints, sometimes brown with a metallic lustre; perianth-segments ovate-lanceolate, 10-11 mm long; column widely winged, hair-tufts white, turned upwards; segment between the hair-tufts deeply 3-lobed; post-anther lobe incurved, irregularly denticulate at the top, and reaching a higher level than the adjacent ones; lateral lobes denticulate with oblique tips, passing upwards and inwards and often interlocking like the fingers of two hands; anther with exception of its point, concealed behind the stigma; stigma situated well below the middle of column.

Occurs in Vic. and S.Aust. (Eyre Pen., Murray and S.E. regions).

Flowers Sept.-Oct.

8. *T. flexuosa* Endl., *Nov.Stirp.Dec.* 23 (1839). **Twisted sun-orchid.** A very slender species, usually 15-20 cm high; leaf terete above its opening, 7-8 cm long; stem very wiry, zig zag; stem-bracts 2, situated at points of flexion; flowers small, yellow, 1 or 2, opening on hot days; perianth-

segments very obtuse, outer ones (sepals) concave, ovate, inner ones (petals) oval, c. 7 mm long, the labellar segment rather shorter and narrower than the others; column erect, c. 4.5 mm high, not hooded, widely winged; the wings only very slightly produced at the sides into rounded dentate lobes; post-anther lobe slightly notched and rather higher than the side lobules; all very much shorter than the anther; anther situated entirely above the stigma, apex produced into a large oblong fleshy downy anther point, greatly exceeding the lobes of the wings; pollinia 4 (in 2 pairs), directly connected with the viscid disk; stigma somewhat rectangular; flower cleistogamous.

Occurs in W.Aust., N.S.W., Vic., Tas. and S.Aust. (Eyre Pen., Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Sept.-Nov.

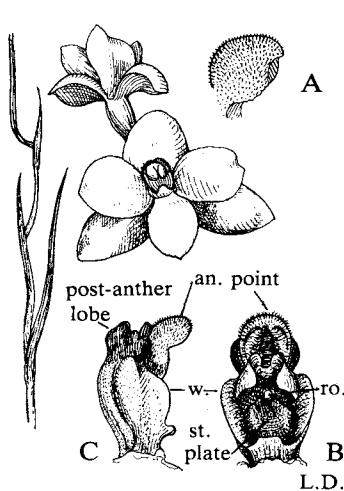


Fig. 457—*Thelymitra flexuosa*. A, anther point; B, column, front; C, column, side.

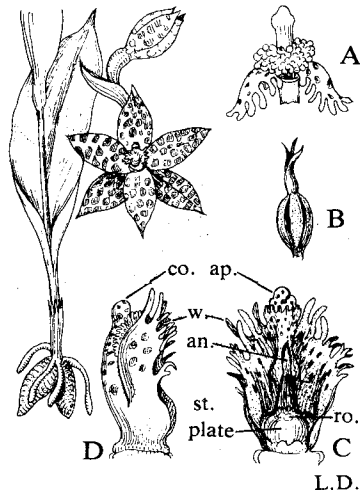


Fig. 458—*Thelymitra fuscolutea*. A, column appendage; B, capsule; C, column, front; D, column, side.

9. *T. fuscolutea* R.Br., *Prod.Fl.Nov.Holl.* 315 (1810). **Blotched (leopard) sun-orchid.** Generally rather stout, 15-45 cm high; leaf the widest in the genus, ovate-lanceolate to oblong lanceolate, contracted and sheathing at base, dimensions very variable, 4-12 cm long and 1.5-5 cm wide; flowers 2-6, large, yellowish marked with dark-brown spots, c. 2.5 cm diam.; perianth-segments elliptic-lanceolate, acuminate, 14-16 mm long; column 7-8 mm long including wings, but very short (only 2 mm) below the anther; wings voluminous, produced behind and beyond the anther in the form of a canopy or broad hood, without definite lateral lobes, the upper margins dissected into dentate or linear processes, a dorsal thickening from the base produced upwards into an undivided clavate appendage rather shorter than the linear processes, the summit of the hood in front of the appendages densely woolly; anther at its apex produced into a long recurved finger-like process, concealed, except its apex, behind the stigma; stigma situated in the concavity formed by the wings at base of column; rostellum prominent in upper border of stigma; no caudicle.

Occurs in W.Aust., Vic. and S.Aust. (Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Nov.-Dec.

10. *T. irregularis* Nicholls, *Victorian Nat.* 63:126 (1946). **Crested sun-orchid.** A slender, glabrous plant, 25-40 cm high; leaf narrow-linear, 10-20 cm long, rather thin, channelled, acute; stem pink, with tendency to angulation or nearly straight; stem-bracts 2, subulate, sheathing; flowers medium, 2-4 on slender pedicels; ovary rather slender, terete; perianth-segments c. 13 mm long, bright rose-pink, expanding freely, elliptical and finely speckled with dots; column erect and rather narrow, 6-7 mm long; column-arms produced upwards into two golden-yellow penicillate hair-tufts; post-anther lobe yellow, denticulate, short and abrupt, an erect collar-like fringe of small calli immediately below; apex of anther obtuse, showing distinctly below column-arms, two-celled; anther-case carried high above the stigma; stigma small, with pink upper border; pollinia 2, each bilobed, attached directly or by a very short caudicle to the viscid disk; the specific epithet is in allusion to the irregular margins of the post-anther-lobe.

Occurs in N.S.W., Vic. and S.Aust. in the Southern Lofty region.

Flowers Oct.-Nov.

The pollination mechanism is adapted for cross-pollination.

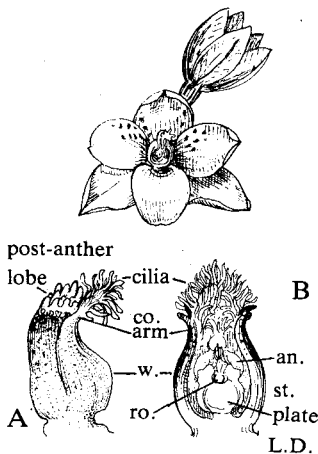


Fig. 459—*Thelymitra irregularis*. A, column, side; B, column, front.

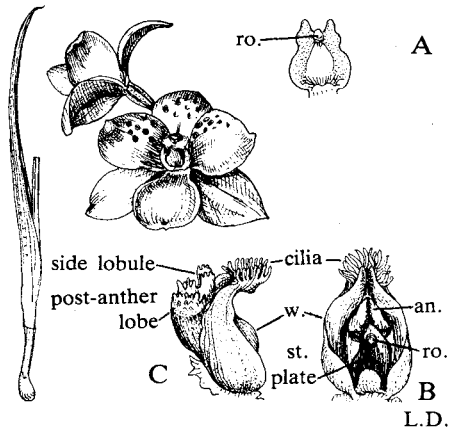


Fig. 460—*Thelymitra ixioides*. A, stigmatic plate, front; B, column, front; C, column side.

11. *T. ixioides* Sw., *K.Svenska Vet.Acad.Handl.* 21:228 (1800). **Dotted sun-orchid.** Varies from a robust, many-flowered plant to one with slender stem and few flowers; stem 20-60 cm high; leaf linear, often exceeding 12 cm in length, channelled; flowers on very slender pedicels, about 2-6, blue on inside with spotted dorsal sepal and petals; the sepals reddish-purple on the outside; perianth-segments (including labellum) not very acute, 8-9 mm long, elliptical; column erect, c. 4 mm long; column-arms extended upwards and forward on either side of anther, ending in white hair-tufts; post-anther lobe, much shorter than the side lobules, crested with several rows of calli; anther slightly above the stigma and rostellum, its blunt point produced a little above the bases of the penicillate lobes; pollinia concealed behind stigma; some plants cleistogamous.

Occurs in New Zealand, New Caledonia and all Australian States except N.T. Recorded in S. Aust. from the Southern Lofty, Kangaroo I. and S.E. regions.

Flowers Oct.-Nov.

The typical form is recognisable by its *Ixia*-like appearance and characteristic deep purple dots (sometimes unspotted). The column may also vary in shape. (Fig. 448 A).

12. *T. longifolia* Forst. & Forst.f., *Char. Gen. Pl.* 98:t.49 (1776). **Plain sun-orchid.** Varies from a slender to a robust habit 10-60 cm high; leaf very variable, often 30 cm long and 10-20 mm wide, strap-shaped, more or less ridged, thick but flaccid; flowers often scented, rather large, 1-15; perianth-segments rather acute, 8-15 mm long, reddish-green externally, internally occasionally white, purple or pink, commonly blue, without stripes or spots; dorsal sepal slightly broader than laterals; petals and labellum alike, ovate, subacute; column erect, c. 6 mm high, hooded; column-arms terete, usually bent inward, cilia numerous, white, short and crowded in globose masses, lying more or less under post-anther lobe, post-anther lobe sometimes dark coloured and smooth above middle, more or less yellowish at margin, notched, often laterally dilated, hooded, overtopping the hair-tufts; anther point showing at the base of the post anther lobe, with stigma concealing the anther; stigma prominent, with the upper border conspicuously cleft; pollinia 4 in 2 pairs; some populations cleistogamous.—*T. nuda* R. Br., *Prod. Fl. Nov. Holl.* 314 (1810); *T. megalyptra* Fitzg., *Aust. Orchids* 1 (5) (1879); *T. aristata* Lindl. var. *megalyptra* (Fitzg.) Nicholls ex. J. M. Black, *Fl. S. Aust.* 215 (1943); *T. aristata* non Lindl., sensu J. M. Black, *Fl. S. Aust.* 215 (1943).

Occurs in New Zealand, New Caledonia, all Australian states except N.T. and probably the commonest and most widespread species of *Thelymitra* in S. Aust. (Flinders Ranges, Eyre Pen., Northern Lofty, Murray, Yorke Pen., Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Sept.-Nov.

There has been much disagreement on the taxonomy and nomenclature of this species (see A. George, *Nuytsia* (1971) 1(2):195 and J. H. Willis (1962) *A Handbook to plants in Victoria* 1:348), but it is considered the broad concept of *T. longifolia* will prove the most acceptable. Moore & Edgar (1970), *Fl. N.Z. 2*, have been followed in retaining *T. pauciflora* as a separate species, although it is also regarded by some authors (e.g. Nicholls (1969) *Orchids of Australia*) as possibly synonymous with *T. longifolia*. (Fig. 448 B-E).

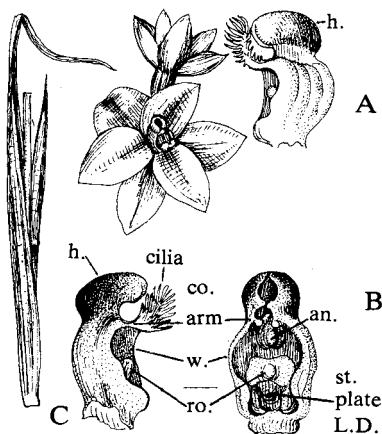


Fig. 461—*Thelymitra longifolia*. A, column, extreme constriction under the hood; B, column, front; C, column, side.

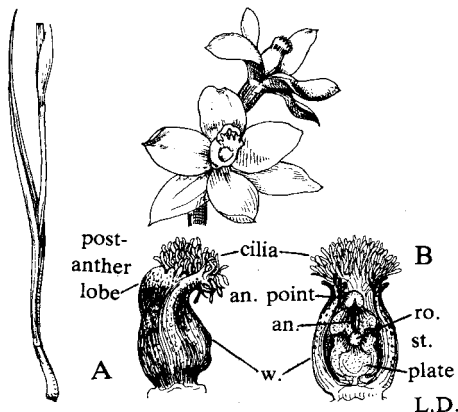


Fig. 462—*Thelymitra luteociliium*. A, column, side; B, column, front.

13. *T. luteociliium* Fitzg., *Gdnrs' Chron.* n.s. 17:495 (1882). **Fringed sun-orchid.** Slender, 15-37 cm high; leaf long, fleshy, slightly channelled, narrow-linear to rather broadly-linear; flowers pinkish or light-red, generally 2-5 on slender pedicels, rarely expanding; perianth-segments oblong-lanceolate, not very acute, 7-8 mm long; column erect, 4-5 mm long, wings not very wide, hair-tufts yellow, turned upwards; post-anther lobe between the hair-tufts with a

convex crenate margin not forming a very prominent hood; anther situated above the stigma, its rather blunt triangular point projecting between the hair-tufts, dehiscing in the early bud; stigma semi-circular, oblique, the lateral wings of the column uniting to form a cup-like depression at its base; rostellum situated in middle of upper border of stigma; pollinia 4 (in 2 pairs) connected directly with viscid disk; plant cleistogamous.

Occurs in N.S.W., Vic. and S.Aust. (Flinders Ranges, Eyre Pen., Yorke Pen., Murray, Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Sept.-Nov.

14. ***T. mackibbinii*** F. Muell., *Chem. & Drugg. Lond. Aust. Suppl.* 42:44 (1881). **Brilliant sun-orchid.** (Ill. W. H. Nicholls (1969) *Orchids of Australia* t.44.) Slender purplish plant, 15-18 cm high; flowers 1-3, 2.5-3 cm diam.; perianth-segments striped, purplish and violet; column 5-7 mm long, not hooded, deep violet, the upper margins yellow; column-arms fleshy, deep golden-yellow, ovoid, flat, pedicellate, c. 2 mm long, their margins glandular-papillate, the outer surface rugulose with granulations and/or papillae, in an erect position above the anther.

Very localised and rare in Vic. Recorded in S.Aust. by J. H. Willis (*Handbook to plants in Victoria* 1 (1970) 353) on the basis of a specimen collected near Port Elliot (Southern Lofty region) in Sept., 1896.

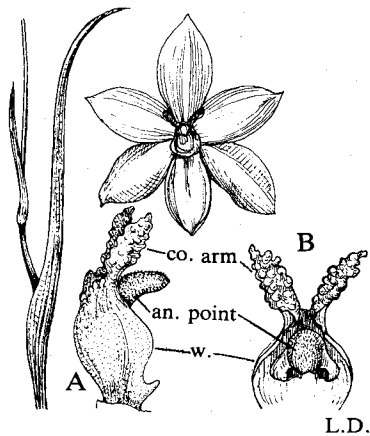


Fig. 463—*Thelymitra macmillanii*. A, column, side; B, column, front (upper portion).

15. ***T. macmillanii*** F. Muell., *Fragm. Phyt. Aust.* 5:93 (1865). **Crimson sun-orchid.** Slender, 10-20 cm; stem wiry, flexuose; leaf erect, almost terete, sheathing, 5-10 cm long, channelled; flowers large, 1-6, very variable in colour, salmon-pink to crimson, usually expanding freely; perianth-segments elliptical to oblong-elliptical, 10-22 mm long; column erect, 6-7 mm high, red tinted; column-arms produced into tall, erect, lanceolate-oblong, yellow to red, irregularly crenulate lobes with rugulose margins but more or less smooth surface; post-anther lobe not produced behind the anther, but forming a deep sinus, irregularly denticulate, yellow upper part produced into short side lobules; anther situated above the stigma, its apex produced into a broad thick, yellow curved pubescent blunt anther point; stigma transversely oval, situated basally on the column, rostellum conspicuous in its upper portion; pollinia 2, bilobed, attached by caudicle to the viscid disk.

Occurs in W.Aust., Vic., Tas. and S.Aust. (Yorke Pen., Southern Lofty and S.E. regions).

Flowers Sept.-Oct.

16. ***T. matthewsii*** Cheesem., *Trans. N.Z. Inst.* 43:177 (1911). **Spiral sun-orchid.** A slender plant 10-20 cm high; leaf flexuose or spirally twisted round stem, broadly sheathing, finely and closely puberulous, as is the stem immediately below, lamina 3-6 cm long, linear and very much narrower than sheath; stem slender, erect, glabrous above leaf, with a subulate clasping bract 2.5 cm long about the middle; flower one, seldom two, opening in hot sunny weather, cleistogamous; ovary slender, c. 1.3 cm long, greenish; perianth-segments alike, lanceolate or oblong-lanceolate, acute or shortly acuminate, 8-14 mm long, rich purple with darker veins; column stout and short, c. 6 mm high, purplish; column-arms broadly elliptical or orbicular, plano-convex, erect behind the anther, yellow; post-anther lobe much shorter and rudimentary, not crested, margin crowned

with grape-like papillae; anther yellow, largely exposed; incumbent, connective prolonged into a cucullate anther point, exceeding the column-arms; stigma prominent, situated just below the anther, orbicular or transversely oval, almost pedicellate, concave, disk-like.—*T. daltonii* R. S. Rogers, *Trans.R.Soc.S.Aust.* 54:42 (1930).

Occurs in New Zealand, W.Aust., Vic. and S.Aust. in the Kangaroo I. and S.E. regions. Flowers Sept.-Oct.

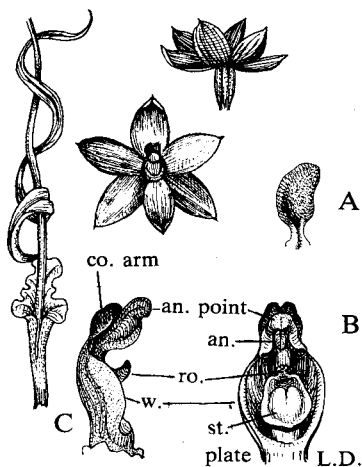


Fig. 464—*Thelymitra matthewsii*. A, anther point; B, column, front; C, column, side.

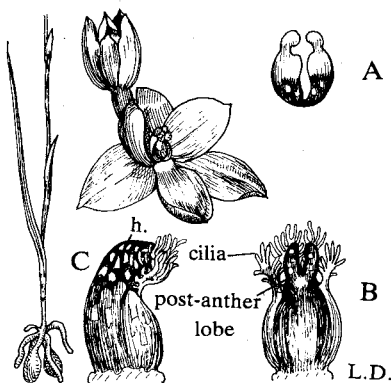


Fig. 465—*Thelymitra mucida*. A, hood, from above; B, column, rear; C, column, side.

17. *T. mucida* Fitzg., *Gdnrs' Chron.* n.s. 17:495 (1882). **Plum orchid.** A slender species 20-50 cm high; leaf linear, thick, channelled, 8-15 cm long; flowers 1-3 (-5), lilac blue; perianth-segments oblong-lanceolate, acute, 8-10 mm long, sepals sometimes darker; column rather stout, hooded, c. 3 mm long; post-anther lobe deeply and acutely emarginate, with entire margins, basally very deeply coloured, the apices yellow, covered with a hoary, thickly viscid secretion (resembling mould) which easily rubs off, leaving the dark under-colour apparent; column-arms produced horizontally, the yellow hairs perpendicular, and red at the base (sometimes the hairs white); anther more blunt than acute; situated behind and above the stigma; basal portion concealed; stigma prominent, discoid, wide-ovate, situated in lower part.

Occurs in W.Aust., Vic., N.S.W. and S.Aust. (Southern Lofty and S.E. regions). Flowers Sept.-Nov.

18. *T. pauciflora* R.Br., *Prod.Fl.Nov.Holl.* 314 (1810). **Slender sun-orchid.** A plant of variable habit, commonly slender, 5-50 cm high; leaf narrow-linear or lanceolate, rather long, channelled, often thick and fleshy, variable in length, to 25 cm long and 3-15 mm wide; flowers blue, lilac-blue or light-blue, occasionally white, without stripes or spots, small, frequently solitary, to five in a loose raceme; only opening in very hot weather, the capsule often maturing without perianth opening; perianth-segments similar, elliptic, subacute, 7-13 mm long, labellum mostly smaller than the other segments; column erect, c. 5 mm high, hooded; column-arms terete, more or less erect, hair-tufts usually white, sometimes pink, mauve or yellow; post-anther lobe exceeding anther, produced into a hood variable in length and colour, dark above middle and usually yellow on margin which is so turned in as to appear deeply cleft or bifid, the two halves rounded and

meeting along mid line above anther; anther only concealed by stigma at extreme base; stigma situated low down; rostellum prominent, viscid; pollinia in 2 pairs; no caudicle.

Occurs in New Zealand and all Australian States, except N.T.; in S.Aust. (Flinders Ranges, Southern Lofty, Kangaroo I. and S.E. regions).

Flowers Sept.-Nov.

This species is closely related to *T. longifolia* but can best be distinguished by the deeply cleft hood in which the two sides are smoothly incurved so that their margins are usually not visible. See discussion under *T. longifolia*.

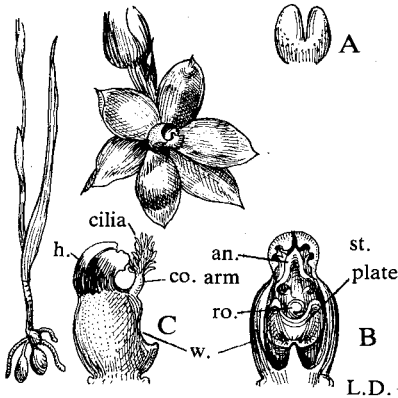


Fig. 466—*Thelymitra pauciflora*. A, hood, from above; B, column, front; C, column side.

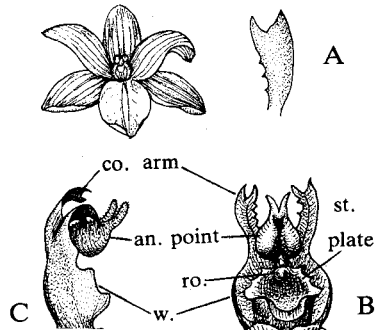


Fig. 467—*Thelymitra venosa*. A, column arm; B, column, front; C, column, side.

19. *T. venosa* R.Br., *Prod.Fl.Nov.Holl.* 314 (1810). **Veined sun-orchid.** Plant 15-70 cm high, often gregarious; leaf linear, fleshy, roundly thickened on margins and keel and so more or less trefoil-shaped in transverse section; often extending beyond the middle of scape; stem more or less sinuous; flowers 1-5, comparatively large, on long slender pedicels, blue, rarely white or pink; perianth-segments rather thin, conspicuously striped with darker blue veins, less commonly without; sepals longer than petals, 12-15 mm long; labellum differentiated, broadly obovate, the anterior margins crisped, sometimes slightly crenate towards tip or mucronate; column erect, c. 5 mm long, not cucullate; column arms produced into blunt erect more or less ribbon-like appendages, tending to twist through $\frac{1}{2}$ -1 $\frac{1}{2}$ turns of a loose spiral, tips sometimes unevenly notched, not ciliate or roughened; post-anther lobe lacking; anther very protuberant, bent forward, overhanging the stigma, almost fully exposed, ending in two short horn-like anther points; a narrow band of clear, blister-like, crowded calli lies across back of anther between bases of column arms and sometimes extends up their lower margins; pollinia not connected with the rostellum; stigma placed obliquely below the anther, its upper margin bicuspidate.

Occurs in New Zealand, New Caldedonia, N.S.W., Vic., Tas. and S.Aust. in the Southern Lofty region.

Flowers Nov.-Dec.

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