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NOTES ON *HIBBERTIA* (DILLENIACEAE) 3. *H. SERICEA* AND ASSOCIATED SPECIES

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Abstract

Twelve species and three subspecies are recognised, illustrated and keyed out. The new combination, *H. platyphylla* subsp. *major*, is published for *H. sericea* var. *major* J.M.Black. The following new taxa are described: *H. crinita*, *H. patens*, *H. platyphylla* as well as its subsp. *halmaturina*, *H. praemorsa*, *H. puberula*, *H. simulans*, *H. superans*, *H. tenuifolia* and *H. villifera*. *H. humifusa* is excluded.

Introduction

For most of a century only one species was recognised in this complex. The name, *H. sericea*, or *Pleurandra sericea* as originally described by de Candolle (1817) based on a specimen collected by Robert Brown near present Melbourne, was usually applied. Hooker (1835) described *Pleurandra densiflora*, and its combination *Hibbertia densiflora* was often used instead, as it was the first name for the species in *Hibbertia* (Kew Rule). Bentham (1863) adopted similar broad concepts as in the *H. aspera* group (Toelken 1998) in the *H. sericea* complex.

Black (1912, 1926, 1952) started a new evaluation of this group in South Australia and described in *H. sericea* a var. *major* with larger flowers, and var. *scabrifolia*, a 'scabrid-leaved' form. Of those the former is here recognised as a subspecies in *H. platyphylla* and the latter was reduced to synonymy within *H. sericea*. His *H. paeninsularis* (Black 1926, 1952), is still recognised as a localised species on southern Eyre Peninsula and western Kangaroo Island. The fact that Black (1952) also erroneously included *H. cinerea* as a variety of *H. sericea* based on their similar dense indumentum, shows the strong influence still imposed by Bentham's treatment on modern taxonomy. Black did not realise that this species should be placed in the *H. aspera* group (Toelken 1998).

The taxa, as in the *H. aspera* group, were here largely delimited on their morphology but usually their circumscription was supported by their specific geographical distribution. The complex itself is at present distinguished by the combination of a number of characteristics as enumerated above the key to the species. The following species were examined in this study: *H. crinita*, *H. paeninsularis*, *H. platyphylla*, *H. praemorsa*, *H. puberula*, *H. sericea*, *H. sessiliflora*, *H. simulans*, *H. superans*, *H. tenuifolia*, *H. villifera*. Although it may seem to be a natural group of species, its delimitation will become clearer once close groups, especially the *H. riparia* - *stricta* complex, has been revised. For instance, *H. humifusa* with very long stalked flowers and short fleshy bracts has here been excluded, although it agrees in a number of respects with the *H. sericea* complex. It had been revised in Toelken (1995) but its affinities are as yet not clear.

Characters

Habit

Plants of the *H. sericea* complex are usually shrubs with more or less woody branches, but as in most hibbertias the habit is rather plastic. Decumbent plants of, for instance, *H.*

paeninsularis were occasionally found rooting at the nodes, but no suckering plants as commonly found in the *H. riparia* complex have been observed in this group.

Vestiture

As in the *H. aspera* group (Toelken 1998) the different hair types are also useful in the classification of the *H. sericea* complex if examined over a large sample of the different organs of the species. They are therefore described here in a similar way.

All hairs have a tuberculate base but, unlike the *H. aspera* group, there are no basal cells with thickened walls arranged around them. A similar progression from simple to stellate hairs as Toelken (1998) reported for the latter group has also been observed in this group. Indications are, that, if other characters are equally considered, species with only simple hairs seem here to represent a different group, which possibly had developed in geographical isolation, as the two groups now scarcely overlap. They do not necessarily represent the primitive group when compared to those with stellate hairs (cf. Affinities). Only in the case of *H. superans* and *H. crinita* do close affinities exist.

Leaves

The intrapetiolar or **axillary tufts of hairs** are particularly well developed immediately below flowers in this species complex, but the actual length varies considerably from one plant to another and according to conditions, so that it can not usually be used to distinguish between taxa. In some species the hairs remain a distinct tuft but in others they merge into the spreading simple hairs along the branches, as for instance in *H. sericea*.

In contrast to the *H. aspera* group, there are no distinct juvenile leaves except that the first leaves are more sparsely hairy and often the central vein is not as well developed. The cotyledons and hypocotyl of seedlings of *H. sericea* (R.D. Hoogland 11869, CANB) are glabrous, but everything above is more or less pubescent. A gradual acropetal change can be observed particularly below flowers as these leaves and branches are not only more densely hairy, but individual hairs tend to be longer (usually including the tufts in the axils of leaves). These upper leaves of some forms of *H. sericea* may become so densely hairy on both surfaces that they are indistinguishable from normal cauline leaves of *H. crinita*. When in doubt it is important to examine as many of the lowest leaves of all branches in order not to confuse the modified leaves below flowers with cauline leaves, as many of the latter may have been shed. The uppermost leaves modified in shape and/or size are for convenience referred to as hypsophylloids (cf. flowers).

The development of the central vein particularly of the cauline leaves of taxa of this complex is often characteristic in respect of its recessed/raised nature in relation to the revolute margins, and the length of the leaf for which it is visible on mature leaves. Young leaves on herbarium specimens are often misleading because the tissues of the central vein collapse, so that it can not usually be seen clearly how close it reaches to the apex of the leaf.

Environmental conditions may influence the size and shape of the leaves because the margins of the leaves recurve accordingly and this determines the amount of the undersurface visible. In some species the central vein is considerably broadened so that the undersurface is never visible as in the case of *H. platyphylla* subsp. *platyphylla*, while it is usually more or less visible in the other two subspecies. As a result of the strongly recurved margins of the leaves the adaxial surface covers much of the undersurface of the leaves. The vestiture of the leaves above and/or below are described thus irrespective of whether they are adaxial or abaxial in origin (cf. Toelken 1998). Similarly the revolute margins are not restricted to the original leaf margins but refer to that whole recurved part of the leaf.

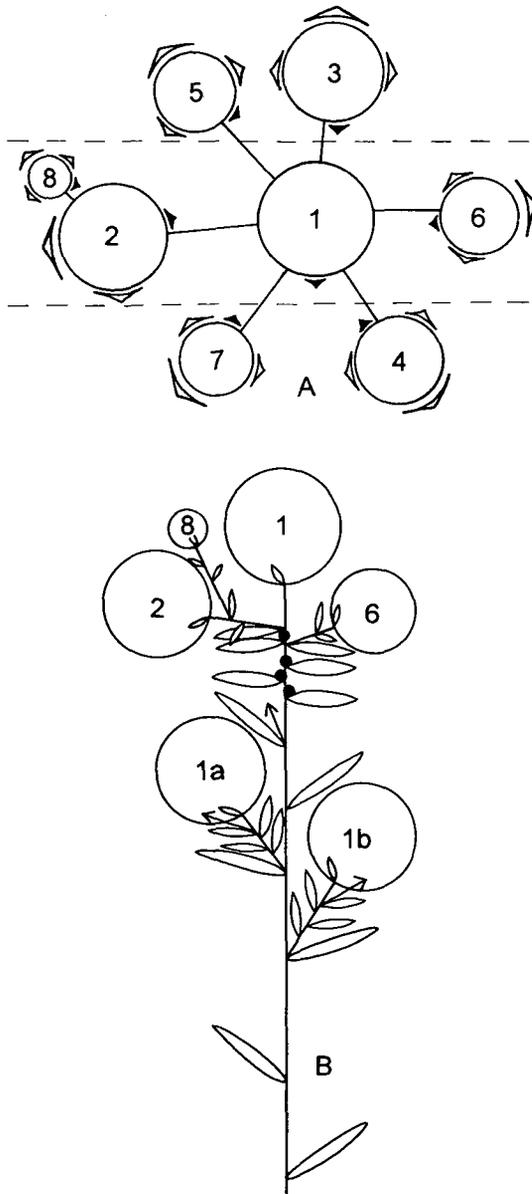


Fig. 1. *H. villifera*. **A**, diagram of arrangement of flowers in a corymbiform polymonad seen from above. **B**, diagram of vertical section (cf. dotted lines in **A**) through terminal flower cluster with broad hypsophyllids, and upper branch with flowers terminal on short shoots from axils of linear-elliptic cauline leaves. br bract; h hypsophylloid; ● indicates the position of flowers omitted here; † indicates likely positions of new growth flushes. (**A**, **B**, *H.R.Toelken 9177*, AD).

Flower arrangement

It is characteristic of the *H. sericea* complex that the terminal flowers are more or less hidden in the very densely clustered leaves at the apex of branches. A single terminal flower has been recorded in the species with only simple hairs, while there is usually more than one flower at the apex of branches in species with some stellate hairs, except in *H. sessiliflora* and *H. superans*. Fig. 11 (p. 46) of the latter shows the remains of the previous season's flower being overtopped by growth flushes from the axil of the first and second (or rarely the third but not in the example illustrated) leaf below the flower. This excludes the often leaf-like bract subtending the flower and which is not visible on the remains of the inflorescence because it is usually shed with the flower. In a good season the current terminal flower is soon similarly overtopped by vegetative growth, which will, however, terminate in a flower, often followed by another similar growth flush.

In *H. crinita*, a very similar species, comparable growth flushes produce terminal clusters of flowers because each of these flowers is derived usually in progressive basipetal succession from axils of the hypsophylloids below the terminal flower. Each new branch develops first 2 or 3 (rarely up to 5) reduced leaves and then ends in a terminal flower subtended by a bract, i.e. also here no growth was observed to develop from the axil of this last leaf below the flower. The flowers on the flower head of some forms of *H. crinita* are loosely arranged because of slightly elongated internodes between several leaves, while they are more or less sessile and below them on very short axes are two opposite leaves and a bract to the inside in *H. platyphylla*, *H. sericea* and *H. villifera* (fig. 1A). The length of the prevailing favourable season will determine the number of flowers in terminal clusters. Sometimes seeds are shed from the first flowers while flower buds still develop on the periphery.

Since the terminal flower is always subtended by a usually leaf-like bract, the basic unit found here, as in most Hibbertias, is the **monad**, i.e. "an inflorescence ... consisting of a solitary flower together with its axis and the prophylls ... of the axis" (Briggs & Johnson 1979, p.244). Both internodes on either side of the bract are usually scarcely elongated so that the flower appears to be sessile in this complex. Under prolonged favourable conditions the inflorescence in *H. superans* is overtopped by repeated vegetative growth each with a terminal monad to form a **spiciform polymonad**. The dense terminal heads described for *H. villifera* (fig. 1) are similar except that the whole of the inflorescence has been condensed into a **corymbiform polymonad**. The polymonads are mainly found in species with stellate hairs except for the occasional specimens of *H. paeninsularis* (cf. fig. 3), and they can often be observed in cultivated plants of that species. Other species with simple hairs are not known to have been cultivated.

This inflorescence seem to be derived from a thyrsoid similar to that found in *H. conspicua* (Western Australia) and a possible reduction is well visualised by the bracteate and extensively branched inflorescence of *Pachynema*, especially *P. junceum*, as analysed by Wagner (1906). Here too the main axis is terminated by a single flower, below which then branches (paraclades of first order) with up to 12 nodes without flowers before a terminal flower are formed. Each successive branch has fewer infertile nodes at the base until 2 remain in several species. Repeated branching (paraclades of the first, second, third etc order), each with this unusual feature of a single terminal flower, overtop the first flower (acrotonic ramification in Weberling 1965). This is reminiscent of the repeated branching in *H. superans* above, except that this usually little-branched inflorescence is distinctly foliose. The inflorescence of *Pachynema*, however, usually differs in two important aspects: firstly the leaf below the bract is often more or less displaced by recaulescence onto the branch which develops from its axil, and secondly occasional branching from the axil of the bract, more common in some species than in others, has been observed but it starts much later and shows a less vigorous growth than the axis subtended by the leaf below. Both these phenomena have never been observed in the *H. sericea* complex.

In most *Hibbertias* this monotelic inflorescence is reduced to flowers (monads) terminating most branches, and only in some species, and usually only under favourable conditions additional paraclades are produced. While some specimens of the form "Scabrifolia" of *H. sericea* develop only single terminal flowers, the similar species, *H. sessiliflora* produces only single terminal flowers commonly on short shoots along the branches, but the leaves subtending the flower are usually much reduced in contrast to single terminal flowers densely surrounded by large leaves in the species with simple hairs.

Although the first axillary bud develops usually from the first leaf below the bract there does not always seem to be a strict sequence in the development of subsequent growth flushes particularly once more than three branches (paraclades) have been established. The orientation of new axillary axes particularly of dense terminal polymonads seems to be determined by space, i.e. often the axillary bud of the second or third leaf in preference to the first one below the flower develops as it faces sideways (tangentially) or towards the outside. In larger terminal polymonads simultaneous growth from several of the lower leaf axils was observed so that some such branches might appear to be lateral short shoots with terminal flower/s (fig. 1B). Although such short shoots are rare in the *H. sericea* complex (except in *H. sessiliflora*, above) they are found in axils of cauline leaves below the dense hypsophylloids and are usually distinguishable by the shape the two types of leaves. Ultimately growth flushes from below them (fig. 1B) show the individual units. Axillary branches have often only a single terminal flower (fig. 1B), but occasionally they too develop into few-flowered terminal polymonads.

In the *H. sericea* complex the bract below the flower has obvious revolute margins, is large and often similar in size to the subtending leaves or only slightly smaller to form a gradation into the often similar outer calyx lobes. The bract is always situated opposite the innermost calyx lobe and in front of the gap between the two carpels. Although the bract is often similar to the surrounding leaves it can be identified by its position and in the *H. sericea* complex it hugs the base of the flower while there is usually a short internode between it and individual leaves below. The calyx is basally connate so that the bract can be easily distinguished from the often similar outer calyx lobes.

In most species of the *H. sericea* complex the leaves below the flowering region usually become gradually modified from the cauline ones by increasing denseness (and frequently length) of the hairs, as well as, particularly in the stellate haired group, their shape and/or size. The last are here called for their obvious similarity **hypsophylloids**, because hypsophylls are according to modern definition part of an inflorescence (Briggs & Johnson 1979; Weberling 1989), but this is not easily delineated in *Hibbertia*. Hypsophylloids are a term of convenience and can often not easily be distinguished, because the hypsophylloids as the hypsophylls, usually show a gradation into normal cauline leaves.

Stamens

The number of stamens may vary considerably particularly in more widespread species such as *H. sericea* and *H. crinita*, but some variation has been recorded in all the species. The anthers are usually clumped between the upturned styles usually with the central one, or rarely a few anthers, longer. The filaments are more or less basally connate except in forms of *H. villifera*, where they are fused to just below the anthers.

Unusual are a few tufts of hair between the anthers and the respective petal as found in most of the species of this complex with stellate hairs, a feature not observed in other species of *Hibbertia* in eastern Australia.

Ovary

The style originates from the apex of the ovaries in species with an indumentum of simple hairs, while in most species with stellate as well as simple hairs the styles are more

or less laterally inserted into the ovary. The simple hairs of the ovaries of the former can usually only be recognised on fruiting ovaries, when they have much expanded.

Affinities

The species are at present listed alphabetically as a numbering system can only be established once all the species in the genus are known. This *H. sericea* complex is not as well defined as the *H. aspera* group and a clearer delineation will only emerge once the adjoining groups, especially the *H. riparia* complex, have been revised. All information available at present suggests a group of species with close affinities but too little agreement exists to assume monophyletic origin especially as the species can be grouped into four geographical complexes. Morphologically the species can be divided into those with simple hairs and others with at least some stellate hairs on the branches. Here, as in the *H. aspera* group (Toelken 1998), stellate hairs are considered derived from clustered simple ones as is clearly shown in the two closely related species *H. superans* and *H. crinita*. In contrast to the *H. aspera* group juvenile leaves of the *H. sericea* complex differ only by a usually slightly less dense indumentum from cauline leaves, which in turn are less densely hairy than the floral leaves, and some of them, the hypsophylloids, are different in shape and/or size, and only found in plants with stellate hairs. This restricted occurrence of hypsophylloids together with the high frequency of clusters of terminal flowers and the central vein of cauline leaves not reaching the apex of cauline leaves in the group with stellate hairs indicates that the following four complexes have at least for some time developed independently.

1. Species with only simple hairs (*H. paeninsularis*, *H. patens*, *H. praemorsa*, *H. puberula*, *H. simulans*, *H. tenuifolia*) mainly occur on or east of the Great Divide from north of Nowra to southern Queensland, the exception being *H. paeninsularis* from western South Australia (EP, KI). There are some records of *H. simulans* from the Western Slopes of New South Wales. They are often known only from restricted distribution areas.

It may be significant that simple hairs in the putative hybrid, *H. paeninsularis* × *H. villifera*, are dominant over stellate hairs, a supposedly advanced character. This strengthens the notion that group 1 represents an independent development which is further shown by the central vein of leaves continuing, although not always visible because of excessively recurved margins, to and usually more or less overtopping, the apex, which is then often tufted and recurved when young in contrast to those species with at least some stellate hairs on their branches.

2. Among the species with at least some stellate hairs on the branches *H. superans* and the often almost indistinguishable *H. crinita* occur largely in New South Wales, but also known usually from inland localities in Victoria and South Australia. Although *H. superans* has predominantly simple hairs and occurs east of the Great Divide, its central vein reaches to the leaf apex, but does not usually overtop it as in the previous group. The central vein only overtops the apex in the extreme form of *H. crinita* from the Flinders Ranges.

H. crinita is very similar to and often confused with *H. sericea* of the next group.

3. Species with mainly stellate hairs (*H. platyphylla*, *H. sericea*, *H. sessiliflora*, *H. villifera*) particularly on the undersurface of the leaves occur commonly in coastal south-eastern Australia. They are characterised by the presence hypsophylloids and their cauline leaves have a central vein, which does not reach the apex except in the case of the very much raised and broadened central vein of *H. platyphylla*. All the species have clustered flowers except *H. sessiliflora*, where the flowering branches are predominantly reduced to axillary short shoots with a single flower. The species is otherwise very similar to *H. sericea* and the rare Tasmanian *H. hirsuta*. Although the latter species has similar 'sessile' flowers on short shoots along the branches and the typical tufts of hairs in the leaf axils it has not been included. Its flat bracts without recurved margins and a central vein continued into the apex

of leaves as well as small flowers without tufts of hairs between the stamen/s and petals are usually characteristics of the *H. riparia* complex.

4. The *H. humifusa* complex from central Victoria also shares a number of characteristics with the *H. sericea* complex, but has not been included in the present paper, because a detailed account was published earlier (Toelken 1995). These plants look quite different because, in contrast to the terminal shoots with reduced internodes below flowers of *H. sericea*, their flowers are usually borne on an elongated flower stalk with internodes above and below the bract (anthopodium and propodium, cf. Conn 1995) usually elongated. They too produce flowers interspersed with vegetative growth (Toelken 1995, fig. 1D, E, F). This species has a slender central vein to the apex of leaves as well as some stellate hairs so that it does not fit into any of the above-mentioned groups of species. Although it has stellate hairs there are no tufts of hairs between the petals and the stamens in *H. humifusa*.

These and other minor morphological similarities mainly discussed under the individual species suggest the following developmental elaboration of the species of this complex for eventual numbering: *H. puberula*, *H. praemorsa*, *H. patens*, *H. simulans*, *H. tenuifolia*, *H. paeninsularis*, *H. superans*, *H. crinita*, *H. sericea*, *H. sessiliflora*, *H. villifera*, *H. platyphylla*, *H. humifusa*.

Taxonomy

The following combination of characters is here used to define the *H. sericea* complex:

1. A tuft of simple hairs, which elongates acropetally is found in the axil of leaves and is particularly long below the terminal flowers.
2. Simple hairs are often pronouncedly tubercle-based which resemble 'goose bumps' (but without base cells as in the *H. aspera* group).
3. Outer sepals and the bract subtending each flower have more or less recurved margins.
4. Bracts subtending the flowers are usually scarcely shorter than the leaves and have obvious recurved margins.
5. The floral region is vertically abbreviated so that not only the subterminal leaves and bracts but also often additional flowers develop in more or less tight terminal polymonads.
6. Few tufts of hairs are found between the anthers and petals.

Unlike the *H. aspera* group (Toelken 1998), the *H. sericea* complex is less well defined and has no unique characteristics. Only the first of the above characters is represented in all the species, but is also found, usually in a less well developed form in other species complexes, such as *H. cystiflora*, *H. riparia* and *H. vestita*. Until these have been investigated in similar detail this group of species is informally referred to as the *H. sericea* complex. The criteria for the inclusion of species in this paper are based on various combinations of the above characteristics as well as their apparent affinity to one another.

Although J.M. Black worked mainly from the herbarium specimens now in AD and on which he wrote various notes, it can from a few documented examples be assumed that duplicate specimens now housed in other herbaria, were sent there by Black to seek opinions from experts at other institutes on taxa he regarded as new. All of these specimens, irrespective of the presence of his annotations, or whether it is known that they were sent to other herbaria before or after publication of the new name, are regarded as part of Black's investigations of that taxon and are considered in the selection of lectotypes.

Key to the species and subspecies

- 1. Hairs all simple; terminal flowers single and surrounded by leaves similar to cauline leaves:
 - 2. Undersurface of leaves usually not exposed between revolute margins and central vein; long hairs up to 0.6 mm long; leaves puberulous to glabrescent;
 - 3. Ovary puberulous to glabrescent; leaves narrowly triangular *H. puberula*
 - 3: Ovary villous or tomentose; leaves more or less linear:
 - 4. Outer calyx lobes not recurved and scarcely accrescent; ovary villous..... *H. simulans*
 - 4: Outer calyx lobes recurved and strongly accrescent; ovary tomentose *H. tenuifolia*
 - 2: Undersurface of leaves usually exposed between revolute margins and central vein, or long hairs on leaves usually longer than 0.8 mm; leaves villous to appressed-pubescent;
 - 5. Leaves with more or less appressed hairs; South Australia (EP, KI)..... *H. paeninsularis*
 - 5: Leaves with hairs spreading at ±90°; Queensland (Mo), New South Wales (ST, NC, CC):
 - 6. Leaves (2.4-) 3–4.5 (-7.6) mm broad; central vein not or scarcely raised *H. praemorsa*
 - 6: Leaves 1.1–2.4 mm broad; central vein distinct (raised and/or broadened):
 - 7. Leaf apex more or less rounded and recurved; indumentum mainly of long hairs with a few shorter ones in between *H. patens*
 - 7: Leaf apex acute becoming obtuse, erect; indumentum of velutinous layer of dense short hairs under few long ones..... *H. superans*
 - 1: Hairs simple and stellate at least on branches; at least some terminal flowers in clusters of 1-5 (-15) and often surrounded by leaves different from cauline leaves (hypsophylloids):
 - 8. Central vein of cauline leaves not broadened and scarcely visible under stellate indumentum; leaf margins loosely recurved, not appressed..... *H. sessiliflora*
 - 8: Central vein of cauline leaves broadened at least in basal third and clearly demarcated whether with or without stellate indumentum; leaf margins revolute and usually appressed:
 - 9. Central vein of cauline leaves more or less confluent with apex:
 - 10. Cauline leaves with short indumentum (often under more or less long simple hairs) about equally dense below and above (especially on the margins):
 - 11. Hairs on branches and undersurface of leaves mainly stellate; ovary stellate-tomentose, with styles laterally attached; seeds broadly obovoid..... *H. crinita*
 - 11: Hairs on branches and undersurface of leaves simple with few stellate ones; ovary villous with simple hairs, with apical styles; seeds oblong-obovate to narrowly comma-shaped *H. superans*
 - 10: Cauline leaves stellate-tomentose on undersurface but only or mainly simple hairs above:
 - 12. Cauline leaves with central vein reaching their apex but not confluent:
 - 13. Hypsophylloids with central vein not reaching the apex *H. villifera*
 - 13: Hypsophylloids with central vein confluent with the apex *H. sericea*
 - 12: Cauline leaves with central vein more or less confluent with the apex *H. platyphylla*
 - 14. Branches without, rarely with few scattered long simple hairs below flowers; terminal flowers 1, or up to 3 but then in loose clusters *H. platyphylla* subsp. *platyphylla*
 - 14: Branches more or less densely covered with long simple hairs; terminal flowers (1-) 2–5 (-15) in usually dense clusters:
 - 15. Old cauline leaves straight and if recurved then from petiole; undersurface of cauline leaves not visible between revolute margins and central vein or if visible then leaves usually longer than 8 mm; Eyre and Yorke Peninsula..... *H. platyphylla* subsp. *major*
 - 15: Old cauline leaves recurved along their whole length; undersurface of cauline leaves exposed between revolute margins and central vein; leaf length (2.2-) 3.6–7.5 (-11.4) mm; Kangaroo Island *H. platyphylla* subsp. *halmaturina*
 - 9: Central vein of cauline leaves visible up to only 2/3 or just below apex and not confluent with apical margins:
 - 16. Central vein of cauline leaves visible for ca 2/3 of its length; styles yellow; simple hairs on upper leaf surface up to 0.8 mm long except for a few on revolute margins, coarse and usually without obvious tubercle..... *H. sericea*
 - 16: Central vein up to but not confluent with leaf apex; styles red; simple hairs on upper leaf surface up to 2 mm long, silky and usually arising from pronounced tubercles ('goose bumps') *H. villifera*

***H. crinita* Toelken, sp. nov.**

H. stricta (R.Br. ex DC.) F.Muell. var. *hirtiflora* Benth., Fl. Austral. 1: 27 (1863), partly as for "near Bathurst, A.Cunningham".

H. sericea auctt. non (R.Br. ex DC.) Benth.: Benth., Fl. Austral. 1: 26 (1863), partly; J.M.Black, Fl. S. Austral. 1 edn, 3: 386 (1926), partly; Ewart, Fl. Vict. 769 (1930), partly; J.M.Black, Fl. S. Austral. 2 edn, 3: 575 (1952), partly; N.C.W.Beadle et al., Fl. Sydney 1 edn, 196 (1963), partly; Willis, Handb. Pl. Vict. 2: (1973), partly; G.M.Cunningham et al., Pl. West. N.S.W. 498 (1981); N.C.W.Beadle et al., Fl. Sydney 3 edn, 228 (1982), partly; G.J.Harden & J.Everett in G.J.Harden, Fl. N.S.W. 1: 302(1990), partly.

H. stricta (R.Br. ex DC.) F.Muell. var. *canescens* auctt. non Benth.: J.M.Black, Trans. Proc. Roy. Soc. South Australia 43: 36 (1919); Fl. S. Austral. 1 edn, 3: 387 (1926); 2 edn, 3: 576 (1952); S.J.Forbes et al., Cens. Vasc. Pl. Vict. 48 (1984).

H. sericea Benth. var. *sericea sensu* S.W.L.Jacobs & J.Pickard, Pl. N. S. W. 110 (1981), partly.

H. densiflora auctt. non (Hook.)F.Muell.: F.Muell., Pl. Indig. Col. Vict. 1: 15 (1862), partly; Fragm. 7: 125 (1871), partly; Fragm. 11: 92 (1880), partly; Syst. Census 1 (1882), partly; Sec. Syst. Census 1(1889), partly; C.Moore & Betche, Handb. Fl. N.S.W. 10 (1893); Rodway, Tasm. Fl. 4 (1903), partly; Maiden & Betche, Census N.S.W. Pl. 139 (1916).

H. incana auct. non (Lindley)Toelken: Toelken, J. Adelaide Bot. Gard. 16: 64 (1995), partly; in Walsh & Entwisle, Fl. Vict. 3: 311 (1996), partly, as for specimens cited.

A *H. sericea* venis centralibus ad apicem foliorum caulinarum paginisque superis plerumque dense pubescentibus pilis stellatis; a *H. superanti* ovario velutino pilis stellatis, stylo plus minusve laterale, seminibus late obovoideis; a *H. incana* bracteis longis, lobis calycis obtusis vel rotundatis, partibus omnibus tectis aliquot pilis simplicibus differt.

Type: South Australia, summit of Mt Torrens, *N.N. Donner 3998*, 5.ix.1972 (holo.: AD; iso.: BRI; G; K; L; MEL; MO; NSW; NY; PERTH).

Shrubs 0.2–1.5 (-2) m tall, with few erect woody branches to wiry and much branched, villous to velutinous, the hairs rarely wearing off. *Vestiture* on all parts consisting of long silky simple hairs (0.3–2.2 mm long) over more or less dense short erect, usually stellate hairs, both slightly or not tubercle-based and becoming more dense acropetally; *on branches* with scattered or clustered simple hairs often wearing off on lower branches but below flowers distinctly longer than those of the tufts in the axils of leaves or rarely almost absent over dense and erect or sparse and multiangulate radially stellate hairs (3–7 subequal or unequally long branches) scarcely tubercle-based; *on cauline leaves above* with few to many long antrorse simple hairs mainly towards the margin, but often wearing off or increasing below the flowers over more or less dense erect or slightly antrorse short hairs mainly multiangulate stellate hairs (2–5 (-15) subequal branches); *on cauline leaves below* with more or less antrorse simple hairs along the revolute margins and the central vein over erect rarely radial multiangulate stellate hairs (5–15 (-25) subequal branches); *on hypsophylloids* similar to leaves but stellate hairs usually with fewer branches; *on outer calyx lobes* with few to many antrorsely inclined simple hairs on central vein to all over the outer surface over radial (rarely antrorse) multiangulate stellate hairs (3–15 (-many) usually very short subequal branches rarely pulvinate ones on the sides); *on inner calyx lobes* with few to no antrorsely inclined simple hairs mainly along the central vein over short radial to pulvinate multiangulate stellate hairs (many subequal branches) and usually with stellate margins. *Leaves* with axillary tufts of hairs elongating acropetally and rarely up to 1.8 mm long or rarely almost absent; *petiole* 0–0.6 mm long; *lamina of cauline leaves* linear to linear-lanceolate, linear-elliptic to rarely elliptic, (3.2-) 5.2–13.5 (-22.4) × (1.2-) 1.7–2.5 (-4) mm, usually abruptly constricted into petiole, acute to obtuse or rounded, with central vein often raised above and broader than the revolute margins (0.3–0.7(-0.85) mm wide in the middle) and visible to the leaf apex or protruding into apex, stellate-tomentose above and below, but often the undersurface not visible between the central vein and revolute margins, green or bluish-green fading to grey, rarely discolorous; *lamina of hypsophylloids* linear-lanceolate to ovate, (2.8-) 3.1–10 (-14.6) × 1.8–6 (-7.2) mm, usually abruptly constricted into petiole, gradually tapering into apex, similar to cauline leaves to broadly ovate, velutinous with or without long simple hairs. *Flowers* sessile or almost so, 1–6 (-8) in

usually corymbiform polymonads, often loosely arranged or younger overtopping older ones, subtended by few to many hypsophylloids, rarely none, terminal on main and often on short lateral branches; *bracts* like hypsophylloids subtending it. *Calyx* grey, pale to deeper green, often somewhat accrescent; *outer calyx lobes* oblong-lanceolate, lanceolate to rarely ovate, $5.3\text{--}11.7 \times 1.3\text{--}2.2$ (-2.6) mm, usually longer than inner ones, acute to rounded, with more or less recurved margins, outside villous to velutinous, inside one-third to almost

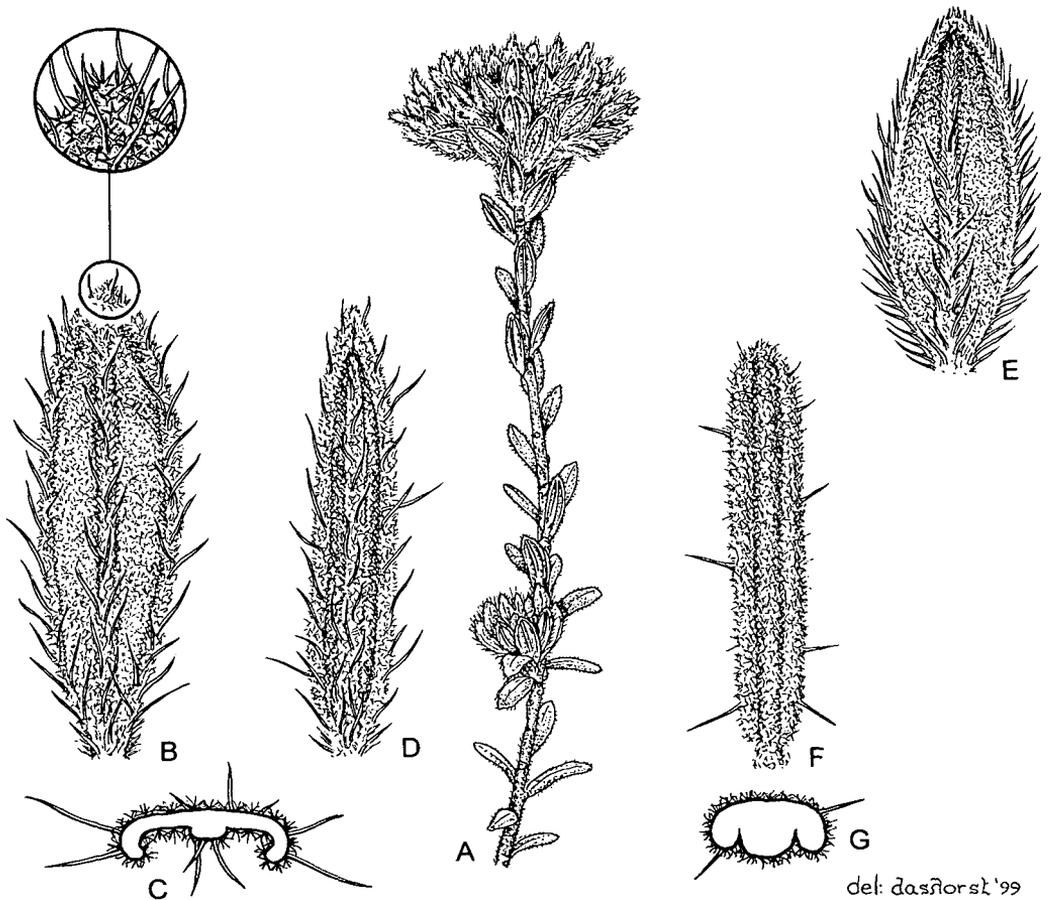


Fig. 2. *H. crinita*. A, Flowering branch showing dense terminal flowers surrounded by hypsophylloids; B, flat cauline leaf; C, transverse section; D, cauline leaf with rolled margins; E, hypsophylloid showing narrow central vein; F, cauline leaf of Flinders Range's form with broad central vein continued into the apex; G, transverse section. (A–E, D.E.Symon 275, CANB; F, G, Ising s.n., AD; A $\times 1/2$; B, D, E $\times 6$; F $\times 9$; G $\times 18$).

completely stellate-pubescent to tomentose or sericeous; *inner calyx lobes* ovate rarely obovate, $4.8\text{--}8.4 \times 2.2\text{--}4.5$ (-5.7) mm, rounded to cuspidate, outside stellate-tomentose rarely with few long simple hairs, inside often tomentose towards the upper margins. *Petals* obovate to broadly obovate, $5.4\text{--}13.6$ (-15) mm long, emarginate to bilobed. *Stamens* (8-) 10–15 (-19) in one cluster with centrifugal ones usually shorter; *filaments* basally, rarely up to half connate, anthers linear, $1.6\text{--}1.8$ (-2.1) mm long, dehiscent by terminal pores and lateral slits. *Pistils* 2, more or less laterally compressed, with 4–6 ovules, style base recurved along the apex of the ovary, then turned upwards on both sides and overtopping stamens, style greenish-yellow becoming more or less tinged red. *Fruit* stellate-tomentose.

Seeds pale to dark brown, ovoid to almost spherical, 1.8–2.1 × 1.8–2 mm, aril with fleshy base and scarcely lobed sheath surrounding and appressed to base of seed. *Flowering*: Aug.–Oct. Fig. 2A–G.

Distribution and ecology

Grows usually on sandy or gravelly soil derived from various geological formations, often associated with granite or sandstone, but has not been recorded from areas with surface limestone, and usually associated with dry woodland particularly Mallee in New South Wales (NWP, SWP, NWS, CWS, SWS, CT, ST), Victoria (LMAL, WIM, WAN, GR, MID, EHL, GPL, EG) and South Australia (FR, EA, EP, NL, MU, SL, KI, SE).

Conservation status. Widespread and locally common.

Diagnostic features

The combination of the characters, cauline leaves with a central vein visible to the apex, the presence of a more or less dense short (usually stellate) indumentum under longer simple hairs on the upper leaf surface, and inner surface of the outer calyx lobes usually being more than half covered with hairs distinguishes *H. crinita* from the very similar *H. sericea*. Usually the long central vein of cauline leaves suffices, but identification can be complicated when the leaf margins are tightly recurved. The base and generally the whole central vein of hypsophylloids of *H. crinita* remain relatively narrow in comparison to those of *H. sericea*, especially its form “*Densiflora*” which has often also a rather long central vein. The simple hairs of the latter form are also short and coarse in comparison to those of *H. crinita*.

Variation

Difficulties in distinguishing the two species may arise because of variation on the same plant. Juvenile leaves of *H. crinita* have very few stellate hairs on the upper surface so that it may be confused with normal cauline leaves of some of the more hairy forms, or at least the leaves below flowers, of *H. sericea* (cf. *H. sericea*: variation). Since the leaves below the flowers sometimes develop their dense indumentum early in both of these species, those of *H. sericea* may appear similar to cauline leaves of *H. crinita*. However, by looking at the whole range of variation on each plant one can compare leaves of similar position. In addition the central vein of *H. crinita* is always continued to the apex of cauline leaves. This is of particular importance in the case of older plants of *H. sericea*, which produce few or no typical cauline leaves between successive annual flower heads.

The genetic variation of *H. crinita* is exemplified in its extreme forms, none of which are distinguished here at infraspecific level because they do not show sufficient discontinuity in their expression. Some South Australian variation appears distinct because of the disjunct distribution of the species on mainly inland mountain ranges, but similarities, or a definite polarity of specific characters on both ends of the distributional gap, show incomplete discontinuity.

1. Erect plants with strikingly homogeneous velvety stellate indumentum under more or less long silky simple hairs on both leaf surfaces and branches had been distinguished under the name *H. stricta* var. *canescens* by Black (1926, 1952) for “Murray lands, Flinders Ranges” in South Australia. This variant with few or no simple hairs (Toelken 1995, p. 67) is here seen as belonging to a more widespread variation easily recognised by its erect stellate hairs (4–8 (-15) subequal branches) on the upper surface of cauline leaves. In South Australia it is usually associated with dry woodland or Mallee and is widespread, but only locally common in South Australia (FR, EA, EP, NL, MU, SL, KI) and Victoria (LMAL, GR) where it merges into main populations.

2. Similarly densely hairy (but usually much less so on the branches) variant of decumbent plants from south-eastern South Australia and adjoining Victoria that are densely covered with long simple hairs towards the apex of branches and especially on the calyx.

3. The most common plants of this species in the Mount Lofty region of South Australia have, as in what was named *H. sericea* var. *scabrifolia*, discolourous elliptic leaves (if not curled up) with the undersurfaces having radiating stellate hairs (8–18 (-25) subequal branches). The branches of this and the next variant tend to be sparsely covered with stellate hairs (4–6 often unequal branches) of various sizes. The type of the species belongs here.

4. While plants of the previous variant usually have single terminal flowers or rarely a few widely spaced ones, the plants of this more robust variation (bushes up to 1.5 m in diameter) have up to eight flowers in a terminal polymonads. Its linear leaves never show the undersurface, and the variant occurs only in a few localities on the southern Fleurieu Peninsula.

Typification

All parts of the type specimen of *Pleurandra incana* from Mt Hope in Victoria (MEL 35895) are covered only with radiating stellate hairs and the leaves have a raised broad central vein, which completely covers the gap of the undersurface of leaves. This combination of characters is sometimes observed in specimens from the Flinders Ranges in South Australia, but was not found in other specimens of *H. crinita* from Victoria, from where plants otherwise always have some simple hairs over the stellate indumentum. Neither are there any simple hairs on the calyx, or if present then few hooked simple hairs were observed on the outer calyx lobes. The latter, the pointed outer calyx lobes as well as the short bract subtending the flower refer *H. incana* to the *H. stricta* complex, although due to the absence of any other collections from the Mt Hope area, it could not be matched with other specimens. In comparing it with the form from the Flinders Ranges Toelken (1995) erroneously placed *H. incana* in the *H. sericea* complex.

H. stricta var. *canescens* Benth. is by implication based on *Pleurandra incana* because Bentham (1863) continued his discussion “In this I should include..” before citing other specimens. It must therefore be referred to the *H. stricta* complex and it is irrelevant that Bentham apparently had not seen either of the above type specimens. Black (1919) based his concept of this variety on *E.H. Ising s.n.* from “Mount Potawurta, near Moolooloo”, but in 1926 he widened this delimitation to include specimens from the “Eastern States”.

Notes

The widespread species, *H. crinita*, is similar to *H. sericea*, but unlike that species it occurs in drier woodlands mainly in inland localities of New South Wales, Victoria and South Australia. While *H. sericea* occurs mainly in coastal areas of Victoria, Tasmania and South Australia, the distribution of it and *H. crinita* overlap particularly in the Grampians (Victoria) and the southern Lofty Ranges (South Australia). Even here they were found in different habitats and never growing next to one another. These different distribution patterns are used here to show up the elements referred to by different authors under different names, because they usually did not annotate specimens to indicate their concepts. The synonymy can therefore only be broadly referred to.

The oldest specimen known of this species was collected by A. Cunningham (near the present Bathurst) on Oxley’s Lachlan River Expedition in 1817. Bentham (1863) referred it to *H. stricta* var. *hirtiflora*.

The name *Pleurandra cinerea* is written on a number of sheets of *H. crinita* in F. Mueller’s herbarium, indicating that he, followed by others, presumably considered these

species to be conspecific. Several of these specimens were collected by Mueller in his first year in Australia, e.g. MEL 35773 from Glen Osmond. In 1862 he cited *P. cinerea* in the synonymy of *H. densiflora* and in 1863 Bentham placed it under *H. sericea* but he also correctly referred to it under *H. billardiarei* (cf. Toelken 1998). The latter two species are not even placed next to one another by Bentham, so that this confusion seem to have arisen merely because *H. crinita* and *H. cinerea* have a similar dense indumentum. Bentham also placed some specimens of *H. crinita* into *H. stricta* var. *canescens* and var. *hirtiflora* (cf. citations above) as they resemble densely hairy forms of that species complex. Mueller (1871; 1880) reinstated *H. densiflora* for this complex in favour of the inapt epithet "sericea" (see also Mueller, 1862), because it was the earlier name in *Hibbertia* (Kew Rule). During the following ca forty years this name was widely accepted for this species complex, and, it seems, some authors referred to it specimens here named *H. crinita*, because Bentham described his var. *densiflora* as "more villous". *H. densiflora* as used by Mueller (1882, 1889) refers to the whole *H. sericea* complex, as discussed there.

In South Australia Black (1926) was the first to recognise additional taxa and published *H. sericea* var. *cinerea*, which is excluded here as it was dealt with in the *H. aspera* group (Toelken 1998). Black's concept of *H. stricta* var. *canescens* was largely similar to the form from the Flinders Ranges but as he also referred to the "Eastern States" his delineation becomes obscure (see also typification).

Etymology

The epithet "*crinita*", Latin, "having tufts of long weak hairs" refers to the local tufts of long silky simple hair overtopping the short usually stellate indumentum.

Voucher specimens (ca 460 examined)

NEW SOUTH WALES: *J.D.Briggs* 2287, Newell Hway, 1 km S railway crossing at Alleena, 19.x.1987 (CANB, NSW); *R.D.Hoogland* 12295, ca 5 miles SW Schwagers Bore, 2.xi.1972 (CANB, MEL, NSW; A, BRI, K, L, P, n.v.); *M.M.Richardson* 179 *et al.*, 1km downstream from Burrinjuck Dam wall, 8.vi.1988 (CANB, NSW).

VICTORIA: *A.C.Beauglehole* 35377, East Gippsland, Lambour Break, 11.xii.1970 (CANB, MEL); *R.D.Hoogland* 11872, ca 20 miles S Kaniva, 18.xi.1970 (AD, BRI, MEL; BISH, CANB, K, M, L, S, n.v.); *A.Meebold* 21640, Seymour, xi.1936 (AD, MEL, NSW).

SOUTH AUSTRALIA: *H.Eichler* 15094, Monarto South, 4.x.1958 AD, CANB); *R.D.Hoogland* 11854, Upper Hermitage, Mt Lofty Ranges, 13.xi.1970 (AD; A, CANB, K, L, n.v.).

H. paeninsularis J.M.Black, Trans. Proc. Roy. Soc. S. Austr. 49: 275 (1925); Fl. S. Austral. 1 edn, 3: 387 (1926); 2 edn, 3: 575 (1952); Jessop in Jessop & Toelken, Fl. S. Austral. 4 edn, 1: 355 (1986).

Type: South Australia, Coomunga, *J.M.Black s.n.*, 20.xi.1915 (holo.: AD 97037182; iso.: MEL 119767).

H. sericea auct. non (R.Br. ex DC.)Benth.: Tate, Handb. Fl. Extratrop. S. Austral. 24, 205 (1890), partly.

Low shrublets up to 25 cm high, with few to many decumbent branches, usually wiry-woody, rarely little branched, villous below the apices but glabrescent or glabrous below. *Vestiture* on all parts sparse to dense, more or less appressed, of fine simple hairs (up to 2.1 mm) often of equal length on the same organ except on inner calyx lobes with occasionally shorter hairs under longer ones, with basal tubercles often well developed towards the apex of leaves but hairs usually soon wear off. *Leaves* with axillary tuft of hairs elongating acropetally up to 1.7 mm long; *petiole* 0–0.3 (–0.4) mm long; *lamina of cauline leaves* and *hypophylloids* similar except the latter tend to be larger, linear-lanceolate, (3.1–) 4.5–6.5 (–7.8) × 0.4–0.9 (–1.3) mm (or up to 9.3 mm long for hypophylloids), scarcely tapering into petiole, pointed or acute and often with terminal tuft of hairs, with scarcely broadened, recessed (except broad and raised on first leaves on each branch and below each flowering

branch, i. e. prophylls) central vein (0.2–0.4(-0.5) mm broad at the middle), continued into the apex but often obscured by strongly revolute margins, undersurface not visible, sericeous to villous on both surfaces but soon wearing off, usually grey-green turning reddish-brown. *Flowers* sessile, single, rarely in spiciform polymonads, subtended by few to many hypsophylloids, terminal on long and short shoots, with new growth from between hypsophylloids or below; *bracts* linear to linear-lanceolate, 4.3–8.6 mm, similar to hypsophylloids, with strongly recurved margins covering more or less of the central vein, villous. *Calyx* grey-green, rarely tinged red when flowering; *outer calyx lobes* lanceolate to ovate, (4.5-) 5–6.5(-7.1) × 1.3– 1.6 mm, acute to acuminate and often accentuated by terminal tuft of hairs, villous, inside upper third pubescent with appressed simple hairs; *inner calyx lobes* broadly ovate, rarely oblong-ovate, (4.4-) 5–6.2 (-6.8) × 2.1–2.8 mm, obtuse to acute, or mucronate, villous centrally, sericeous and appressed laterally. *Petals*

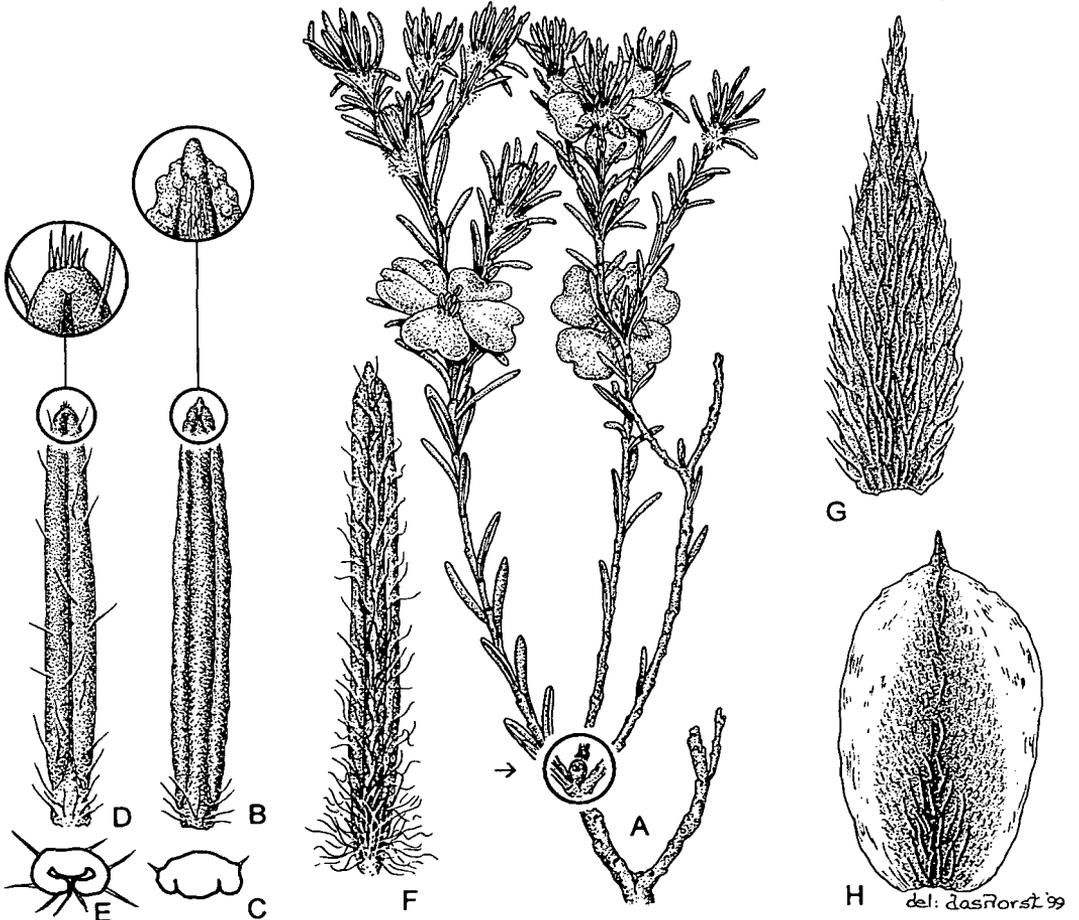


Fig. 3. *H. paeninsularis*. A, flowering branch showing scar of flower from previous year and overtopping flowers within the same year; B, cauline leaf with raised central vein prevalent, as on Kangaroo Island; C, transverse section; D, cauline leaves with recessed central vein and rolled margins common on Eyre Peninsula; E, transverse section; F, bract; G, outer calyx lobe; H, inner calyx lobe. (A, D–H, J.D.Briggs:1248, AD; B, C, B.M.Overton 2586, AD; A ×½; B, D, F ×10; C, E ×15; G, H ×14).

obovate to broadly obovate, (6.8-) 7.5–9.5 (-11.4) mm long, more or less bilobed. *Stamens* 6–8, with filaments basally to half connate; anthers oblong, 1.4–1.5 mm long, subequal, dehiscing by terminal pore and lateral slit. *Pistils* 2, scarcely compressed, with 6 ovules,

style base scarcely recurved along apex of villous rarely tomentose ovary; styles yellow. *Fruit* simple-villous. *Seeds* brown to probably shiny-black, ca 1.6 × 1.6 mm, aril with a fleshy base surrounded by scarcely lobed fleshy sheath covering lower quarter to third of seed. *Flowering*: Sept.–Nov., but also in May. *Common name*: Peninsula guinea-flower (Jessop 1986). Fig. 3A–H.

Distribution and ecology

Grows on sand, sandy clay, often lateritic clay with or without ironstone, and often associated with wet depressions or drainage lines in open forest to woodland and sometimes common in or next to cleared areas; endemic to South Australia (southern, rarely central EP, mainly western and central KI).

Conservation status: Locally common and conserved in several conservation parks and Heritage Agreement areas on Eyre Peninsula and Kangaroo Island. 3RCa (Davies 1992; Briggs 1996).

Diagnostic features

Like all the species in the *H. sericea* complex *H. paeninsularis* has pronounced axillary hairs which become even longer acropetally, but differs from all southern species by the presence of only simple hairs on all parts of the plant, a decumbent to almost prostrate habit, and single terminal flowers which are never borne in clusters but often, especially in cultivation, overtop one another as part of proliferation as described earlier.

Variation

The leaves of *H. paeninsularis* like those of *H. sessiliflora* roll tightly and no specimen, alive or dried, has been seen in which the undersurface was exposed. The apex or much of the central vein is often obscured by the strongly revolute margins in plants from the Eyre Peninsula, so that its continuation into the apex is rarely visible. In contrast most collections from Kangaroo Island have the central vein broadened and raised to the level of the revolute margins, so that they are usually visible into the apex of the leaf, or at least on the shorter prophylls. In some leaves parts of the undersurface may become exposed (cf. Davies 1986) but this is rare. The two forms are usually distinguishable irrespective of the amount of rolling of the leaves due to environmental conditions. Although the leaves of the former tend to be narrower, these characteristics of the two geographic forms showed few intermediates but were never found to be consistently linked to other characters as in *H. platyphylla* subsp. *halmaturina* (see also hybrid below).

The flowers and in particular the calyx lobes are very variable in size sometimes even on the same plant.

Notes

Two specimens of this species were collected on 28.ii.1886 by J.G.O. Tepper between “Cygnets [River] to Ravine [des Casoars]”, but presumably because they had no flowers the species was described only about forty years later. These specimens (AD 97828175, 97828197) were not identified but a similar Tate specimen (AD 97620423) from Port Lincoln was inscribed *H. sericea*. These three specimens probably form the basis for Tate’s (1890) records of *H. sericea* from these two regions, and may be his reason for “outer sepals somewhat silky”, which is usually not the case in what Black (1925) described as the var. *scabrifolia*, the most common form of that species in South Australia.

Voucher specimens (61 examined)

SOUTH AUSTRALIA: *J.D.Briggs 1200*, 15 km N Port Lincoln, 17.ix.1983 (AD, CANB, MEL, P); *R.J.-P.Davies 636*, 1.5 km W of NE corner of Yeldulnie Conservation Park, 25.v.1992 (AD); *P.Martensz 328*, Kangaroo Island, 3.x.1970 (AD, CANB, K, L); *B.M.Overton 1123*, intersection of Birchmore Road and Playford Highway, 7.xii.1989 (AD).

*Putative hybrid****H. paeninsularis* × *H. villifera***

This plant stood out among others of *H. paeninsularis* because of its relatively long branches with long internodes throughout, central vein strongly recessed, sometimes with terminal polymonads of few flowers, and the presence of short simple hairs under long ones on the branches, all characters also found in *H. villifera*. The plant had a decumbent habit, short leaves, and only simple hairs reminiscent of *H. paeninsularis*.

The dominance of only simple hairs on all parts of the plant is an interesting feature of this putative hybrid.

Specimens examined

SOUTH AUSTRALIA: *H.R.Toelken 9233*, ca 1 km E Kelly Hill, 17.x.1997 (58% abnormal pollen; plant with abnormal growth); *H.R.Toelken 9235*, ca 1 km E Kelly Hill, 17.x.1997 (37% abnormal pollen; almost typical habit);

H. villifera

SOUTH AUSTRALIA: *H.R.Toelken 9225*, Lower Church Road NW of Kelly Hill, 16.x.1997 (5% abnormal pollen); *9238*, Southern Highway, 14.4 km E Kelly Hill, 17.x.1997 (2% abnormal pollen); *9242*, Kingscote to American River, 17.x.1997 (4% abnormal pollen).

H. paeninsularis

SOUTH AUSTRALIA: *P.Martensz 328*, Kangaroo Island, 3.x.1970 (1% abnormal pollen); *H.R.Toelken 9232*, ca 1 km E Kelly Hill, 17.x.1997 (6% abnormal pollen).

H. patens* Toelken, *sp. nov.

H. sericea auctt. non (R.Br. ex DC.) Benth.: C.T.White, Proc. Roy. Soc. Queensl. 47: 51 (1936); N.C.W.Beadle, Stud. Fl. NE N.S.W. 3: 255 (1976), partly; Stanley in Stanley & E.M.Ross, Fl. SE Queensl. 1: 189 (1983); G.J.Harden & J.Everett in G.J.Harden, Fl. N.S.W. 1: 302(1990), partly; S.T.Reynolds, Queensl. Vasc. Pl. 100 (1994); Queensl. Pl. 65 (1997), partly.

A *H. sericea* pilis simplicibus partibus omnibus et costa centrali angusta foliorum confluenti margine apicale; a *H. simulanti* pilis sericeis longis et costa centrali foliorum angustiore quam petiolo differt.

Type: Queensland, Mt Maroon, *I.R.Telford 3541*, 4.x.1973 (holo.: CANB; iso.: A, L, n.v.).

Shrubs 0.6–1m tall, usually much branched and with several branches from the base, villous. *Vestiture* on all parts consisting of a mixture of long and short spreading simple hairs, both more or less prominently tubercle-based particularly on leaves and spreading at ca 90° unless restricted and on the calyx lobes antrorse. *Leaves* with axillary tuft of hairs elongating acropetally to 1.8 mm long; *petiole* 0.4–1.4 mm long; *lamina of cauline leaves* and *hypophylloids* linear to oblong-ob lanceolate or -elliptic, (3.5-) 4.5–11.8 (-15.4) × 1.1–2.4 mm, obtuse or if pointed then apex somewhat recurved, gradually constricted into petiole, distinct central vein usually raised to level of recurved margins and continued (0.2–0.35 (-4) mm wide in the middle) into tufted recurved apex, villous, with undersurface usually visible. *Flowers* single, terminal commonly on main branches; *bracts* linear-ob lanceolate, 4.8–12.2 × 1.8–2.2 mm, leaf-like, villous to appressed-pubescent. *Calyx* more or less accrescent; *outer calyx lobes* oblong-lanceolate, pointed to acuminate with slightly recurved margins, 5.4–12.3 × 2.2–3.5 mm, outside villous to appressed-pubescent, inside

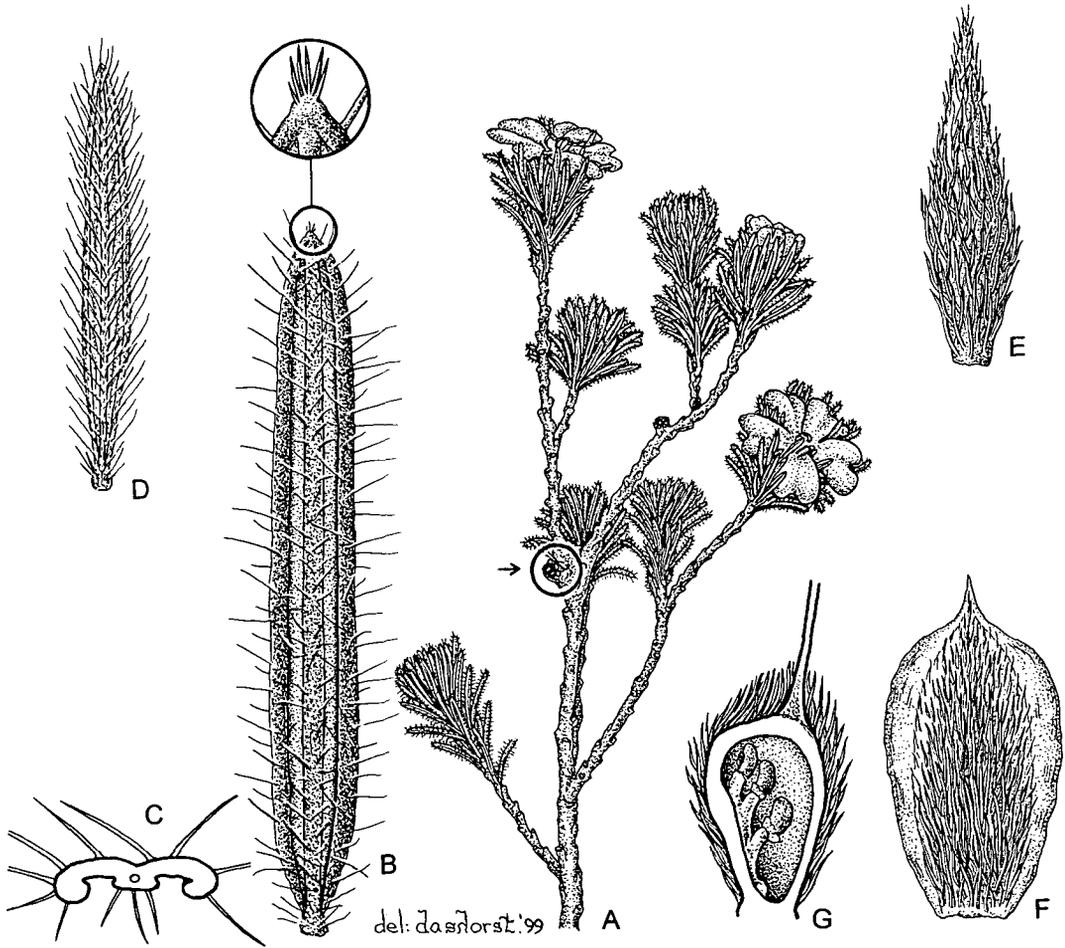


Fig. 4. *H. patens*. A, flowering branch; B, cauline leaf; C, transverse section; D, bract; E, outer calyx lobe; F, inner calyx lobe; G, half pistil with terminal style from ovary with simple hairs. (A–D, I.R.Telford 3541, CANB; E–G, E.F.Constable NSW24044; A $\times \frac{1}{2}$; B, D, F, $\times 10$; C $\times 20$; E $\times 6$; F $\times 4$; G $\times 12$).

one-third to two-thirds covered with appressed silky hairs; *inner calyx lobes* oblong-elliptic to -lanceolate, acute or pointed by folding, 5.3–11.8 \times 2.3–3.7 mm, outside villous to appressed-pubescent along the central vein becoming pubescent towards the margins, inside with appressed hairs towards the apex. *Petals* obovate, 5.6–13.7 mm long, rounded to slightly emarginate; axillary tuft absent. *Stamens* 12–26, subequal; filaments scarcely basally connate; anthers narrowly oblong, 1.8–2.6 mm long, dehiscing by terminal pore and lateral slits. *Pistils* 2, each ovoid, with 4–6 ovules; style from apex, erect in front of clustered stamens. *Fruit* villous with simple hairs. *Seeds* not seen. *Flowering*: Mainly Aug.–Nov., but also one record from March. Fig. 4A–G.

Distribution and ecology

Grows usually in rock crevices at altitudes of more than 600 m on Mt Ernest, Mt Maroon and Mt Barney in south-western Queensland (MO).

Conservation status. The three main localities are conserved but no population studies are available. 2RC.

Diagnostic feature

The long silky simple hairs which spread at about right angles from their base are characteristic of this species, as are the long axillary hair tufts, the terminal leaves clustered around a flower, and the exposed undersurface of the leaves. Unlike *H. sericea*, *H. patens* is distinguished by having only simple hairs, the central vein is visible to the apex of cauline leaves, which are similar to the leaves clustered around the flowers (i.e. hypsophylloids are not distinguishable), and the absence of a tuft of hairs between the stamens and petals. *H. patens* is also distinct from *H. simulans* by its silky simple hairs on both sides of the leaves, the undersurface is more or less visible on most leaves, and the distinct central vein is scarcely broadened, viz. narrower than the petiole.

Variation

Although this species has been recorded from separate populations at altitudes above 600 m on different mountains (Stanley 1983) it seems to be a genetically homogeneous entity as is indicated by the fact that the described range of variation in the size of the different organs was found covered by two extreme specimens collected on Mt Barney (robust form: *E.F. Constable NSW 24044*; depauperate form: *S.L. Everist 1375*, BRI).

Notes

Although leaves below the flowers often seem to be different and especially more densely hairy this is here often not the case because these silky hairs quickly wear off, as can particularly be seen with the apical tufts. At times the central vein of these leaves appears more pronounced and hypsophylloids cannot in this species be distinguished. The terminal clusters of leaves were found to contain only one flower in contrast to the clusters in *H. sericea*, but in a few cases another flower occurs on a short branch below. Since one cannot distinguish hypsophylloids it cannot be evaluated from herbarium material whether this flower is part of a terminal cluster (cf. flowering leaves) or a short branchlet with a terminal flower.

Etymology

This distinct species is covered by characteristic long and short soft hairs spreading at about right angles, which is captured in the epithet "*patens*", Latin, "spreading, diverging from the axis at almost 90°".

Specimens examined (8 examined)

QUEENSLAND: *E.F. Constable 3850* (BRI, NSW); *S.L. Everist 1375*, Mt Barney, 13.x.1935 (BRI); *G. Leiper s.n.* (AQ458082), Mt Ernest, 11.ix.1989 (BRI); *N. Michael 2223*, Mt Lindesay, 14.vii.1935 (BRI); *L.S. Smith s.n.*, Mt Maroon, s.d. (BRI); *C.T. White 7852*, Mt Barney, 27.viii.1931 (BRI); *86591*, Mt Ernest, 10.x.1932 (BRI)

H. platyphylla Toelken, *sp. nov.*

H. stricta auct. non (R.Br. ex DC.)F.Muell.: Tate, Handb. Fl. Extratrop. S. Austral. 24, 205 (1890), partly.

H. sericea auct. non (R.Br. ex DC.)Benth.: J.M.Black, Fl. S. Austral. 1 edn, 3: 387 (1926), partly; 2 edn, 3: 576 (1952), partly.

A *H. sericea* costa centrali foliorum caulinarum confluenti margine apicali, hypsophylloidibus latis, 1 rare 3 floribus terminalibus; a *H. stricta* var. *glabriuscula* hypsophylloidibus latis exponentibus paginis abaxillaribus, costa centrali plerumque recessa, presentia frequenti pilorum simplicium differt.

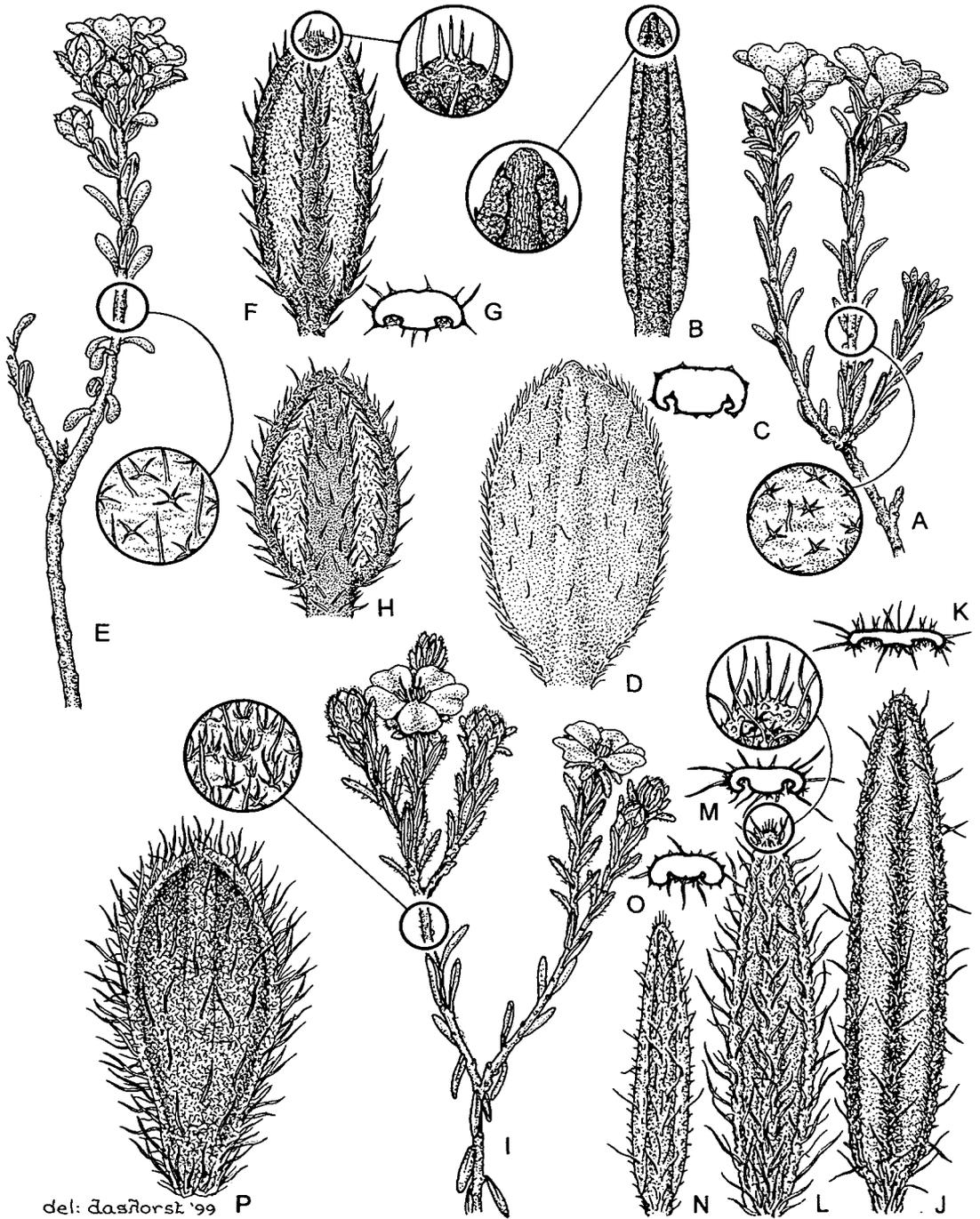
Type: South Australia, *H.R. Toelken 8565*, 0.5 km S of intersection, along Foul Bay Road, 1.x.1994 (holo.: AD; iso.: CANB, G, K, MO, NSW, PERTH, S).

Shrubs 0.3–1 (–1.5) m tall, with many stems and wiry branches to few stems with woody branches, often becoming densely branched, villous, pubescent to puberulous. *Vestiture* on

all plants consisting of simple hairs (0.2–1.8 mm long) but sometimes few over small stellate hairs, both more or less tubercle-based and becoming denser acropetally; *on branches* with many to sometimes few scattered simple hairs often wearing off on lower branches, below flowers often of similar length to the tufts in the axils of leaves so that these tufts appear to spread laterally (but not along the decurrent leaf bases), over multiangulate hairs of two sizes, the few to absent larger erect ones (1–3 often unequal branches) over usually many smaller, often depressed or pulvinate ones (3–6(-8) usually subequal branches) increasing in number and size acropetally (5–8 (-22) often antrorse subequal branches); *on leaves above* with antrorse simple hairs becoming longer towards the margins, many to often few and wearing off, over acropetally increasing and antrorse to radial stellate hairs (1–5 subequal branches); *on leaves below* with scattered simple hairs along margins and central vein (rarely completely absent) over multiangulate or erect stellate hairs (3–5 often unequal branches) to dense ones((8-) 10–20 (-26) subequal branches) on the undersurface if visible: *on hypsophylloids* above with few to many antrorsely inflexed to appressed simple hairs over usually antrorse stellate (rarely radial) stellate hairs, below with few to many antrorsely curved hairs over mainly dense multiangulate stellate hairs; *outer calyx lobes* with many to few antrorsely inclined and curved, often coarse simple hairs, over antrorse (rarely radial) multiangulate stellate hairs (3–8 often unequal branches) to erect but pulvinate ones (5–10 or more often unequal branches) towards the sides; *on inner calyx lobes* sometimes with few simple hairs mainly along the central vein over short pulvinate stellate hairs (many very short subequal branches), and usually stellate-ciliate margins. *Leaves* with axillary tuft of hairs more or less elongating acropetally to 1.6 mm long, but usually much shorter; *petiole* (0.2-) 0.8–1.5 mm long; *lamina of cauline leaves* linear, linear-elliptic or -oblanceolate, rarely oblong-lanceolate, (3.6-) 6–16 (-26.4) × 1.1–3.5 (-4.8) mm, obtuse to rounded, more or less abruptly constricted into petiole, with broad central vein continued into apex and varying from little broader to slightly thinner (0.4–0.6 (-0.8) mm wide at the middle) than, and usually only up to about as thick as, revolute margins, above scabrid to pubescent or glabrous, undersurface if visible (cf. subspecies) then tomentose; *lamina of hypsophylloids* elliptic to obovate, rarely ovate or oblong-ovate, 2.2–4.3 (-18.4) × (1.2-) 2.5–5.5 (-6.2) mm, rounded, rarely obtuse, with recurved margins often much reduced, scarcely raised central vein often only visible in upper third, widely exposed undersurface strigose- to stellate-tomentose. *Flowers* sessile to stalked (up to 8 mm long and subtended by few often caducous hypsophylloids), 1–5 (-16) in dense or loose corymbiform polymonads, terminal on main branches, rarely on subterminal short shoots; *bracts* lanceolate, elliptic or oblanceolate, (1.2-) 2.5–6 (-10.6) × 1.3–3.5 mm, flat to more or less cymbiform with central vein scarcely raised, tomentose, pubescent to almost glabrous. *Calyx* green tinged red to purple, more or less accrescent; *outer calyx lobes* ovate and acute, 4.8– 8.5 (-13.8) × 2.6–4.3 (-5.2) mm, acute to cuspidate, outside hispid, villous to almost glabrous, inside sericeous, with few simple hairs over stellate ones on much of the surface; *inner calyx lobes* oblong-ovate to almost orbicular, 3.7– 8 (-12.3) × 3.9–5.5 (-6.3) mm, obtuse, rounded to emarginate, coarse-sericeous along the central ridge to stellate-tomentose towards the ciliate margins. *Petals* broadly obovate to obcordate, 6.6–11.9 (-15.2) mm long, broadly bilobed. *Stamens* 10–15 (-22), subequal; filaments basally connate; anther oblong, 1.8–2.1 (-2.6) mm long, dehiscing by terminal pore and lateral slits. *Pistils* 2, laterally compressed, with (4-) 6 ovule; style with base recurved along the apex of each ovary, then curved upwards around the clustered stamens, yellow to yellowish-green. *Fruit* stellate-tomentose. *Seed* brown to shiny black, almost spherical, ca 2.3 × 2.2 mm, aril a fleshy ring basally expanding into scarcely lobed surrounding sheath appressed to lower third of seed.

Diagnostic features

Cauline leaves of *H. platyphylla* have a broad central vein which extends to the apex of the leaves and is there more or less obviously confluent with the revolute margins. The arrangement of the flowers often seems rather similar to that of *H. stricta* var. *glabriuscula*,



and, since it has often similar tightly rolled leaves it is not surprising that many specimens have been identified as such. *H. platyphylla*, however, usually produces tufts of hairs in the axils particularly of the upper leaves and also has a few hairs between the petals and stamens (not always present), and the undersurface of the leaves is often slightly visible between the central vein and the revolute margins in at least all the leaves of subsp. *halmaturina*. These are all characteristics of the *H. sericea* complex.

Variation

The three subspecies are not always easily identified as some local populations show intermediate characteristics of some characters and only by the use of others they can be separated. The subsp. *major* is particularly rich in local variation which is often restricted to isolated mountain ranges on Eyre Peninsula. The hypsophylloids often seem characteristic but their shape and size varies considerably. Differences in the size of the calyx seem to be due to local variation in the degrees of their accrescence. Among the many variations found in this species particularly on Yorke Peninsula the hairs on the branches were found the most reliable character to distinguish between the two mainland forms. Only the subsp. *halmaturina* is found on the nearby Kangaroo Island and it is remarkably uniform in producing cauline leaves recurving with age and in having an exposed undersurface. Both subsp. *major* and *halmaturina* have many simple hairs on their stems although in the latter they tend to be shorter and more like those of subsp. *platyphylla*. As this characteristic could not be linked with any others, because even the stalked flowers of the typical variety are occasionally found in subsp. *major*, the three entities are treated as subspecies. The long simple hairs on leaves typical of subsp. *major* are usually, unlike those of *H. villifera* and *H. paeninsularis*, not distinctly longer towards the petiole although they usually become more frequent. However, because the hairs towards the apex of the leaves wear off much more quickly, those at the base may appear to be longer.

Notes

Stellate hairs on the branches and especially on the inner calyx lobes are often depressed or erect but with very short branches (pulvinate).

Etymology

Specimens of this species were often confused with the very variable *H. stricta* var. *glabriuscula* because, similar to that species, the bold central vein continues into the leaf apex of at least the typical subspecies. The epithet "*platyphylla*", Greek, "*platys*" "broad or flat" and "*phylla*" "leaves", refers to its relatively broad and flat leaves with more or less recessed central vein in contrast to those of *H. stricta* var. *glabriuscula*, where the central vein is raised above the revolute margins.

a. subsp. *platyphylla*.

H. stricta (R.Br. ex DC.) F. Muell. var. *hirtiflora* Benth., Fl. Austral. 1: 27 (1863), partly as for specimens "from Spencer Gulf" and "Streaky Bay".

H. sericea (R.Br. ex DC.) Benth. var. *scabrifolia* J.M. Black, Trans. Proc. Roy. Soc. South Australia 49: 278 (1925), partly, as for "Streaky Bay".

Fig. 5. *H. platyphylla* subsp. *platyphylla*. A, flowering branch with scar of previous flowers below; B, cauline leaf with undersurface not visible; C, transverse section; D, hypsophylloid/ bract. – subsp. *halmaturina*. E, flowering branch showing recurved old leaves; F, cauline leaf; G, transverse section; H, hypsophylloid/ bract. – subsp. *major*. I, flowering branch; J, flat cauline leaf of typical form; K, transverse section; L, flat cauline leaf of common form; M, transverse section; N, cauline leaf with rolled margins of common form; O, transverse section; P, hypsophylloid/ bract. (A–D, *H. Eichler* 14086, AD; E–H, *H. Eichler* 15538, AD; I, M–P, *R.J. Bates* 7925, AD; J, K, *C.R. Alcock* AD98827192; A, E, I $\times 1/2$; B, G $\times 6$; C, D, N, P $\times 10$; F, H, L, M $\times 7$; J, K $\times 4$; O $\times 15$).

H. stricta auct. non (R.Br. ex DC.)F.Muell.: Tepper, Trans. Proc. Roy. Soc. South Australia 3: 34 (1880); Tate, Trans. Proc. Roy. Soc. South Australia 12: 70 (1889); Handb. Fl. Extratrop. S. Austral. pp. 24, 205 (1890), partly; Trans. Proc. Roy. Soc. South Australia 13: 116 (1890), partly.

H. stricta var. *glabriuscula auct. non* J.M.Black; J.M.Black, Fl. S. Austral. 1 edn, 3: 387 (1926), partly; 2 edn, 3: 576 (1952), partly.

H. sericea auct. non (R.Br. ex DC.)Benth.: J.M.Black, Fl. S. Austral. 1 edn, 3: 387 (1926), partly; 2 edn, 3: 576 (1952), partly.

H. sericea (R. Br. ex DC.)Benth. var. *major auct. non* J.M.Black: Jessop in Jessop & Toelken, Fl. S. Austral. 1: 358 (1986), partly.

Shrublets with many spreading stems; branches wiry and often scrambling, pubescent to glabrescent with few or no simple hairs (0.3–0.6 mm long) over radial multiangulate stellate hairs (4–7 (-10) subequal branches) of similar size or rarely with a few larger stellate hairs (2,3 branches) below flowers. *Cauline leaves* linear, or if oblong to oblong-elliptic then glabrescent, 3.8–21.4 × 1.1–3.2 mm, with revolute margins appressed against central ridge so that the undersurface of the leaf is rarely visible between them, more or less straight and spreading from the petiole even when old, with antrorse simple hairs if present. *Flowers* stalked, singly, rarely in loose terminal corymbiform polymonads of up to 3. *Flowering*: mainly Aug.–Nov. Fig. 5A–D.

Distribution and ecology

Recorded from various soil types but often associated with surface limestone in South Australia, especially from southern Yorke Peninsula and mainly the south-eastern Eyre Peninsula.

Conservation status. Restricted distribution but locally common and conserved in a few parks.2RCa.

Variation

While the number of stellate hairs on the branches increases acropetally this apparently does not apply to the number of simple hairs of which there are only few below the terminal flowers. Since, however, the hypsophylloids on these terminal branches are caducous especially on dried herbarium sheets, one must be careful not to interpret the long simple hairs of the axillary tufts of these hypsophylloids, which are often numerous and developed in quick succession, as simple hairs on the stems. In this region the longer erect type of stellate hairs as found in the other two subspecies were also occasionally observed. The calyx of plants particularly from the Eyre Peninsula are usually almost glabrous, while they often have coarse simple hairs on the Yorke Peninsula (e.g. *H.R. Toelken 8564*, 5.7 km S turnoff to Corny Point lighthouse). This collection also shows plants with many rigid stems developed under the harsh conditions on sand behind the coastal cliffs; *H.R. Toelken 8565* (type) represents the most commonly found wiry form from inland localities, and *H.R. Toelken 8566* are little-branched scrambling plants growing in the shade of shrubs near to the previous collection.

Notes

The earliest specimens collected of this taxon were placed by Bentham (1863) tentatively in *H. stricta* var. *hirtiflora* and subsequently by Black (1925, 1926, 1952) under *H. sericea* var. *major: sine leg.*, near Spencer Gulf (MEL 35801); *Major Warburton*, Streaky Bay (MEL 35803). It is interesting that no species of the *H. sericea* complex has since been recorded from the north-western Eyre Peninsula. It is likely the Warburton specimen was incorrectly labelled and is more likely from near Port Lincoln.

Tepper (1880) identified a specimen of this subspecies as *H. stricta* in his account of the flora of the Ardrossan area and this was probably accepted by Tate (1890). Black (1926, 1952) seems to have included some of his specimens in *H. sericea*, as he quoted Yorke Peninsula in the distribution of that species but not under the varieties. There are, however, indications that he also quoted some specimens under *H. stricta* var. *glabriuscula*. Jessop (1986) placed the material of this species into *H. sericea* var. *major*, and, although this concept is maintained for the complex, the var. *major* was not raised to species level because it is based on an odd form (cf. variation: subsp. *major*).

Flowers of subsp. *platyphylla* are often more or less stalked so that they form a rather loose terminal polymonads. This makes it difficult to distinguish between flowers of the clusters at the end of branches, which are part of the sympodial growth pattern, and others, which arise as subapical axillary short shoots with a terminal flower, as the latter often also develop a little later as the terminal flower. Short shoots can usually be distinguished by their broad hypsophylloids, while additional flowers of the terminal polymonads are usually subtended by "leaves" that approach depauperate cauline leaves. The latter are much narrower and their revolute margins are well developed for most of their length.

Voucher specimens (42 examined)

SOUTH AUSTRALIA: *N.N.Donner 11095*, ca 3 km from gate to Taylors Landing, 4.xi.1985 (AD, CANB, G, K, MO, NSW); *R.D.Hoogland 11841*, ca 1 mile N White Hut along the Corny Point- Marion Bay road, 11.xi.1970 (AD; B, HBG, CANB, K, L, MEL, UC, US, n.v.); *H.R.Toelken 8564*, cliffs above Berry Bay, 5.7 km S of turnoff to Corny Point, 1.x.1994 (AD, B, BRI, HBG, G, K, MEL, NSW, PERTH, S, US).

b. subsp. *major* (J.M.Black) Toelken, *stat. et comb. nov.*

H. sericea (R.Br. ex DC.)Benth. var. *major* J.M.Black, Trans. Proc. Roy. Soc. South Australia. 36: 21 (1912); Feddes Repert. Sp. Nov. Regni Veg. 14: 352 (1916); Trans. Proc. Roy. Soc. South Australia 49: 274 (1925), partly, excl. Kangaroo Island; Fl. S. Austral. 1 edn, 3: 386 (1926), partly; Fl. S. Austral. 2 edn, 3: 575 (1952), partly; Jessop in Jessop & Toelken, Fl. S. Austral. 1: 358 (1986), partly.

Type: South Australia, near Port Lincoln, *H.H.D.Griffith s.n.*, 15.x.1909 (lecto.: AD ; iso.: K, MEL 35797, NSW 85983).

H. sericea auct. non (R.Br. ex DC.)Benth.: Tate, Handb. Fl. Extratrop. S. Austral. pp. 24, 205 (1890), partly.

Shrubs with few stiffly erect stems; branches rigidly woody, with many simple hairs (0.6–1.8 mm long) over usually erect multiangular stellate hairs of two sizes, the fewer larger stiffly erect ones ((1) 2, 3 often unequal branches) of varying size over smaller erect and/or radial ones (3–5 subequal branches) of similar size. *Cauline leaves* linear to oblong, if oblong-elliptic then straight when old, (4.3-) 7.5–16 (-26.4) × (1.1-) 1.5–3.5 (-4.8) mm, with revolute margins often not appressed to the central vein so that the tomentose undersurface often becomes slightly visible, rarely obviously showing, more or less straight and spreading from the petiole even when old, with antrorse simple hairs over shorter antrorse to radial stellate hairs (1–3(4) subequal branches) acropetally. *Flowers* sessile to slightly stalked, (1-) 3–7 (-15) in terminal corymbiform polymonads. *Flowering*: mainly Aug.–Nov., and often ripe seed is shed concurrently with later flowers. Fig. 5I–P.

Distribution and ecology

On sandy to sandy clay soils and often associated with rocky slopes in woodland; restricted to South Australia where it occurs mainly on the southern but also into central Eyre Peninsula as far north as Mt Olinthus and Middlecamp Hills Conservation Park, and in a few localities in central Yorke Peninsula.

Conservation status: Locally common on mainly the southern Eyre Peninsula but very local further north, and present in several conservation parks.

Variation

The type specimen belongs to a particularly robust form found mainly north-west of Port Lincoln and which was initially distinguished because of its long hairs, leaves with scarcely recurved margins and a central vein often just reaching their apex. Juvenile growths of other plants are, however, often equally vigorous and fall into the range of variation of these plants so that it was found impossible to delimit this form. Even the number of stamens tends to increase in such robust plants.

Although the calyx of most of the species of this complex is more or less accrescent it is particularly noticeable in this subspecies.

Notes

The var. *major* was based on a specimen by H.H.D.Griffith collected near Port Lincoln on 15.x.1909. Only a few days earlier S.A.White collected the same taxon at Warunda on 9.x.1909, but the earliest specimens known of this plant are: *J.St.Browne MEL 35795*, Port Lincoln, 1874; (*Schmid sub J.G.O.Tepper*, Warrow, 1879(AD); *Mrs Richards s.n.*, between Port Lincoln and Streaky Bay, 1883 (AD; MEL 35800). Black (1925, 1926) recorded it also from Kangaroo Island as he was probably referring to a H.H.D.Griffith (x.1908) specimen of *H. villifera*, which was mounted on the same sheet as the lectotype, and in 1952 he erroneously extended the distribution to western Victoria. Jessop (1986) included material of subsp. *platyphylla* from the Eyre and Yorke Peninsulas and rather large flowered specimens, including *H. villifera* from the Southern Lofty region.

Typification

The specimen of the type collection (*H.H.D.Griffith s.n.*, 15.x.1909 from near Pt Lincoln) of *H. sericea* var. *major* in AD was selected as the lectotype because it, in contrast to isotypes in other herbaria, is accompanied by notes and a dissection. On the same sheet was also mounted a (not type) specimen of *H. villifera* (*H.H.D.Griffith s.n.*, x.1908), which is not mentioned in the protologue but in all his subsequent publications reference is made to Kangaroo Island; and a later (not type) specimen *H. sericea* (*F.Mueller s.n.*, Austral. Felix, received from the National Herbarium, Victoria in 1944), which is presumably the reason for extending the distribution to western Victoria in Black (1952).

Voucher specimens (84 examined)

SOUTH AUSTRALIA: *B.J.Blaylock 813*, Section 141, Hundred of Curramulka, 7.x.1967 (AAU, AD; B, C, H, K, P, SI, TI, n.v.); *D.E.Symon 6545*, Hincks National Park, "Oak Amphitheatre", 13.x.1968 (AD, CANB, K); *D.J.E.Whibley 7256*, Mt Olinthus, 1.x.1980 (AD, K, NSW, PERTH); *P.G.Wilson 355*, Warrow – Edillilie road, 10.x.1958 (AD; G, IA, K, L, P, n.v.).

c. subsp. *halmaturina* Toelken, *subsp. nov.*

H. sericea (R.Br. ex DC.) Benth. var. *scabrifolia* J.M.Black, Trans. Proc. Roy. Soc. South Australia 49: 278 (1925), partly, as for "Cape Borda, *H.D.D.Griffith s.n.*" and "Rocky River, *J.B.Cleland s.n.*" cf. *H. sericea*: typification.

H. sericea var. *major* auct. non J.M.Black: Jessop in Jessop & Toelken, Fl. S. Austral. 1: 358 (1986), partly.

A subspecie typica pagina infera exposita foliorum plurimorum foliisque veterioribus recurvis; a subsp. *major*e foliis oblong-ellipticis veterioribusque recurvis differt.

Type: South Australia, Kangaroo Island, Rocky River to Cape Borda, ca 1.5 km before turnoff to West Bay, *H.Eichler 15538* (holo.: AD; iso.(n.v.): K, MEL, NSW, NY, PERTH).

Shrubs with few stiffly erect stems; branches rigidly woody, with many simple hairs (0.3–0.8 mm long) over few longer stiffly erect stellate hairs (1–3 often unequal branches) and smaller erect and/or radial ones (3–6 subequal branches) all of similar size. *Cauline leaves* elliptic to elliptic-oblong, (2.2–) 3.6–7.5 (–11.4) × (0.9–) 1.3–2.2 (–2.8) mm, with undersurface showing between the central ridge and revolute margins, more or less recurved along the whole length when old, with spreading simple hairs above. *Flowers* sessile, 1–3(–5), in terminal corymbiform polymonads. *Flowering*: Aug.–Dec. Fig. 5E–H.

Distribution and ecology

Grows on laterite usually under mallee mainly in the western parts of Kangaroo Island (South Australia).

Conservation status. Scattered plants are rarely common but often recorded from Flinders Chase National Park. 2RCa.

Notes

The western population is of remarkably uniform plants with short recurved cauline leaves, the central vein of each constricting more or less abruptly into the apex in this resembling leaves of subsp. *major* or *H. villifera*. The latter two are, however, distinguished by their long marginal simple hairs over stellate ones on the upper leaf surface.

The central vein also does not continue to the apex of cauline leaves of *H. sericea*, which occurs in a few coastal localities on Kangaroo Island, while the somewhat similar subsp. *halmaturina* has been recorded from inland localities. Three specimens from near Muston (*H.M.Cooper AD 96452008, AD 97938048, B.M.Overton 99*) are here included in the broad concept of *H. sericea* although they have a similar rigid habit and rounded to truncate leaves with the central vein without stellate hairs, and are in the case of *B.M.Overton 99* distinctly recurved. However, unlike subsp. *halmaturina*, the central vein of the cauline leaves of these specimens does not visibly join the apical margin. Although these three specimens are different from others recorded from Kangaroo Island, they are easily matched with specimens of *H. sericea* from south-eastern South Australia.

Etymology

The epithet, “*halmaturina*”, Greek, “*halma*” “a leap” and “*uora*” “a tail”, alludes to kangaroos, and when combined with the Latin geographical ending “*-ina*” it refers to Kangaroo Island, where this subspecies is endemic.

Voucher specimens (26 examined)

SOUTH AUSTRALIA: Kangaroo Island: *E.N.S.Jackson 4445*, Ravine des Casoars, 24.viii.1982 (AD); *G.Jackson 1502*, near Mr Rex Ellis’s property, 14.viii.1981 (AD); *E.C.Nelson 17437*, Brakeneck Creek, -.xi.1973 (AD, CANB).

H. praemorsa Toelken, *sp. nov.*

A. H. patenti 7–9 staminibus, foliis latioribus cum costis centralibus complanatis differt; *H. bracteatae* similis sed absentia bractearum sub florem et tomento glabrescenti differt.

Type: New South Wales, Morton National Park, site 1, *P.M.Jordan s.n.*, 18.ii.1999 (holo.: AD; iso.: K; MEL; MO; NSW).

Shrubs up to 1.3 m tall, more or less branched, villous. *Vestiture* on all parts a mixture of long and short spreading simple hairs, both more or less tubercle-based particularly on leaves and spreading at ca 90° unless restricted and then antrorse. *Leaves* with axillary tuft of hairs scarcely elongating acropetally to 1.5 mm long; petiole 0.2–0.4 (–0.6) mm long; *lamina of cauline leaves* and *hypsohylloids* oblong-elliptic, (5.1–) 6.5–9.5 (–13.2) × (2.4–)

3–4.5 (7.6) mm, obtuse to rounded or slightly emarginate due to recurved apex, usually abruptly constricted into petiole, central vein (0.3–0.4 mm wide in the middle) scarcely raised but visibly continued into the tufted recurved apex, with undersurface visible, villous to sericeous. *Flowers* single, terminal commonly on main branches; *bracts* like cauline leaves. *Calyx* scarcely accrescent, green; *outer calyx lobes* lanceolate to narrowly oblong-lanceolate, pointed to almost acuminate, margins not recurved, 6.5–9.3 × 1.6–2.1 mm, outside villous to appressed-pubescent, inside the upper third rarely with appressed silky hairs; *inner calyx lobes* oblong-elliptic to oblong-lanceolate, acute to pointed, rarely cuspidate, 6.1–7.7 × 2.8–3.3 mm, outside more or less appressed, pubescent to puberulous and glabrous towards the margins, inside glabrous. *Petals* broadly obovate, 5.1–8.8 mm long, slightly emarginate, yellow with reddish main vein. *Stamens* 7–9, side ones often longer; filaments more or less basally connate, anthers narrowly oblong, (2.3–) 2.4–2.6 mm long, dehiscing mainly by terminal pores and later by lateral slits. *Pistils* 2, each ovoid, with 4 ovules, style from outer apex, then spreading laterally of clustered stamens. *Fruit* villous with simple hairs. *Seeds* (slightly immature ones seen) brown, broadly obovoid, laterally compressed, ca 2.2 × 2.4 mm, aril a fleshy ring basally expanding into scarcely lobed sheath surrounding and appressed to base of seed. *Flowering*: Oct.; Jan., Feb. Fig. 6A–G.

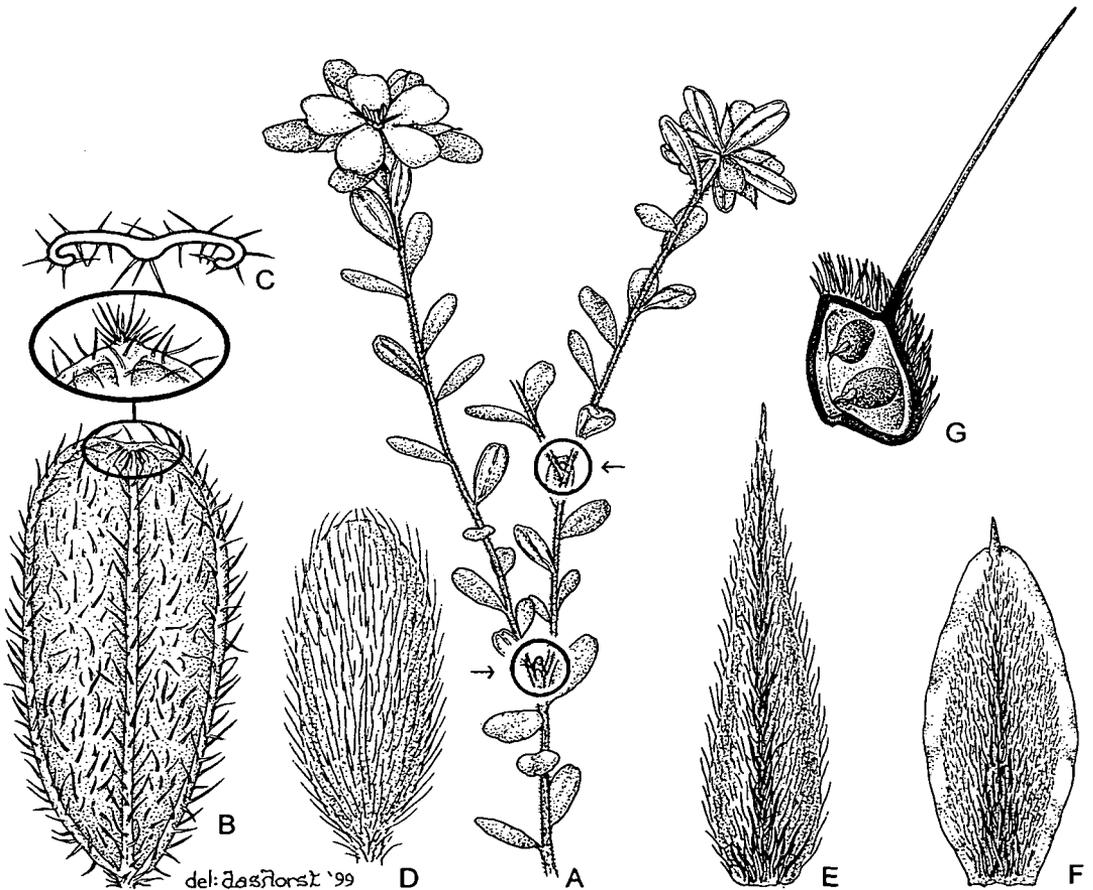


Fig. 6. *H. praemorsa*. A, Flowering branch with scars of two previous flowers; B, cauline leaf; C, transverse section; D, bract; E, outer calyx lobe; F, inner calyx lobe; G, half a pistil with ovary covered with simple hairs. (A–G, *P. Jordan s.n.*, AD; A $\times \frac{1}{2}$; B, C $\times 6$; D $\times 10$; E, F $\times 8$; G $\times 30$).

Distribution and ecology

Grows on steep rocky sandstone slopes with *Eucalyptus sieberi*, *Allocasuarina littoralis*, *Hakea salicifolia*, *Isopogon aridifolius*, *Acacia terminalis* and *Philotheca (Eriostemon) scabra*; in northern Morton National Park (New South Wales: ST), or associated with *Eucalyptus multicaulis*, *Philotheca*, *Hakea dactyloides* and *Banksia spinulosa* on similar aspects in the southern locality.

Conservation status. Known only from two populations with more than 600 plants in northern Morton National Park and one record but with unknown size of population/s from the northern Budawang Range in the same park. 2RCi.

Diagnostic features

The whole plant and especially the leaves are, as in *H. patens*, covered with long and short simple hairs, which are spreading up to 90°, but in spite of this superficial resemblance, *H. praemorsa* is distinguished by its scarcely broadened and thickened central vein, broader leaves, the usually unequally long stamens, and sideways spreading stigmas. The broad leaves could be confused with those of *H. bracteata* except for its spreading hairs and scarcely developed central vein. In *H. praemorsa* also the leaves below the flowers are not reduced to scale-like 'bracts'. The relatively broad leaves with a narrow central vein and covered with spreading hairs resemble those of *H. hirta*, also from Morton National Park, but the flowers are sessile and the hairs are all simple in *H. praemorsa*.

Variation

Except for variation in size of the various organs the present material shows little variation. The calyx of some of the flowers from the southern population is more distinctly acuminate than of the northern ones.

Notes

The specimen from the southern locality was collected on the 2nd October so that it is flowering like most other species of *Hibbertia* in the area during September and October. According to the collector of the northern specimens the main flowering period of the species there is February, which is unusually late for hibbertias from south-eastern Australia.

Etymology

The abrupt constriction of relatively broad leaves into a rounded, truncate or even slightly emarginate apex often appears "bitten off", Latin, "*praemorsa*" as referred to in the specific epithet.

Specimens examined

NEW SOUTH WALES: *P. Gilmour* 5272, northern Budawang Range, 2.x.1985 (CANB); *P.M. Jordan s.n.*, S Bundanoon, i.1997 (AD).

***H. puberula* Toelken, sp. nov.**

H. sericea auctt. non (R.Br. ex DC.) Benth.: A.A. Hamilton, Proc. Linn. Soc. New South Wales 34: 118 (1909); N.C.W. Beadle et al., Vasc. Pl. Sydney 1 edn: 196 (1963), partly; G.J. Harden & J. Everett in G.J. Harden, Fl. N.S.W. 1: 302 (1990), partly; Carolin et al., Vasc. Pl. Sydney 4 edn: 274 (1993), partly.

A *H. sericea* costa centrali foliorum extensa ad apicem et pagina infera invisibili, nonnunquam pilis stellatis, absentia hypsophylliodum; a *H. simulanti* et *H. patenti* ovariis puberulis vel glabrescentibus, habitu decumbenti differt.

Type: New South Wales, Yowie Bay, *A.A. Hamilton s.n.*, 14.xi.1908 (holo.: NSW 101955, sheet two; iso.: NSW 101955, sheet one; CANB, n.v.).

Shrublets with few spreading but ultimately wiry branches up to 30 cm long, sparsely branched, pubescent, often glabrescent. *Vestiture* on all parts varying but becoming denser acropetally, consisting of longer over shorter simple hairs and both types usually with pronounced basal tubercles; *on branches and leaves above and below* fine spreading hairs rarely exceeding 0.7 mm; *on outer calyx lobes* outside with coarse longer hairs (up to 1.3 mm) antrorsely curved and/or some hooked (but sometimes reclining) over smaller hooked reclining (rarely inclining) ones, inside with fine straight longer and shorter simple hairs over much of the surface; *on inner calyx lobes* longer coarse simple hairs usually restricted to along the central vein while short hooked hairs also laterally spreading often almost to the margins. *Leaves* with axillary tuft of hairs elongating acropetally to 0.8 mm long, often slightly continued on both sides of decurrent base of petiole; petiole 0.2–0.5 mm long; *lamina* oblong-lanceolate to almost linear, (1.2-) 3.2–5.5 (-7.9) × (0.6-) 0.8–1.4 (-1.8) mm, acute, sometimes becoming obtuse, abruptly constricted into petiole, with broad central vein (0.4–0.6 mm wide in the middle) continued into apex but recessed from revolute margins, above and below minutely scabrous to glabrescent, with undersurface not visible. *Flowers* single or rarely in a cluster consisting of up to 3 on short shoots subtending the terminal flower, terminal mainly on main branches but also on short shoots; *bracts* elliptic to elliptic-lanceolate, (2.9-) 3.2–3.5 (-4.0) × 0.6–0.72 mm, leaf-like but often slightly flattened and central vein often indistinct, minutely scabrous to glabrescent. *Calyx* more or less accrescent; *outer calyx lobes* ovate, more or less beaked with recurved margins towards the apex, (5.8-) 6.8–8.5 (-10.2) × (1.7-) 2.5–3.8 (-4.2) mm, longer than inner ones, outside hispid, one- to two-thirds covered on inside, pubescent to silky; *inner calyx lobes* oblong-elliptic to oblong-ovate, (4.9-) 5.8–6.6 (-7.4) × (1.8-) 2.1–2.6 (-3.2) mm, hispid with spreading bristles mainly along the central ridge and becoming abruptly shorter to the sides, which are largely glabrous. *Petals* obovate, 6.0–8.3 mm long, broadly bilobed but usually with cuneate base. *Stamens* (9) 10–14, subequal; filaments ca one-third connate; anthers oblong, 1.3–2 mm long, dehiscent by terminal pore and lateral slits. *Pistils* 2, almost spherical, with (4-) 6 ovules, style with base recurved along the apex of the ovary, then arched around cluster of anthers, pale. *Fruit* puberulous with simple hairs. *Seed* brown, obovoid, 1.8 × 1.3–1.4 mm, aril a fleshy ring scarcely expanding into surrounding sheath, on lateral base. *Flowering:* Oct., Nov. Fig. 7A–G.

Distribution and ecology

Recorded from sandy soil often associated with sandstone mainly from coastal areas in New South Wales (CC).

Conservation status. Poorly known, but probably endangered due to urban spread as the most recent collections of the species were made 45 years ago. 2K.

Diagnostic feature

H. puberula closely resembles species of the *H. sericea* complex in that it sometimes produces similar sympodial clusters of terminal flowers, the outer calyx lobes often have the upper margins recurved (cf. *H. crinita*), and the long hairs of the axillary tufts more or less continue along the base of the petiole. However, it is easily distinguished from other species by the combination of its linear-lanceolate leaves with a central vein raised up to the leaf apex, only simple hairs, absence of a tuft of hairs between the stamens and the petals, a puberulous ovary, and obloid seeds.

This species has often been combined with *H. simulans* (see below), but is distinguished by its puberulous ovary and its decumbent habit with wiry branches.

Variation

The sympodial clusters of terminal flowers is not a common phenomenon in the species and was best observed on one sheet (NSW 101955) of two by *A.A. Hamilton s.n.*, xi.1908.

Etymology

The epithet "*puberula*", Latin, "minutely pubescent" refers to the few short soft simple hairs on the leaves and more importantly on the ovary, being a characteristic feature of this species.

Specimens examined

NEW SOUTH WALES: *W.F. Blakely & D.W.C. Shires* NSW 101951, Canoe Ground, Hawkesbury River, 14.x.1927 (CANB, NSW); *E.F. Constable* NSW 101959, Blaxland, 28.x.1949 (NSW, CANB); *A.A. Hamilton* NSW 101955, Yowie Bay, 14.xi.1908 (CANB, NSW); *J.M. Lindale* NSW 101952, Frenchs Forest, -ix.1946 (CANB, NSW); *K. Mair* NSW 101954, South Coogee, 27.xi.1954 (NSW).

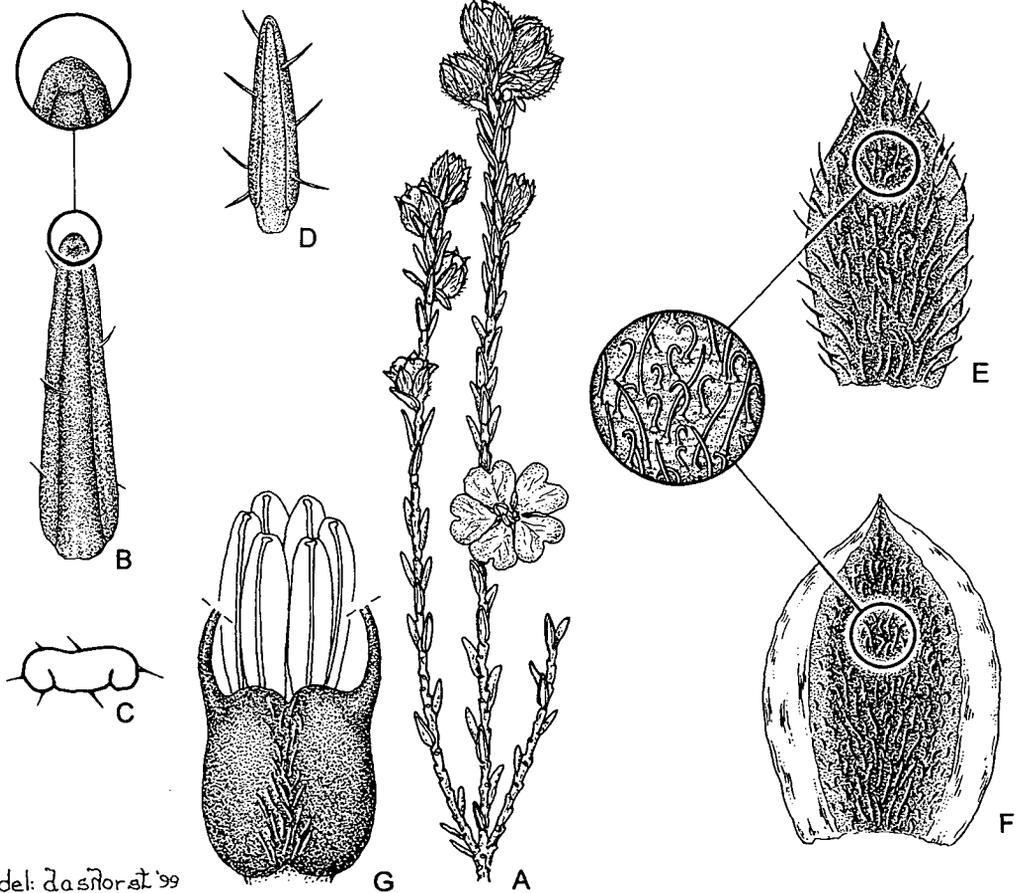


Fig. 7. *H. puberula*. A, Flowering branch; B, cauline leaf; C, transverse section; D, bract; E, outer calyx lobe; F, inner calyx lobe; G, two glabrescent ovaries. (A–G, *J.M. Lindale* NSW 101952; A x1; B, D x10; C x15; E, F x6; G x20).

H. sericea (R.Br. ex DC.) Benth., *Fl. Austral.* 1: 26 (1863), partly; Spicer, *Handb. Pl. Tasm.* 100 (1878); C. Moore, *Cens. Pl. N.S.W.* 1 (1884), partly; Tate, *Handb. Fl. Extratrop. S. Austr.* 14, 205 (1890), partly; Gilg, *Pflanzenfam.* 3, 6: 120, fig. 61F, G [very poor] (1893),

partly; Ewart, Fl. Vict. 769 (1930), partly; Gilg & Werderm. Pflanzenfam. 2 edn, 21: 30 (1925), partly; J.M.Black, Trans. Proc. Roy. Soc. South Australia 49: 274 (1925), partly; Fl. S. Austral. 1 edn, 3: 386 (1926), partly; Fl. S. Austral. 2 edn, 3: 575 (1952), partly; W.M.Curtis, Fl. Tasm. 20 (1956), partly; H.Eichler, Suppl. Fl. S. Austral. 226 (1965); partly; J.Galbraith, Wildfl. Vict. 3 edn, 93, fig.98 (1967), partly; Willis, Handb. Pl. Vict. 2: 390 (1973), partly; Jessop in Jessop & Toelken, Fl. S. Austral. 1: 357 (1986), partly; Toelken in Walsh & Entwisle, Fl. Vict. 3: 310 (1996).

Type: Victoria, near Port Phillip, *R. Brown s.n.* (lecto. – selected here: G-DC; iso.: BM, n. v.; MEL 35698; syn.: *J.B.LT.Leschenault s.n.*, P, n.v.).

Pleurandra sericea R.Br. ex DC., Regn. Veg. Syst. Nat. 1: 416 (1817); Deless., Ic. Sel. Pl. 1: 21, t. 79 [poor] (1821); Steud., Nomencl. Bot. Pl. Phan. 1 edn, 633 (1821); 2 edn, 2: 355 (1841); Hook.f., Fl. Tasm. 1: 16 (1855), partly, excl. *P. cinerea*; Hannaford, Jottings in Austral. 36 (1856); F.Muell., Ann. Rep. Govt Bot. Dir. Bot. Gard., 24 (1858).

P. densiflora Hook., J. Bot. (Hook.) 1: 245 (1835); Hook.f., J. Bot. (Hook.) 2: 401 (1840); Walp., Rep. Bot. Syst. 1: 64 (1842).

Type: Tasmania, *R.W.Lawrence 227* (K, n.v.)

H. densiflora (Hook.)F.Muell., Pl. Indig. Col. Vict. 1: 15 (1862), *nom. illeg.*; Fragm. 7: 125 (1871), partly; Fragm. 11: 92 (1880), partly; Syst. Census 1 (1882), partly; Sec. Syst. Census 1 (1889), partly; Tate, Trans. Proc. Roy. Soc. South Australia 3: 50 (1880); C.Moore & Betche, Handb. Fl. N.S.W. 10 (1893); Rodway, Fl. Tasm. 4 (1903), partly; Maiden & Betche, Census N.S.W. Pl. 139 (1916).

H. sericea (R.Br. ex DC.)Benth. var. *sericea*. Benth., Fl. Austral. 1: 26 (1863), partly; J.M.Black, Trans. Proc. Roy. Soc. South Australia 49: 274 (1925), partly; Fl. S. Austral. 1 edn, 3: 386 (1926), partly; Fl. S. Austral. 2 edn, 3: 575 (1952), partly; Willis, Handb. Pl. Vict. 2: 390 (1973), partly; Jessop in Jessop & Toelken, Fl. S. Austral. 1: 357 (1986), partly; Toelken in Walsh & Entwisle, Fl. Vict. 3: 311 (1996).

H. sericea (R.Br. ex DC.)Benth. var. *densiflora* (Hook.)Benth., Fl. Austral. 1: 26 (1863).

Type: as for *P. densiflora*.

H. sericea (R.Br. ex DC.)Benth. var. *scabrifolia* J.M.Black, Trans. Proc. Roy. Soc. South Australia 49: 274 (1925); Fl. S. Austral. 1 edn, 3: 386 (1926); Fl. S. Austral. 2 edn, 3: 575 (1952); Willis, Handb. Pl. Vict. 2: 390 (1973); Toelken in Walsh & Entwisle, Fl. Vict. 1: 357 (1996).

Type: South Australia, Keith, *J.M.Black s.n. & ADB*, 22.xi.1917 (lecto – selected here: AD; syntypes: Mt McTyre (AD); without locality or date, *J.M.Black s.n.* (AD); Tintinara, *J.M.Black s.n.* (AD); East Wellington, *J.M.Black s.n.* (AD); Cape Borda, *H.H.D.Griffith s.n.* (AD – excl.); Keith, *J.M.Black s.n. & ADB*, 23.xi.1917 (AD); S. Lameroo, *J.M.Black s.n.*, 15.x.1918 (AD); Cape Bonney, *J.B.Cleland s.n.*, xii.1922 (AD); Rocky River, *J.B.Cleland s.n.*, 18.x.1924 (AD – excl.); Streaky Bay, *Major Warburton s.n.* (MEL 35803 – excl.) see typification).

Shrubs 0.3–1.2 m tall, with few erect to spreading branches, becoming moderately to densely branched, villous to pubescent. *Vestiture* on all parts consisting of simple hairs (0.1–1.8 mm long) over stellate hairs (rarely locally absent), both more or less tubercle-based and becoming denser acropetally; *on branches* with more or less scattered simple hairs often wearing off on lower branches but below flowers often of similar length to those of the tufts in the axils of leaves, which thus appear to overflow to both sides and along the decurrent leaf bases, over multiangulate radial stellate hairs usually of different sizes (2–5 often unequal branches) increasing in number and size acropetally (3–8 (-10) usually subequal branches); *on leaves above* with few to many usually antrorse simple hairs, often of different size, becoming longer and spreading towards the margins, sometimes wearing off, over few (rarely none), but increasing below flowers, antrorse to rarely only radial multiangulate stellate hairs (2–5 usually subequal branches); *on leaves below* with more or less scattered antrorse simple hairs along the margins and central vein over radial multiangulate stellate hairs (5–8 usually subequal branches) or only densely matted ones (7–12 subequal branches) on the undersurface, if visible; *on hypsophylloids* above with usually many antrorsely inflexed to appressed simple hairs over usually antrorse (rarely radial) multiangulate stellate hairs, below with few to rarely many antrorsely curved simple hairs over mainly dense, often antrorse, multiangulate stellate hairs; *outer calyx lobes* with

few to many antrorsely inclined or curved, often coarse, simple hairs over radial (rarely antrorse) multiangulate stellate hairs (3–7 usually subequal branches) to radial or rarely pulvinate ones (many subequal branches) towards the sides; on *inner calyx lobes* with few or no antrorse simple hairs along the central vein over short radial to pulvinate multiangulate stellate hairs (many subequal branches), and often with simple- to stellate-ciliate margins. *Leaves* with axillary tuft of hairs elongating acropetally up to 1.2 mm long, often continued along both sides of decurrent base of petiole; *lamina of cauline leaves* linear-oblongate to linear-lanceolate, rarely linear-elliptic, 2.6–17.8 × 1.8–5.6 mm, gradually or scarcely tapering into petiole, obtuse often becoming acute, rarely acute, with central vein visible for two-thirds to seven-eighths of their length and often broader and usually shallower than the revolute margins (0.2–0.4 (-0.6) mm wide at the middle), above pilose or pubescent to glabrescent, below tomentose with undersurface usually visible and then leaves discolourous; *lamina of hypsophylloids* linear-elliptic to ovate, (1.8-) 3.5–10 (-12.4) × 0.8–3(-5.6) mm, scarcely tapering into petiole, bluntly acute to obtuse, like cauline leaves, velutinous to tomentose on both surfaces. *Flowers* sessile, (1-) 3–9 (-15) in broad rarely oblong corymbiform polymonads, subtended by few to many hypsophylloids, terminal on main or lateral branches and often on short shoots; *bracts* lanceolate to ovate, 1.6–11.8 × 0.7–4.4 mm, similar to hypsophylloids, flat with margins recurved mainly towards the apex, central vein broader and shallower, tomentose to velutinous above and below. *Calyx* often turning reddish-brown, scarcely accrescent; *outer calyx lobes* lanceolate, 3.9–8.1 × 1.9–3.4 mm, acute, with scarcely recurved margins towards the apex, scabrous, inside on upper half appressed-villose; *inner calyx lobes* oblong-ovate, 3.8–7.3 × 3.7–5.9 mm, obtuse, stellate-tomentose with some scabrous hairs along the ridges. *Petals* obovate, rarely with cuneate base, (6.7-) 8.5–14 (-16.3) mm long, distinctly bilobed. *Stamens* (6-) 8–10 (-15), subequal; filaments basally connate, *anthers* obloid, (1.6-) 1.8–2.2 (-2.6) mm long, dehiscing by terminal pore and lateral slits. *Pistils* 2, scarcely laterally compressed, with 4–8 ovules, style base recurved along the upper third of ovary, then arched around the cluster of stamens, yellow, sometimes turning red. *Fruit* stellate-tomentose. *Seed* brown to shiny black, obovoid to almost spherical, 1.8–2.2 × (1.6-) 1.8–2.2 mm, aril with fleshy base and scarcely lobed sheath surrounding and appressed to base of seed. *Flowering*: Aug.–Nov. *Common name*: Silky Guinea-flower (Willis 1973, Jessop 1986). Fig. 8A–O.

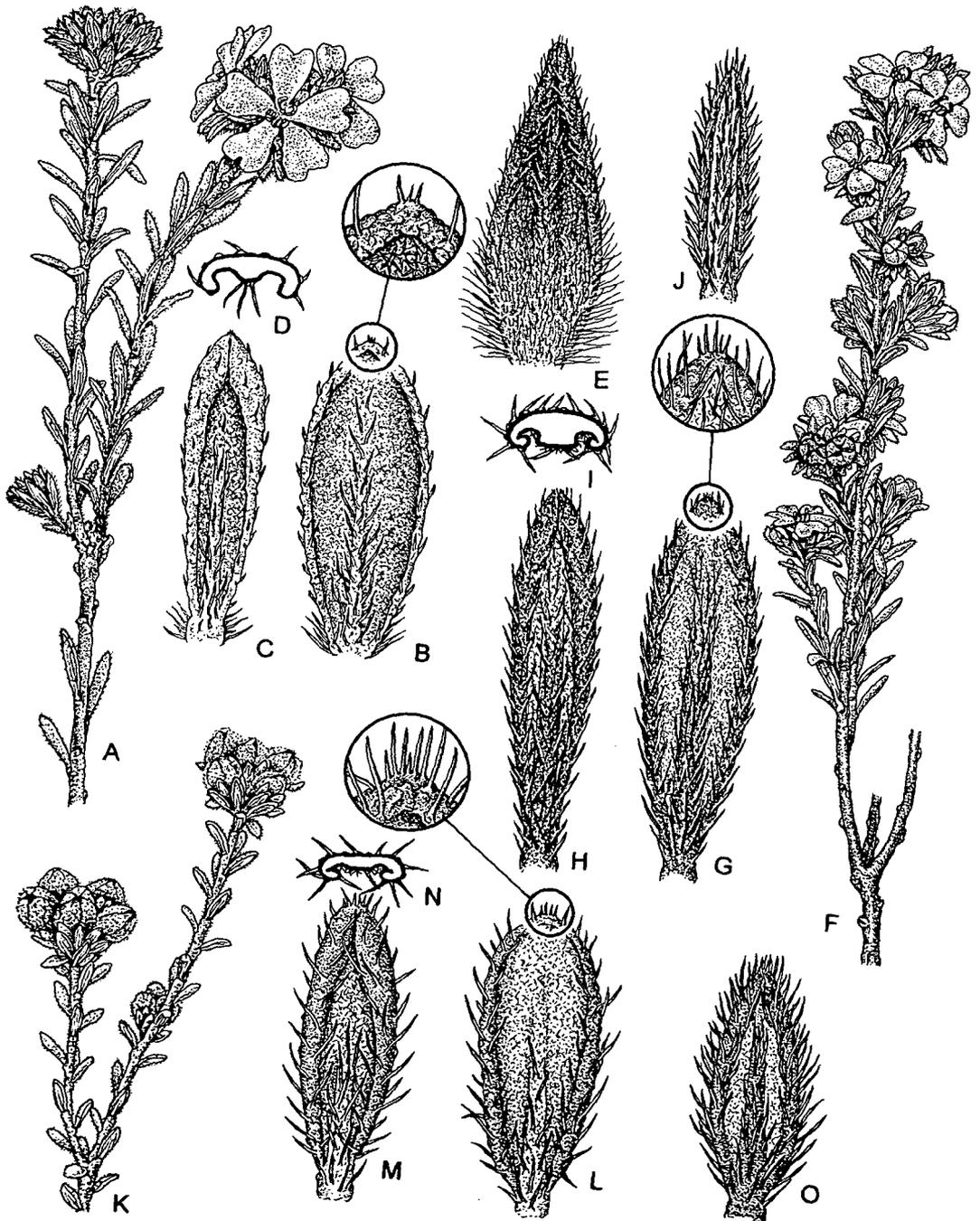
Distribution and ecology

Usually grows in sandy soils often associated with woodland or mallee but most commonly found in coastal heath or low woodland, which is often associated with wetter and swampy conditions in south-eastern to western Victoria (LMAL, WIM, WAN, GR, OTPL, OTRA, GPL, PROM, EG), mainly northern Tasmania and south-eastern South Australia (MU, SL, KI (2 specimens), SE).

Conservation status. All forms of the species occur widespread and are often locally common.

Diagnostic features (see also under variants below)

H. sericea is distinguished from other taxa in this complex by the central vein being visible to two-thirds to seven-eighths of the length of cauline leaves, the presence of predominantly simple hairs on the upper leaf surface (as opposed to mainly stellate hairs in *H. crinita*, as discussed there), and stellate hairs usually covering more than one-third of the inner surface of the outermost calyx lobe. The central vein only being visible for part of the length of the leaves may not be clearly visible in depauperate plants or specimens from drier areas because of the strongly revolute margins of the leaves.



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H. villifera is very similar to *H. sericea*, particularly to the form "Densiflora", which shares more or less oblong leaves, a pronounced central vein almost to the apex, and styles often becoming red during flowering. But the former is distinguished by its mainly terminal polymonads, the long silky simple hairs (1.8–2.4 mm long), the larger over smaller stellate hairs on the undersurface of particularly the acropetal parts of cauline leaves and especially leaves below the flower clusters, and plants usually grow on dry sandy or lateritic soils.

Variation

The number of stamens and ovules per carpel vary from one population to another but could not be linked to other characters. In *H. sericea* the stamens are generally densely clustered with the inner ones more or less leaning over the ovaries between the two styles. In "Scabrifolia" the usually distinctly longer central inner stamen, which, as in *H. stricta* var. *glabriuscula*, is situated behind the gap between the two ovaries, is thought to be part of a specific pollination syndrome. The phenomenon is less distinct in "Densiflora" because there are often two or three longer stamens, which, in contrast to "Scabrifolia", have no raised connective or short appendage.

In a variable species like this the choice of material to be examined for identification can be critical as in some forms (e.g. *M.C.R. Sharrad 158*, Cooke Plains, AD) the leaves develop early the dense indumentum typical of leaves below the flowers, and these may resemble the cauline leaves of *H. crinita*. While cauline leaves of *H. sericea* can normally be identified by their central vein not reaching the apex, it may be visible to the apex on leaves below the flowers. Plants which must be identified as *H. sericea* because of the dissimilar denseness of the indumentum on both surfaces of the leaves, rarely have the central vein continued to the apex (*R.J. Bates 11690*). Identifications need to be done using lower cauline leaves and the combination of the length of the central vein as well as the indumentum of the upper and lower surface should be used as the hairs may wear off on older leaves of *H. crinita* (e.g. *R.D. Hoogland 11872*). Senescent plants may sometimes have to be assessed because the remaining leaves on the specimen are mainly those from below successive annual flowers interspersed with little real vegetative growth.

In analysing previously recognised local forms it was found that specimens of *H. sericea* fall into two groups. Those with a long and broad central vein visible to just below the apex (ca seven-eighths of the length) of their linear to linear-lanceolate cauline leaves, which are normally acute, and their margins are more or less equally broad all round irrespective of the degree of recurving. In others a narrower central vein is visible for two-thirds of their oblong-oblong-lanceolate (rarely linear) cauline leaves. The former leaves are usually acute, whereas the latter are obtuse unless their margins are strongly recurved due to extreme environmental conditions or preparation of herbarium specimens in which case the apex of the margin is obscured, when the margins are usually obviously broader below the apex of the cauline leaves (cf. fig. 8C, M) of the latter.

Three informal groups, which were at one or other stage recognised at varietal level, are based on these two types of cauline leaves and are here used to describe the variation within the species. "Densiflora" has a broad central vein with up to ten simple hairs abreast at the middle and the vein almost reaches to the apex (to about seven-eighths of the leaf length).

Fig. 8. *H. sericea*. A, Flowering branch of "Sericea" with flower clusters mainly terminal on long branches; B, flat cauline leaf; C, cauline leaf with rolled margins broader towards the apex; D, transverse section; E, hypsophylloid/ bract; F, flowering branch of "Densiflora" with flower clusters terminal on long and short branches; G, flat cauline leaf; H, cauline leaf with rolled margins scarcely broader towards the apex; J, hypsophylloid/ bract; K, branch of "Scabrifolia" in fruit with clusters subtended by short hypsophylloids; L, flat cauline leaf; M, cauline leaf with rolled margins broader towards the apex; N, transverse section; O, hypsophylloid/ bract. (A–E, *R.D. Hoogland 12422*, NSW; F–J, *M.E. Phillips 309*, CANB; K–O, *A.C. Beaglehole 84461*, MEL; A, F, K $\times \frac{1}{2}$; B, C $\times 3$; D, E, G–J $\times 5$; L–N $\times 8$; O $\times 12$).

The central vein in “*Sericea*” and “*Scabrifolia*” is much narrower, with up to five simple hairs abreast and reaches only two-thirds of the leaf length. They are then further distinguished by the size of the leaf and hypsophylloids, which in the former envelopes the terminal flowers, while they cover only the base of the apparently separate flowers in the latter. Other characteristics are also provided in the description below, but none of them are consistent. Although these groups are locally distinct, no formal taxonomic rank is assigned because many intermediates were observed. Several such intermediate populations were investigated, and, although no definite indications of hybridity, such as abnormal pollen, could be found, the range of variation recorded within restricted areas, especially on Wilsons Promontory and in several localities in south-eastern South Australia indicate some such phenomenon. Other populations have variation patterns which are more complex particularly in south-eastern South Australia. Plants with a pronounced central vein which resemble “*Densiflora*” have been mainly recorded from coastal areas, often near wetlands, in Tasmania, but similarly also on the mainland from eastern and southern Victoria, where they merge into “*Sericea*” plants, to western Victoria and south-eastern South Australia to near Victor Harbour, where their range of variation overlaps at various points with that of “*Scabrifolia*” plants.

This leads me to conclude that the three groups had at one stage been geographically and/or ecologically (but not biologically) isolated and might have developed local forms before they came again into contact. In contrast to these variation patterns “*Sericea*” and “*Scabrifolia*” apparently do not show any overlap in distributions, and intermediates can usually be identified by the use of secondary characters (cf. “*Sericea*”, variations). The following descriptions are intended to provide a better understanding of the species but more discerning collections representing a more complete range of material found in populations over the whole range of the species are required.

a. “*Sericea*”

Shrubs to 1.2 m tall, with few erect, stiffly woody branches, usually sparsely branched. *Cauline leaves* linear-oblongate, rarely linear, (6.3-) 8.5–10.5 (17.8) × (2.1-) 3–4.5 (-5.6) mm, obtuse or rounded and usually exposing much of the undersurface unless becoming rolled and then acute and with broader margins below the apex, above mainly with short simple hairs 0.2–0.5 (-0.8) mm long; central vein (and revolute margins) scarcely broadened (at lower third 1–2 times broader than revolute margins, (3) 4–6 simple hairs abreast) and visible for two-thirds of the length of leaves. *Flowers* (1-) 4–15, in usually rounded terminal polymonads; hypsophylloids lanceolate to ovate, as long as or just longer than calyx, with distinct revolute margins and central vein often almost to the apex. *Outer calyx lobes* linear-lanceolate to lanceolate, longer than inner lobes, usually with distinct central vein and recurved upper margins; *inner lobes* obtuse to rounded, rarely cuspidate. *Stamens* (10-) 12–15. *Diagnostic features*: Both the “*Sericea*” and “*Scabrifolia*” types have a short central vein but the former is distinguished from the other two by its larger linear-oblongate leaves with the undersurface usually visible.

Variation: Although “*Sericea*” is usually distinguished from “*Scabrifolia*” by its larger leaves and hypsophylloids, specimens from the coast between Geelong and Lorne approach an intermediate size. Many of their leaves are 3–5 times longer than broad, a previously held characteristic of “*Scabrifolia*” (Toelken 1996). These plants seem to represent a local form of “*Sericea*”, as they often have the longer hypsophylloids, never have their leaves so tightly rolled that the undersurface is not visible as well as their more rigid-erect habit.

In the Grampians plants usually grow associated with woodlands on the lower slopes and have usually much broader hypsophylloids except for one record from Mt Abrupt in the south. These southern specimens also have oblongate leaves with usually a short central vein at least on lower cauline leaves, but they are commonly broader and with more simple hairs than those of the northern counterparts. Since their hypsophylloids are linear-

lanceolate and frequently longer than the flowers they subtend, it is often not easy to distinguish specimens of this form from those of “*Densiflora*”.

Some collections (e.g. *R.D.Hoogland 11888, 12423, T. & J.Whaite 1484*) from the Grampians have leaves less than 1 cm long, but they were included in “*Sericea*”, because their hypsophylloids are usually longer than the calyx, and they have more than four flowers in their terminal polymonads. The undersurface of the leaves is at least partially visible. But other specimens (e.g. *T.S.Henshall NSW 106155*, from Mt Arapiles) have all the characteristics of “*Scabrifolia*”. Although the two groups have not been recorded from the same area there is a specimen from the Little Desert (*T.S.Henshall MEL 1517518*, 14 mls S Nhill), which does not agree with any other specimen from that area and is identified as “*Sericea*”. There are some intermediate specimens which are at present not fully understood.

Voucher specimens

VICTORIA: *J.Burne NSW 85968*, Lorne, vi.1940 (NSW); *K.Cowle MEL 580024*, Sandringham, - (MEL); *R.D.Hoogland 11888*, ca 1 mile S Cave of Fishes, 20.xi.1970 (MEL); *12423*, near Golton Gorge, 15.ix.1973 (MEL); *A.Morrison BRI 352889*, Brighton, - (BRI); *S.T.W.Parfett 125*, 4 km N Zumsteins, 22.viii.1987 (MEL); *M.E.Phillips 405*, near Anglesea, 18.ix.1961 (CANB); *J.H.Ross 2536*, Rosebud, Mornington Peninsula, 16.viii.1981 (MEL); *H.B.Williamson MEL 85963*, Mt Abrupt, x.1901(MEL).

TASMANIA: *L.G.Adams & C.J.Adams 3414*, ca 3 km ESE Port Latta, 9.xii.1977 (CANB).

b. “*Densiflora*”

Shrubs 0.3–0.6 (-1) m tall, with many spreading, usually stiffly woody branches, much branched. *Cauline leaves* linear to linear-lanceolate, (3.2-) 4.5–10.5 (-15.7) × (0.8-) 1.2–2.5 (-3.1) mm, acute and scarcely exposing the undersurface, revolute margins of similar width all around; above mainly with long simple hairs 0.6–0.9 (-1.2) mm long; central vein (but not revolute margins) considerably broadened (at lower third 2–3.5(-4) times broader than revolute margins, (4) 5–7 simple hairs abreast) and visible to just below the apex. *Flowers* 1–8 (-12) in often oblong, loose terminal polymonads commonly and on short shoots or many lateral branches; *hypsophylloids* linear-lanceolate, usually distinctly longer to as long as calyx, with well-defined central vein and revolute margins. *Outer calyx lobes* linear-lanceolate, usually longer than inner lobes, with more or less distinct central vein and recurved upper margins; *inner lobes* acute to obtuse or rounded. *Stamens* 8–10 (-14), subequal. *Diagnostic features*: *Cauline leaves* of “*Densiflora*” are distinguished from those of the other two groups by its central vein reaching almost to the apex and being so broad at the middle that it has up to seven simple hairs abreast and is usually broader than the revolute margins.

Variation: “*Densiflora*”, which occurs mainly in coastal Tasmania, is as Gunn stated (*Gunn 636/1837* in K) very variable: “...when exposed to violent winds and spray off the sea, it becomes a very dwarfed plant rarely exceeding 4-6 in. high, and growing in dense tufts. In sheltered spots it attains 12- 18 in.” An extremely depauperate specimen from Flinders Island (*J.S.Whinray 1410*) with leaves 2.6-4 mm long, is, however, distinguished from “*Scabrifolia*” by its almost appressed simple hairs, the pronounced central vein though very short, and hypsophylloids vary from half to as long as the calyx. In South Australia this form in particular is usually associated with temporary wet or swampy conditions.

Only a few seeds were seen of this form and they were slightly narrower than those of the mainland forms so that they were often distinctly longer than broad. But a specimen from near Georgetown (MEL 35717) shows a wide range covering the extremes.

Although the broad central vein of cauline leaves is usually well developed in plants from Tasmania, the occasional one is less well developed (*P.Collier 629, W.M.Curtis HO 29767*). Their hypsophylloids are, however, typical of “*Densiflora*”. But *L.G.Adams &*

C.J.Adams 3414 is indistinguishable from the small form of “*Sericea*” from between Geelong and Lorne. The many simple hairs commonly found on the broad central vein are very sparse in some local forms.

An unusually hairy form (*P.Collier 4162*, Mines Creek, E Mt Tanner, Flinders Island), which resembles *H. crinita* was retained in *H. sericea*, because of an incomplete central vein on the cauline leaves like plants in “*Densiflora*”, usually producing predominantly simple hairs and few stellate hairs, and the outer calyx lobes scarcely or not at all recurved at the apex and not covered with simple hairs up to half their length on the inside. In addition, the specimen (*W.M.Curtis HO 3248*, near Lady Barron) shows a range of intermediates.

The South Australian plants with a long pronounced central vein and generally resembling “*Densiflora*” tend to have shorter hypsophylloids, but in contrast to plants of typical “*Scabrifolia*” they are linear and acute to pointed. Very few records of such plants are available. Plants with a pronounced central vein commonly have oblanceolate leaves with obtuse apex, or becoming acute because particularly in the upper regions the margins are strongly revolute. They are intermediate and mainly restricted to coastal areas.

Voucher Specimens

“*Densiflora*”

TASMANIA: *F.E.Burbury HO 97765*, Georges Bay, - (HO); *P.Collier 629*, N Bryans Beach, 6.vii.1985 (HO); *W.M.Curtis HO 29767*, near Rocky Cape, ii.1948 (HO); *R.C.Gunn 636*, George Town, 23.x.1844 (NSW); *W.D.Jackson 238*, near Interview River, 15.i.1954 (HO); *J.Milligan 1078*, Oyster Cove, - (HO).

VICTORIA: *P.G.Abell 306 & C.Herscovitch*, 8.6 km from car park along maintenance road to lighthouse, South East Pt, Wilsons Promontory, 5.xii.1986 (NSW); *A.C.Beauglehole 68085*, Bemm River education area, 3.ii.1980 (MEL); *J.Bowen NSW 85967*, Mornington, ix.1940 (NSW); *P.C.Heyligers 80017*, 5 Km SW Hordern Vale, 28.vii.1980 (CANB); *R.D.Hoogland 11910*, road onto Wilsons Promontory, 25.xi.1970 (MEL!; CANB, K, L, HBG, US, n.v.); *M.E.Phillips CBG 12246*, near old aerodrome at north end, Wilsons Promontory, 23.xi.1961 (CANB); *CBG 44913*, Portland, along track towards Pt Danger, 28.x.1971 (CANB); *P.S.Short et al. 3277*, Moleside camping ground, ca 8 km S Drik Drik, 28.ix.1988 (MEL).

SOUTH AUSTRALIA: *J.R.Dodson 148*, Lake Robe, 3.iii.1972 (AD); *D.Miller 17*, near Parawa, x.1967 (AD); *K.Stove 914*, Tilley Swamp, 23.vii.1980 (AD); *L.D.Williams 12418*, Canunda National Park, 16 km from Millicent, 9.vii.1982 (AD).

“*Densiflora*”→“*Scabrifolia*”

VICTORIA: *Eckert 27*, Lower Glenelg River, 1891 (MEL 35684); *P.C.Heyligers 80050*, near Cape Nelson lighthouse, 31.vii.1980 (CANB).

SOUTH AUSTRALIA: *N.N.Donner 9013*, ca 3km SE Salt Creek, 1.x.1982 (AD, NSW); *W.E.Poole s.n.*, near Lake Hawdon, xi.1972 (CANB); *P.Wilson 1194*, Lake Bonney, 13.xi.1959 (AD)

“*Densiflora*” → “*Sericea*”

VICTORIA: *A.C.Beauglehole 78863 & J.R.Turner*, Gippsland Lakes Reserve, 27.x.1984 (MEL); M.G.Corrick 3346, Bellarine Peninsula, 29.vii.1973 (MEL); *T.B.Muir 6197*, 8 km SE Lang Lang, 19.x.1978 (CANB, MEL); *Musgrari MEL 35685*, Wilsons Promontory, - (MEL); *M.E.Phillips CBG 43028*, between Cape Schank & Rosebud, Mornington Peninsula, 23.x.1971 (CANB); *F.M.Reader MEL 35696*, near Melbourne, 1884 (MEL); *O.Thompson 123*, Seaspray-Giffard Road, 19.ix.1982 (CANB – showing a full range, MEL);

TASMANIA: *A.M.Buchanan 11195*, Prime Seal Island, southern Peacock Bay, 13.xii.1988 (HO).

c. “*Scabrifolia*”

Shrublets to 0.35m tall, with few to many spreading to decumbent, often wiry-woody branches, usually much branched. *Cauline leaves* oblanceolate to linear-elliptic, rarely ovate, (2.6-) 3–5 (-11.3) × (1.8-) 2–2.5 (-3.5) mm, obtuse and undersurface more or less exposed or acute and undersurface usually not or scarcely visible and revolute margins

broader below the apex, above mainly with short simple hairs 0.1–0.3 (0.6) mm long; central vein (and revolute margins) somewhat broadened (in lower third 1–2.5 times broader than revolute margins, 1–3 (4) simple hairs abreast) and only visible two-thirds of the length of the leaves. *Flowers* 1, rarely up to 5 but then in a diffuse polyomonads with lateral flowers overtopping terminal one, terminal on main branches; hypsophylloids lanceolate to ovate, at least upper ones half or usually less than calyx lobes and with central vein and revolute margins not or scarcely developed. *Outer calyx lobes* ovate, usually with indistinct central vein and recurved upper margins; *inner lobes* rounded or often emarginate. *Stamens* (6-) 8–10 (-12), with inner central one longer. *Diagnostic features*: Typically cauline leaves of this variety are rarely more than 11mm long and have tightly rolled margins so that the undersurface is rarely visible, but also specimens with scarcely revolute leaf margins and short central vein have characteristic hypsophylloids usually covering only the basal half of the calyx, so that the individual flowers seem quite separate. The longer central stamen (rarely two) is often not clearly visible in dried specimens, but often the raised connective of the stamens forms a short terminal appendage, which usually distinguishes this group from “*Sericea*” and “*Densiflora*”.

Variation: Cauline leaves from inland plants were usually found to have strongly revolute margins. As their hypsophylloids are usually considerably shorter in contrast to those of their counterparts from the coast, this seems to reflect more than different environmental conditions. Plants with tightly rolled leaves from more arid areas also tend to have a relatively broader central vein although this might be accentuated by their shorter leaves. However, because of the difference in the degree of recurved margins of the leaves, which affects their relative width, the characteristic of “leaves 3–5 times longer than broad” (Toelken 1996) can only be used in extreme cases.

In the southern parts of the South-Eastern Region of South Australia populations seem to show a much greater variation and the longer hypsophylloids are often associated with a strongly developed central vein in the often linear-ob lanceolate leaves, which could indicate widescale hybridization with plants of “*Densiflora*”. Records from the nearby Portland are even more revealing because most of their leaves are little recurved so that the plants (e.g. *B.G. Briggs 2935*, *P.C. Heyligers 80050*) superficially resemble the form of “*Sericea*” from south-west of Geelong, but here the hypsophylloids are few and distinctly shorter than the flowers, which are borne in loose terminal and lateral clusters.

A parallel development of a more prominent central vein and smaller as well as often fewer hypsophylloids subtending the flowers in more arid areas can be observed in *H. crinita* (form from the Flinders Ranges) and “*Scabrifolia*” group, but its significance can only be speculated on.

For each of the characters of “*Scabrifolia*” there are some exceptions and since many specimens from the coastal areas and especially from much of the South-Eastern Region of South Australia have a pronounced central vein up to nearly the top of the leaves, i.e. reminiscent of “*Densiflora*”, “*Scabrifolia*” is probably the least clearly delineated group in *H. sericea*.

Particularly hairy forms (e. g. *M. Tindale NSW 85976*) have been recorded from the area between Bordertown and Keith, but these plants have been found to have mainly simple hairs on the upper leaf surface, so that they cannot be confused with *H. crinita*.

Voucher specimens

“*Scabrifolia*”

VICTORIA: *H.I. Aston 1008*, 22.4 mls N Serviceton North, 30.ix.1963 (BRI, MEL); *A.C. Beaglehole 84461*, Kiata Lowan Sanctuary, 15.ix.1986 (MEL); *R. Melville et al. 985*, 24 mls ESE Kaniva, 16.ix.1952 (MEL, NSW). SOUTH AUSTRALIA: *C.R. Alcock 5791*, summit of Mt Rescue, 5.x.1977 (AD, CANB); *R.D. Hoogland 11867*, 15 mls ESE Meningie, 17.xi.1970 (AD, CANB, MEL, NSW; A, HBG, K, L, OKLA, UC, US, n.v.)

“*Scabrifolia*” → “*Sericea*”

VICTORIA: *D.E.Albrecht 1099*, ca 12 km by road west of Portland, 13.x.1984 (MEL); *A.C.Beauglehole 13544*, Castle Rock area, 6.xi.1966 (MEL); *R.V.Smith 59/245*, Anglesea, 15.x.1959 (MEL 673021).

SOUTH AUSTRALIA: *R.Bates 6122*, Waitpinga scrub, 14.ix.1985 (AD); *E.N.S.Jackson 243*, Devils Hole in Caroline Forest Reserve, 17.xi.1959 (AD).

Notes (on *H. sericea*)

Tate (1890) recorded *H. sericea* from his Port Lincoln region, but it is not clear what specimen or species he was referring to, or if he followed Bentham (1863), who had erroneously placed *H. cinerea* from that area into *H. sericea* (Toelken 1998).

“*Scabrifolia*” is not only a small or even depauperate form of “*Sericea*” because in addition to all organs being relatively smaller, the bracts immediately below the terminal flower, which are usually enhanced in that subspecies, are reduced and usually even shorter than the cauline leaves below in “*Scabrifolia*”. It thus presents its flowers not only upwards but in all directions and could represent an entirely different pollination syndrome.

Typification

The specimen of *Pleurandra sericea* collected by R. Brown in Herbarium de Candolle, who attributed the name to Brown, was selected as the lectotype of this species. No Leschenault specimen (the other syntype) could be located in de Candolle’s herbarium, and, since it is very unlikely that de Candolle would have annotated the specimens he had seen elsewhere, it will be difficult to prove that any Leschenault specimen found in another herbarium was the specimen examined by the author. Although some putative hybrids have been recorded from Port Phillip Bay, the type locality, the two specimens examined of the Brown type did not show any signs of hybridity.

As the original description of *H. sericea* var. *scabrifolia* is very general and Black (1925) mentioned only a distribution range instead of enumerating individual specimens examined, one has to lectotypify the taxon on whatever specimens he might have consulted. The folder of this taxon in J.M.Black’s herbarium contained twelve specimens and a description of a specimen from “Mt McIntyre, near Millicent. Tate Herb.” There are three such specimens in the latter herbarium but only one was inscribed *H. sericea* var. *scabrifolia* in what seems to be the author’s handwriting. That specimen is mounted on the same sheet (AD 97620418) as an A.Richards’ specimen of *H. platyphylla* subsp. *major* (cf notes there) from Pt Lincoln – Streaky Bay (Streaky Bay is mentioned in the protologue, see also note below), on which there is a similar identification by the author. These two specimens are included as syntypes, while a second sheet (AD 97620432), which contains another Perrin specimen from Mt McIntyre inscribed “*H. sericea*” and a second specimen from the same locality but without collector or any identification by the author, are not considered as syntypes.

The above specimen mentioning the locality Streaky Bay is not the one that had been examined by Bentham and included in the Flora Australiensis under *H. stricta* R. Br. var. *hirtiflora* Benth. of which Black obviously was aware, because he referred to this variety in the two editions of his Flora (Black 1926, 1952), although not in the protologue (Black 1925). Bentham (1863, p. 27) mentioned two specimens “from Spencer’s Gulf and Streaky Bay”, but only the latter is included in the syntypes because Black (1925) specifically referred to that locality.

Of the twelve specimens of the var. *scabrifolia* in Black’s herbarium, two specimens, i. e. “*J.B.Cleland s.n.*, 22.i.1926” and “*E.C.Black s.n.*, x.1939” must be excluded, because they were collected after the date of publication. Also excluded are “J.M.Black without locality

or date” and the second specimen of “*J.M.Black s.n. & ADB, 22.xi.1917, Keith*” and “*J.M.Black s.n., 15.x.1918, S Lameroo*”, because they were not identified by the author.

Among the syntypes six specimens (1, 4, 5, 7, 8, 9) agree with both Black’s protologue and the present concept of the taxon. The collection 7 (*J.M.Black s.n. & ADB, Keith*) with the most detailed description and illustrations including that of a seed, a good representative specimen, and a determination by J.M.Black was chosen as lectotype. (ADB probably stands for Mrs Alice Black (néé Denford) or Mrs J.M.Black. His diary (manuscript in AD) records that only the two of them went to south-eastern South Australia. The syntypes are (Sc = specimen identified here as “*Scabrifolia*”; Det = identified by J.M.Black):

1. *Perrin s.n.*, Mt McIntyre, near Millicent, AD 97620418 (brief description) – Sc; Det
2. *A.Richards s.n.*, Port Lincoln – Streaky Bay, x.1882, AD 97620418 (no analysis) – *H. platyphylla* subsp. *major* – Det
3. *Major Warburton MEL 35803*, Streaky Bay (no analysis) – *H. platyphylla* subsp. *platyphylla*
4. *J.M.Black s.n.*, 2.viii.1905, Tintinara, 90 Mile Desert, AD (no analysis) – Sc; Det
5. *J.M.Black s.n.*, 4.x.1906, East Wellington, AD (brief notes) – Sc; Det
6. *H.H.D.Griffith s.n.*, x.1908, Cape Borda, AD (brief description) – *H. platyphylla* subsp. *halmaturina*; Det
7. *J.M.Black s.n. & ADB, 22.xi.1917, Keith, AD* (detailed description & illustrations) – Sc; Det – Lectotype
8. *J.M.Black s.n.*, 15.x.1918, S Lameroo, AD (detailed description & illustrations) – Sc; Det
9. *J.B.Cleland s.n.*, xii.1922, Cape Bonney, Millicent, AD (brief notes) – Sc; Det

J.B.Cleland s.n., 18.x.1924, Rocky River, K.I., AD (brief description) – *H. platyphylla* subsp. *halmaturina*; Det

Specimens (see under forms): ca 420 examined.

Putative hybrids

H. cistiflora* subsp. *rostrata* × *H. sericea

The whole plant is more or less covered with simple hairs over antrorse (1–3 subequal branches mainly on leaves above) to radial stellate hairs (4–8 subequal branches on branches, upper leaves and on calyx) or only stellate hairs on the ovary. The single terminal flowers are each subtended by one leaf-like bract, and from the axils of the leaves below it further branching into more flowers results in the terminal polymonads typical of the *H. sericea* complex. The var. *sericea* is the only member of this complex growing in the vicinity and the hairs described above for the hybrid resemble that taxon. The terminal flower clusters are significant as most specimens of *H. cistiflora* subsp. *rostrata* from Mt William, in contrast to other localities in the Grampians, have their single terminal flowers mainly on axillary short shoots. The linear leaves of the hybrid have a very broad central vein to the apex (but not protruding), so that the undersurface is not or scarcely visible reminiscent to those of *H. cistiflora* subsp. *rostrata*.

Although R.D.Hoogland collected similar specimens on two occasions he did not indicate their putative hybrid nature on the accompanying label and they were identified as *H. sericea*. Another collection, *R.D. Hoogland 12438*, from the summit of Mt William, where

H. sericea normally would not grow, shows an even larger percentage of abnormal pollen, which cannot be explained. This specimen, possibly not a hybrid as it shows no abnormal features for *H. cistiflora* var. *rostrata*, and again the collector did not indicate any reasons for selecting this specimen.

Specimens examined

H. cistiflora* subsp. *rostrata* × *H. sericea

VICTORIA: *R.D.Hoogland 11716*, western slopes of Mt William, 10.xii.1969 (CANB: 13% abnormal pollen; MEL, K); *12439*, rocky slopes along Mt William Road, 1.xii.1973 (CANB: 11% abnormal pollen; A, HBG, G, K, L, MEL, UC).

H. cistiflora* subsp. *rostrata

VICTORIA: *A.C.Beauglehole 15935*, north-western slope, Mt William, 14.xi.1966 (MEL: 0 % abnormal pollen); *R.D.Hoogland 11714*, western slopes of Mt William, 10.xii.1969 (CANB: 3 % abnormal pollen; A, K, L, MEL); *12438*, summit area of Mt William, 1.xii.1973 (CANB: 32 % abnormal pollen; HBG, K, L, MEL: 28 % abnormal pollen).

H. sericea

VICTORIA: *M.G.Corrick 10069* & *D.B.Foreman*, Wallaby Rocks, 1.xii.1986 (MEL: 0 % abnormal pollen); *R.D.Hoogland 12423*, near Golton Gorge, 15.ix.1973 (CANB, MEL: 0 % abnormal pollen).

H. sessiliflora Toelken, J. Adelaide Bot. Gard. 16: 69 (1995); in Walsh & Entwisle, Fl. Vict. 3: 308 (1996).

Type: Victoria, near Dergholm, *H.R.Toelken 8358* (holo: AD; iso: B, CANB, G, K, MEL, MO, NSW, NY).

H. stricta var. *readeri* Ewart in Ewart & Jean White, Proc. Roy. Soc. Victoria NS 21, 2: 543 (1909).

Type: Victoria, Casterton, *F.M.Reader s.n.*, 30.vii.1908 (lecto.: MEL 35752; syn.: MEL 695563, NSW 101987).

Shrublets rarely more than 0.2 m tall, with one to few short at first erect but often becoming slender decumbent wiry branches 0.1–0.5 m long, usually glabrescent. *Vestiture* usually sparse, on all parts consisting more or less of longer simple hairs (up to 0.5 mm) over small stellate hairs, and both only often on branches tubercle-based; *on stems* scattered simple hairs unlike axillary tufts over more, scattered, usually unequal, radial stellate hairs (2–6 equal branches) scarcely increasing acropetally; *on leaves above* with mainly longer simple hairs towards the margins and base over few antrorse stellate hairs (1, 2 subequal or unequal branches), rarely scattered radial stellate hairs (4–6 (-8) equal branches) on upper margins; *on leaves below* rarely with few long simple hairs on the margins and the lower central vein over usually dense radial stellate hairs (8–16 subequal branches) on the undersurface including the central vein and inner recurved margins; *on hypsophylloids, bracts and outer calyx lobes* with often coarse, few to many antrorsely inclined simple hairs over antrorse to erect stellate hairs (2–5 subequal branches); *on inner calyx lobes* with simple hairs concentrated on the central vein over/erect to antrorse stellate hairs (2–4 (-6) subequal branches). *Leaves* with axillary tuft of hairs elongating acropetally to 0.8 mm long; *petiole* 0.2–0.6 mm long; *lamina of cauline leaves* linear-elliptic, (3.6-) 4.5–8 (-9.6) × (1.2-) 1.5–2.3 (-4.6) mm, gradually tapering into petiole, apex acute or apiculate, with one to few hairs, below with scarcely broadened central vein (ca 0.2 mm wide at the middle), hispid to stellate-tomentose, visible for two-thirds of the length and about as broad as scarcely recurved margins, with stellate-tomentose undersurface always more or less exposed; above puberulous rarely pubescent, glabrescent, discolorous; *lamina of hypsophylloids* elliptic-lanceolate to ovate, 2.1–3.5 × 0.9–1.4 mm, obtuse, with scarcely recurved margins, hardly raised central vein and widely exposed pubescent to tomentose undersurface. *Flowers* sessile, single, subtended by 3–5 hypsophylloids, terminal on short

shoots along branches but also on main branches; *bracts* like hypsophylloids. *Calyx* grey-green to often reddish-brown; *outer calyx lobes* lanceolate to ovate, 5.2–8 × 1.2–1.8 mm, outside strigose, inside few stellate hairs towards the upper margins; *inner calyx lobes* broadly ovate to oblong-ovate, 5.1–7.5 × 1.4–2 mm, acute, with bristles along the central ridge, and pubescent with simple and stellate hairs on the lateral surfaces. *Petals* obovate often with cuneate base, 3.8–9.6 (-10.7) mm long, distinctly lobed. *Stamens* (4-) 5–7 (-10), with filaments almost free; *anthers* broadly oblong, dehiscing by terminal pore and lateral slits. *Pistils* 2, ovary laterally compressed, each with 4 ovules, style at base recurved along the apex of ovary, then erect in front of cluster of anthers. *Fruit* stellate-tomentose to villous. *Seeds* brown to probably shiny-black, ca 2 × 1.8 mm, fleshy aril surrounded by scarcely lobed sheath appressed to lower quarter of seed. *Flowering*: Sept.–Nov. (Dec.). Fig. 9A–I.



Fig. 9. *H. sessiliflora*. A, flowering branch; B, flat cauline leaf; C, transverse section; D, cauline leaf with rolled margins; E, F, hypsophylloids; G, bract; H, outer calyx lobe; I, inner calyx lobe. (A–I, A.C. Beaglehole 38032, MEL; A $\times \frac{1}{2}$; B, D, F–I $\times 8$; C $\times 12$; E $\times 10$).

Distribution and ecology

Grows on clay soil in seasonally wet heath land or bordering lakes, often surrounded by *Eucalyptus* woodland in Edenhope-Dartmoor area (WAN) in Victoria and near Naracoorte (SE) in South Australia.

Conservation status. Although locally common this species is vulnerable because it is associated with often widely separated seasonally wet heath land. 3V.

Diagnostic features

Although it superficially resembles forms of *H. sericea* it is easily distinguished by its central vein being scarcely or not at all broadened.

Variation

In contrast to other species in this complex, the leaves of *H. sessiliflora* vary very much depending on the extent to which the margins are recurved, and in extreme examples one cannot see the hardly developed central vein between the strongly recurved margins.

Notes

It is not clear whether the phylloms subtending the flowers are hypsophylloids, as here accepted, and are comparable to those in, for instance, *H. sericea*, or merely depauperate leaves on short shoots. Some flowers terminal to long shoots were found to be subtended by normal leaves as in *H. patens* and allied species.

This species resembles *H. patens* and *H. paeninsularis* in that the leaves have a terminal point with one to a few hairs when young, outer calyx lobes which are not apically recurved and the tufts of hairs between the stamens and petals absent.

Voucher specimens (20 examined)

VICTORIA: *A.C. Beauglehole* 37912, 10.5 miles WNW Casterton, on Tullich Rd, 17.xi.1971 (AD, MEL, CANB); 38122, 5.5 miles N Dartmoor, W of Casterton Dartmoor Rd, 31.xii.1971 (MEL, CANB).

SOUTH AUSTRALIA: *D. Hunt* 2191, "Joanna", 17.x.1964 (AD, K, M, NE, CAL, TI); *J.Z. Weber* 7323, Stewart Range, 4.x.1982 (AD, CANB).

***H. simulans* Toelken, sp. nov.**

H. sericea auctt. non (R.Br. ex DC.) Benth.: N.C.W. Beadle et al., Vasc. Pl. Sydney 1 edn: 196 (1963), partly; N.C.W. Beadle, Stud. Fl. NE N.S.W. 3: 255 (1976), partly; G.J. Harden & J. Everett in G.J. Harden, Fl. N.S.W. 1: 302 (1990), partly; Carolin et al., Vasc. Pl. Sydney 4 edn: 274 (1993), partly.

H. sericea Benth. var. *sericea* sensu S.W.L. Jacobs & J. Pickard, Pl. N.S.W. 110 (1981), partly.

A *H. sericea* pilis simplicibus in partibus omnibus et costa centrali lata foliorum confluenti margine apicale; a *H. patenti* costa centrali lata, foliis subtus invisibilibus et staminibus paucis papillosulis; a *H. puberula* ovariis villosis, habitu erecto-patenti differt.

Type: New South Wales, Mount Costigan, *E.F. Constable* s.n., 22.x.1958 (holo.: NSW 55989).

Shrubs 0.3–0.8 (-1) m tall, with several woody erect stems, much branched, pubescent, rarely villous below flowers. *Vestiture* on all parts consisting of few long and many short spreading simple hairs, often not obviously tubercle-based and usually acropetally inclined, not becoming denser acropetally on stems but dense and usually coarse on calyx. *Leaves* with axillary tuft of hairs elongating acropetally to 0.8 mm; *petiole* 0.2–0.5 mm long; *lamina* linear-lanceolate to -triangular, (2.8-) 3.5–6 (-7.2) × 0.7–1.5 mm, apex acute and sometimes recurved but usually becoming obtuse, scarcely constricted into petiole, broadened central vein usually recessed or rarely raised to the level of the revolute margins and continued (0.2–0.6 mm broad in the middle) into or sometimes overtopping the apex, with undersurface not visible, puberulous above and below. *Flowers* single, terminal on main branches and on short shoots; *bracts* linear to linear-lanceolate, 2.3–3.5 × 0.25–0.45 mm, usually without distinct central vein and recurved margin, puberulous. *Calyx* not

accrescent; *outer calyx lobes* oblong-ovate to -lanceolate, pointed to shortly acuminate, usually without recurved margins and central vein, 4.8–7.1 × 2.2–3.1 mm, outside villous to appressed-pubescent, inside with more or less simple hairs on upper half to third; *inner calyx lobes* oblong-elliptic to -ovate, cuspidate to rounded, 4.5–6.8 × 2.5–3.0 mm, outside villous to appressed-pubescent but shorter towards the margins which tend to be ciliate, inside rarely with a few simple hairs towards the apex. *Petals* obovate to broadly obovate, 5.8–8.6 mm long, more or less slightly emarginate. *Stamens* 8–10 (-14), subequal; filaments basally connate; anthers narrowly oblong, 1.8–2.2 mm, minutely papillose, dehiscing mainly by lateral slits. *Pistils* 2; ovary almost spherical, each with 4 ovules; style from outer apex of ovary, then erect in front of clustered stamens. *Fruit* villous with simple hairs. *Seeds* not seen. *Flowers*: Sept.–Nov. Fig. 10A–F.

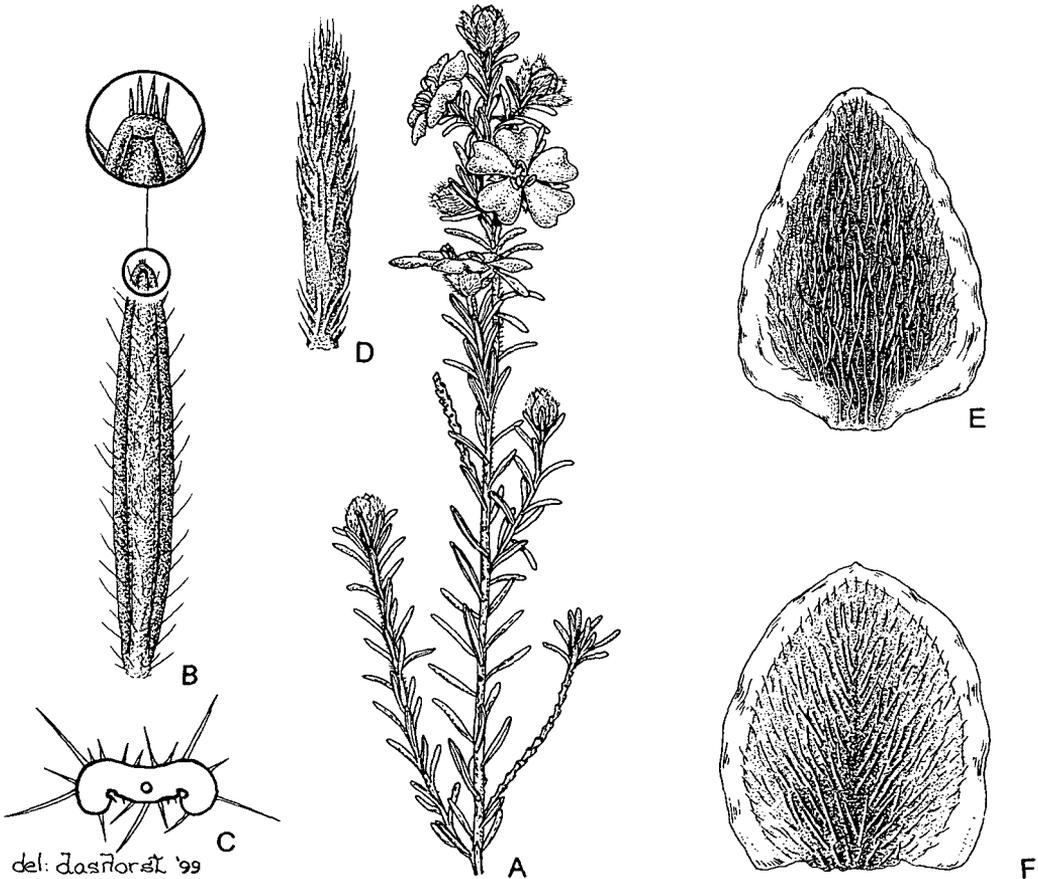


Fig. 10. *H. simulans*. A, flowering branch; B, cauline leaf; C, transverse section; D, bract; E, outer calyx lobe; F, inner calyx lobe. (A–F, E.J. McBaron 4979, NSW101983; A × ½; B, E, F × 8; C × 16; D × 14).

Distribution and ecology

Unlike *H. patens*, which usually grows in rock crevices in ravines, the very similar *H. simulans* has been recorded mainly from scrub vegetation from tops of mountains or, for instance, Georges Plains, apparently usually growing in wetter areas in mainly south-central New South Wales (NWS, CT, ST, SWS).

Conservation status. Cannot be evaluated since the eight specimens examined were collected from widely separated localities more than 40 years ago. 3K.

Diagnostic features

The distinctly broadened central vein continues into the leaf apex and often overtops it, but this protrusion is often erect and rarely recurved similar to leaves of *H. patens*. In the latter species, unlike *H. simulans*, the undersurface is usually visible and covered with long silky hairs. The most northern record of *H. simulans* is from Warialda, although somewhat different from the southern populations, it can easily be distinguished from *H. tenuifolia* by its outer calyx lobes not having recurved margins and the villous ovaries. Only flowering material of that northern collection was available, so that it is not known whether it also has, unlike the latter species, a scarcely accrescent calyx.

Variation

Considering that this species is known only from a few localities, often quite distant from one another, it is remarkable how uniform is the species. The characteristic minutely papillose anthers are unique in this complex. Some significant variation in the shape, size and vestiture particularly on the inside of the calyx also occurs. Usually the outer calyx lobes are longer but in the case of the specimen from Woomargama the inner ones are larger. There are, however, too few specimens available to assess the significance of these variations. Also the size and shape of the bracts varies considerably from very small and with recurved margins scarcely showing to leaf-like.

Notes

This species was previously associated with *H. sericea* because of its resemblance to *H. patens*, but the single terminal flowers subtended by a bract without a distinct central vein might indicate closer affinity to *H. stricta*. It was here described because of its overall resemblance to *H. patens*, but more material is urgently needed. Especially so few specimens exist and the most recent ones were collected in the 1950's suggesting that the species could be endangered though its wide distribution area will hopefully prove otherwise.

Etymology

H. simulans was often combined with *H. patens* under *H. sericea* and yet it is not unlike forms in the *H. stricta* complex, so that the epithet "*simulans*", Latin, "resembling" seems appropriate.

Specimens examined

NEW SOUTH WALES: *P. Althofer* 83, Dubbo-Mendooran road, v.1946 (NSW 101960); *J.L. Boorman* NSW 101979, Georges Plains, 25.xi.1918 (NSW); *E.F. Constable* NSW 55989, Mount Costigan, 22.x.1958 (NSW); *Y.W. Dwyer* NSW 101982, Yass, 22.ix.1911 (NSW); *E.J. McBarron* 4979, Tunnel Road, Woomangama, 2.x.1950 (NSW 101983–2 sheets); *J.H. Maiden* NSW 101958, Box Point to Barbers Creek, 10.ix.- (NSW); *C.W.E. Moore* 2688, Peelwood to Tuena, 15.x.1953 (NSW); *H.M.R. Rupp* NSW 101966, Warialda, vii.1905 (NSW).

H. superans Toelken, *sp. nov.*

H. sericea auct non (R.Br. ex DC.) Benth.: G.J. Harden & J. Everett in G.J. Harden, Fl. N.S.W. 1: 302 (1990), partly.

H. crinitae similis sed ovario villosio pilis simplicibus, stylo apicale, seminibus oblong-obovoideis; ab *H. simulanti* ramis debilibus et tomento brevi densissimo sub piles simplicibus longissimos sericeos differt.

Type: New South Wales, Kellyville, Green Road, *J. Turner s.n.*, 14.xii.1998 (holo.: AD; iso.: G, K, MEL, MO, NSW, NY, PERTH).

Low spreading shrubs to 0.3 m high, with few to many, weak twisted stems and branches, villous when young, becoming tomentose with longer hairs more or less wearing off. *Vestiture* on all parts consisting of more or less long silky over a dense layer of usually short stiffly erect simple hairs, but particularly on the branches and the undersurface of leaves there are often some scattered stellate hairs with 2–3 (-5) equal erect branches (cf. variation below). *Leaves* (none modified into hypsophylloids) with axillary hair tuft below flowers 1–1.2 mm long; *petiole* 0–0.2 mm long; *lamina* linear, rarely linear-elliptic, (5.6–)7.5–10 (-12.3) × 0.9–1.2(-1.4) mm, acute, often becoming obtuse, scarcely constricted into petiole, slightly broadened central vein usually raised to same level as revolute margins and continued (0.4–0.6 mm wide in the middle) into the apex, with undersurface not visible, villous over or becoming tomentose above and below. *Flowers* single, sessile to slightly stalked, terminal on main branches or rarely on short shoot, younger ones freely overtopping older ones; *bracts* linear, 8.3–9.5 × 1.0–1.3 mm, like leaves with distinct central vein, villous sometimes becoming tomentose. *Calyx* not accrescent; *outer calyx lobes* linear-lanceolate, acute, with slender central vein and recurved margins in upper third, (6.8–) 7.5–9 (9.8) × 1.5–1.6 mm, much longer than inner ones, outside villous over or becoming tomentose, inside at least upper half like outside; *inner calyx lobes* oblong-elliptic to –obovate, obtuse to rounded, 4.2–6.5 (-7.6) × 1.9–2.7 mm, outside villous over more or less appressed pubescent, inside rarely with a few appressed hairs towards the apex. *Petals* broadly obovate, 5.5–6.7 mm long, emarginate. *Stamens* 6–9, subequal; filaments basally connate, but often some more than others; anthers narrowly oblong, (1.4–) 1.6–1.8 mm long, dehiscing mainly by lateral slits. *Pistils* 2; ovaries laterally compressed, each with 4 ovules; style from outer apex of ovary, curved outwards and around the cluster of stamens to end at the apex of the outer anthers. *Fruit* villous with very dense erect simple hairs. *Seeds* oblong-obovoid, often oblique, 1.5–1.7 × 1.1–1.4 mm, fleshy aril expanding into a scarcely lobed sheath appressed to the base of seed, often to one side of base of seed. *Flowering*: July–Dec. Fig. 11A–F.

Distribution and ecology

Has been recorded from sandy soil on sandstone, associated with wide range of other plants in woodland or shrub of Sydney Sandstone Ridgetop Woodland in the southern locality; on granite associated with shrubland of *Prostanthera scutellarioides*, *Themeda australis*, *Pomaderris lanigera*, *Grevillea linsmithii* and *Micrantheum ericoides* in the north near Mt Boss in New South Wales (NC, CC).

Conservation status: Although known from two widely separated localities the species is never common. In the north it is described as “locally occasional” while in the southern locality less than 1000 plants were by the collectors. 3K.

Diagnostic features

Although *H. superans* obviously has an affinity with *H. crinita*, because of a similar indumentum of dense uniformly long hairs under few longer ones, and a central vein visible to the apex of the leaf, it is distinguished by its villous ovary with long simple hairs, the terminal attachment of the style, and particularly narrowly oblong-obovate seeds with more or less distinctly laterally placed aril, which is unusual in the whole *H. sericea* group. The dense short hairs on the whole plant are predominantly simple and in particular those on the central vein of all leaves are in contrast to *H. crinita* with 1–3(4) branches. Also the short hairs on the calyx in particular the outer lobes have 1, 2 (3) branches while in *H. crinita* they have (5–) 8–25 very short branches of pulvinate stellate hairs.

Variation

Since the species is known only from three records the amplitude of the variation of the species is not known. The description is largely based on the type specimen which has consistently nine stamens, as also in *O.D.Evans & D.Blaxell NSW101924* from nearby, but *D.Binns 314* is distinguished by only six shorter anthers. This shows that the widely separated populations could be expected to show considerable variation, but, similar to other simple haired species in this complex, *H. superans* is quite distinct from the very variable *H. crinita*. Even the presence of stellate hairs in this species could have developed independently, because the short erect simple hairs are very close to one another and every now and then two or three form a 'stellate hair' with varying amount of basal fusion (cf. *indumentum*).

Etymology

The single successively overtopping flowers found on old flowering branches of this species are not unique in the *H. sericea* complex, but are so obvious that the epithet "*superans*", Latin, "overtopping" seems fitting.

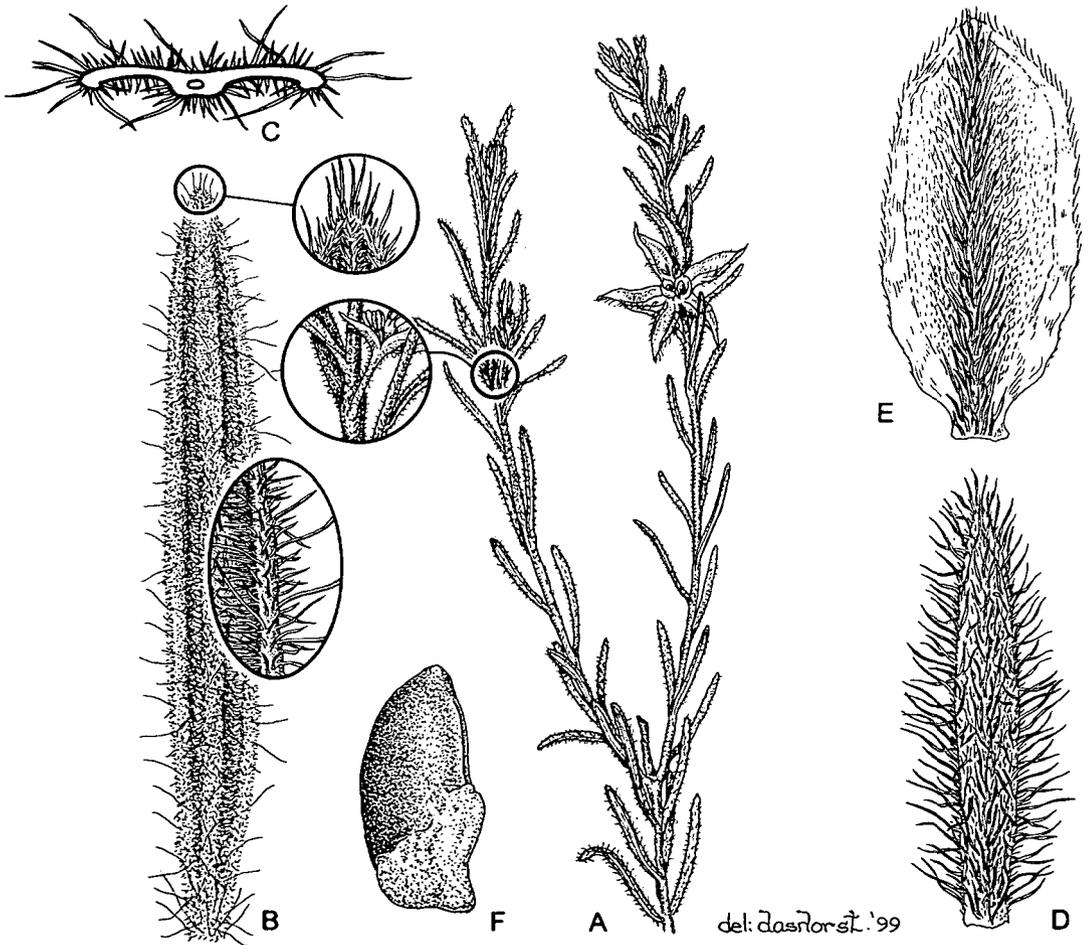


Fig. 11. *H. superans*. A, flowering branch; B, cauline leaf; C, transverse section; D, bract; E, inner calyx lobe; F, narrowly obloid seed. (A–F, *J.Turner s.n.*, AD; A $\times 1$; B, D, E $\times 10$; C $\times 25$; F $\times 20$).

Specimens examined

NEW SOUTH WALES: *D.Binns 314*, Mt Boss, 19.vii.1988 (NSW); *O.D.Evans & D.Blaxell NSW 101924*, Annangrove, 9.x.1958 (NSW); *J.Turner s.n.*, Kellyville, 9.ix.1998 (AD, G, K, MEL, MO, NSW, NY, PERTH).

H. tenuifolia Toelken, *sp. nov.*

H. stricta var. *canescens* auct. non Benth.; Benth., Fl. Austral. 1: 27 (1863), partly as for *C.Stuart*, New England (MEL 35790 – Benth. *vidit*; MEL 35789, 35791).

H. cistoidea auct. non (Hook.) C.T.White: C.T.White, Proc. Roy. Soc. Queensl. 57: 21 (1946), partly as for *C.Stuart*, New England (as above).

H. simulanti et *H. patenti* similis sed habitu decumbenti, margine recurva loborum externorum calycis, antheris latis et ovariis tomentosis differt.

Type: Queensland, Darling Down, between Wyberba and Wallangarra, *L.Pedley 1596*, 31.x.1963 (holo.: NSW; iso.: BRI, n.v.; MEL).

Decumbent shrublets to 0.2 m high, with wiry branches little branched, pilose to pubescent. *Vestiture* on all parts consisting of a mixture of long and short simple hairs, scarcely tubercle-based, usually antrorsely inclined or on calyx antrorsely curved. *Leaves* with axillary tufts of hairs elongating acropetally to 0.7 mm long and continued laterally of the base of the petiole; *petiole* 0.1–0.4 mm long; *lamina of cauline leaves* and *hypsohylloids* linear, rarely linear-lanceolate 4.1–7.5 (–9.2) × 0.6–0.9 mm, acute becoming rounded, scarcely constricted into the petiole, with broadened central vein (0.2–0.3 (–0.4) mm wide in the middle) rarely raised to the level of the recurved margins and continued into a not individually tufted apex, pubescent to almost scabrid, with undersurface rarely visible. *Flowers* single, terminal usually on main branches; *bracts* linear, 4.3–5.4 × 0.6–0.7 mm, leaf-like with recurved margins and raised central vein, pubescent. *Calyx* distinctly accrescent; *outer calyx lobes* lanceolate to linear-lanceolate, 8.2–12.5 × 2.1–3.4 mm, pointed but not usually acuminate although with recurved upper margins, outside usually villous with antrorsely curved simple hairs, rarely appressed-pubescent; inside one-third to half covered with longer and shorter spreading hairs; *inner calyx lobes* oblong-elliptic to lanceolate, acute to more or less pointed, 5.8–7.7 × 2.2–2.9 mm, outside villous to appressed-pubescent along the central vein becoming puberulous to glabrous along the margins, inside glabrous. *Petals* obovate-cuneate, 7.8–10.4 mm long, distinctly emarginate. *Stamens* 12–16, subequal; filaments more or less basally connate; anthers oblong to broadly oblong, 1.4–1.7 mm long, dehiscing by apical pore and lateral slits. *Pistils* 2, each oblong-obovoid and slightly laterally compressed, with 6–8 ovules; style base scarcely recurved, style from the outer edge spreading to erect in front of clustered stamens. *Fruit* tomentose with short spreading simple hairs. *Seeds* dark to mid brown, obloid, 1.8–2 × 1.2–1.4 mm, aril a fleshy ring expanding below the seed into a scarcely lobed collar around the basal but lateral attachment. *Flowering*: Oct.–Dec. Fig. 12A–I.

Distribution and ecology. Queensland (DD); New South Wales (NT).

Conservation status. Poorly known from three specimens collected in 1860s and 1870s from ‘Tenterfield’ or ‘New England’ in New South Wales, and one collected in 1963 from adjoining Queensland. 2K.

Diagnostic features

H. tenuifolia resembles *H. simulans* and *H. patens* but is distinguished by its decumbent habit, distinctly recurved margins of the prominently accrescent outer calyx lobes, broad anthers and tomentose (not villous) ovary.

Variation

The few specimens examined showed little variation.

Typification

Since Bentham (1863) cited similarly Stuart specimens under both *H. stricta* var. *canescens* and var. *hirtiflora* and two specimens (MEL 35789, 35790) found were initialled by him but not identified, the synonymy is at present not clear. Here they are both included under the latter because it is described as “leaves nearly as in var. *canescens*” but “calyx usually large [accrescent], ... and hirsute with spreading hairs”, but a lectotypification of var. *hirtiflora* can only be attempted in conjunction with a revision of the *H. stricta* complex.

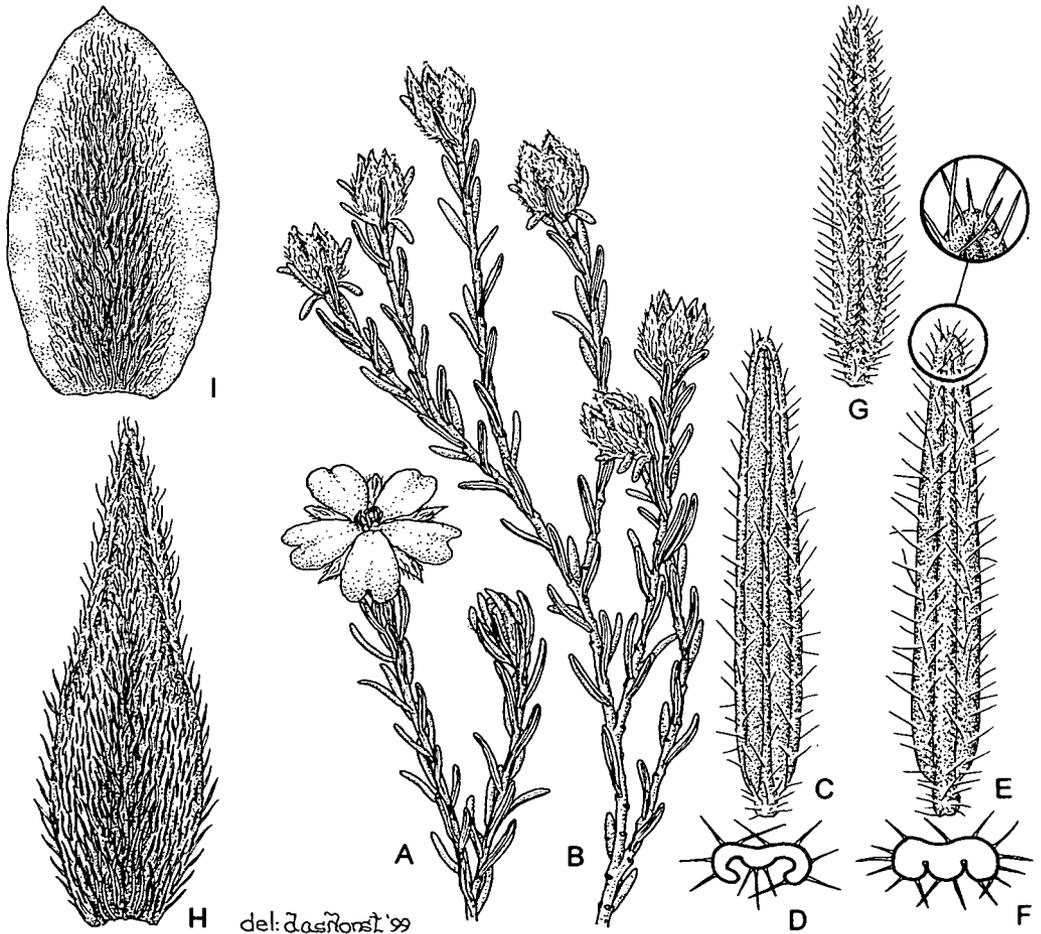


Fig. 12. *H. tenuifolia*. A, Flowering branch; B, fruiting branch with large accrescent calyx; C, flat cauline leaf; D, transverse section; E, cauline leaf with strongly rolled margins; F, transverse section; G, bract; H, outer calyx lobe; I, inner calyx lobe. (A, C–I, *C. Stuart MEL35791*; B, *C. Stuart MEL35790*; A–B $\times 1$; C, E $\times 9$; D, F, G $\times 12$; H $\times 6$; I $\times 8$).

Both these specimens, as the third specimen (MEL 35791) was collected in 1870, have different inscriptions so that each is presumably a single specimen of two different collections. The two specimens of *L. Pedley 1596* were selected as type.

Etymology

The species' "slender leaves", in Latin, "*tenui-folia*" explain the choice of the epithet.

Specimens examined

QUEENSLAND: *L. Pedley 1596*, between Wyberba and Wallangarra, 31.x.1963 (MEL, NSW).

NEW SOUTH WALES: *C. Stuart MEL 35789*, New England ("Pleurandra or *Hibbertia 273*"); *MEL 35790*, New England (" *Hibbertia?* – procumbent - branchlets ascending - 1500 ft"); *MEL 35791*, Tenterfield ("*Hibbertia humifusa?* FM - Tenterfield Decr/70").

H. villifera Tepper ex Toelken, *sp. nov.*

H. sericea *auct. non* (R.Br. ex DC.) Benth.: Tate, Handb. Fl. Extratrop. S. Austral. 14, 205 (1890), partly, as for Tepper specimen from Kangaroo Island.

H. sericea *var. major auct. non* J.M.Black; J.M.Black, Trans. Proc. Roy. Soc. South Australia 49: 274 (1925), partly; Fl. S. Austral. 1 edn, 3: 386 (1926), partly; Fl. S. Austral. 2 edn, 3, 575 (1952), partly, as for Tepper specimen from Kangaroo Island.

H. sericeae et *H. platyphyllae* persimilis sed costis centralibus foliorum et hypsophylliodearum non visibilibus ad apices, paginis abaxillaribus foliorum tectis pilis stellatibus parvis sub magnis (non coactis uniformibus) stylisque plerumque rubris differt.

Type: South Australia, Kangaroo Island, W of Vivonne Bay, *H.R. Toelken 9177*, 14.x.1997 (holo.: AD; iso.: BRI, CANB, K, L, MEL, MO, NY, PERTH).

Shrubs 0.2–0.6 m tall, with one to few erect, rarely spreading stiffly woody branches, little branched, villous, sometimes becoming more or less glabrescent. *Vestiture* on all parts consisting of long simple hairs (up to 2.4 mm long) over small stellate hairs, both usually distinctly tubercle-based (often like 'goose bumps') and becoming more dense and often larger acropetally; *on branches* simple hairs similar to the axillary tufts in leaf axils concentrated along the depression on either side of the decurrent leaf bases over small multiangulate stellate hairs (5–8 (-15) subequal branches) increasing in number and size acropetally (3–6 often unequal branches); *on leaves above* with mainly long simple hairs towards the margins and base over few antrorse stellate hairs (1,2 subequal or unequal branches) increasing mainly in number but also with (2) 3–5 antrorse to spreading subequal branches; *on leaves below* with long simple hairs along the margins and visible central vein over usually dense multiangulate stellate hairs (8–15 subequal branches) on the undersurface including the central vein, often a number of them on the upper leaves enlarge (>25 subequal branches) and usually broaden the base over the normal stellate hairs; *on hypsophylloids* and *outer calyx lobes* antrorsely inclined simple hairs over antrorse to erect stellate hairs (2–5 subequal branches); *on inner calyx lobes* with few simple hairs and/or larger erect stellate hairs (2–4 branches) mainly along the main vein over short multiangulate stellate hairs (3–6 subequal branches). *Leaves* with axillary tuft of hairs elongating acropetally up to 2.1 mm long; *petiole* 0.3–1.1 mm long; *lamina of cauline leaves* linear-elliptic to rarely linear-oblongate, (6-) 9–14 (-18.8) × (1.4-) 2.1–3 (-3.6) mm, gradually tapering into petiole, acute often becoming obtuse, with somewhat broadened raised central vein (0.28–0.49 mm wide in the middle) villous to stellate-tomentose, visible to just below the leaf apex and usually broader or as broad as the revolute margins, with stellate-tomentose undersurface always visible, above villous becoming glabrescent, discoloured; *lamina of hypsophylloids* linear-lanceolate, rarely linear-elliptic, (6-) 9.5–12 (-13.7) × 1.4–2.2 mm, scarcely tapering into petiole and acute apex, with broadened raised central vein (0.4–0.95 mm wide in the middle), villous to stellate-tomentose and visible to just below the leaf apex and usually broader or as broad as

the revolute margins and exposed undersurface, like cauline leaves but somewhat narrower and acute. *Flowers* sessile, (2-) 3-5 (-12) in terminal cymbiform polymonads, subtended by few to many hypsophylloids, in terminal globular clusters on main and lateral branches, rarely elongated due to a number of clusters from short shoots below; *bracts* linear-lanceolate, 3.3-4.5 mm long, flat and usually with margins and broad central vein scarcely raised, villous. *Calyx* usually turning reddish-brown, scarcely accrescent; *outer calyx lobes* lanceolate, 4.8-5.5 × 2.2-2.6 mm, acute to pointed, scarcely recurved apically, villous, inside glabrous with a few stellate hairs towards the upper margins; *inner calyx lobes* oblong-ovate to obovate, 4.7-5.5 × 2.8-3.3 mm, acute to obtuse, stellate-tomentose with few long simple hairs. *Petals* obovate, often with a cuneate base, 5.6-11.3 mm long, distinctly bilobed. *Stamens* 7-11, with filaments basally connate; *anthers* linear, 1.6-2 (-2.3) mm long, subequal or with central one slightly longer, dehiscent by terminal pore and lateral slits. *Pistils* 2, slightly compressed, with 4 ovules, style base recurved along the apex of ovary and stellate-tomentose, style usually becoming red. *Fruit* stellate-villous to -tomentose. *Seeds* brown to shiny black, ca 2 × 2 mm, aril with fleshy ring surrounded by scarcely lobed sheath appressed to base of seed. *Flowering*: Sept.-Nov. Figs. 1A, B; 13A-H.

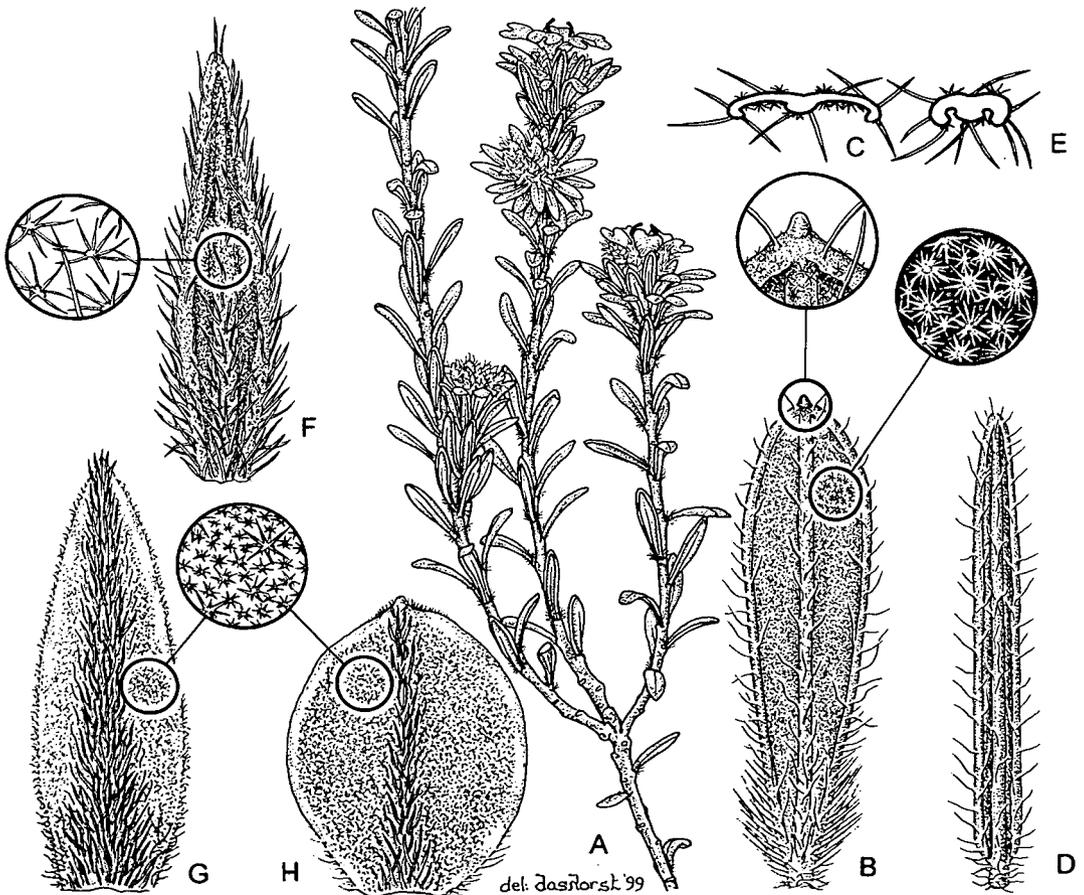


Fig. 13. *H. villifera*. A, flowering branch with scar of previous cluster of flowers at branching point; B, flat cauline leaf showing on undersurface larger over smaller stellate hairs; C, transverse section; D, cauline leaf with rolled margins; E, transverse section; F, hypsophylloid/bract; G, outer calyx lobe; H, inner calyx lobe. (A-H, H.R.Toelken 9225; A × ½; B, D × 6; C, E-H × 8).

Distribution and ecology

Scattered and not common on dry sandy or lateritic soils rarely with surface limestone locally associated with heath or mallee in South Australia (SL, KI).

Conservation status. Although the species occurs on the mainland and on Kangaroo Island it is never common but found in several parks in both parts of its distribution. 3RCa.

Diagnostic features

The rigidly woody stems, long silky simple hairs over more or less developed short stellate hairs on the upper surface of leaves, and flowers fascicled in terminal polymonads resemble those of *H. platyphylla* subsp. *major*. However, *H. villifera* is distinguished by the central vein being visible to just below the apex of leaves and hypsophylloids, the outer calyx lobes only half covered with hairs on the inside, 7–11 stamens and red styles. Superficially depauperate plants often resemble those of some forms of *H. platyphylla* var. *halmaturina* except that in that taxon the central vein continues to the apex, the flowers are rarely clustered and are surrounded by leaves, and the styles are yellow.

H. villifera is also very similar to *H. sericea*, particularly to the “Densiflora” which shares the more or less oblong leaves, the pronounced central vein almost to the apex, and styles often become red during flowering. But the former is distinguished by its mainly terminal polymonads, the long silky simple hairs (1.8–2.4 mm long), which are sparse on the central vein (1 or 2 abreast), the larger over smaller stellate hairs on the undersurface of particularly the acropetal parts of cauline and especially leaves below the terminal polymonads, and the typical substrate of dry sandy or lateritic soils.

Variation

The oblong leaves have marginally often strongly recurved to rolled so that especially the upper ones become linear and more or less pointed.

The larger stellate hairs with broad base and numerous branches are not found on all leaves subtending flowers of all plants, apart from the fact that they are often not visible because the leaves are so strongly recurved.

Notes

The first specimens of this species were collected by J.G.O. Tepper near Karatta on 10.xi.1886 (MEL 35704, inscribed “*Hibbertia villifera*”, as presumably the collector considered it to be distinct) and 16.xi.1887 (AD). It seems Black (1925, 1926, 1952) based his record of *H. sericea* var. *major* from Kangaroo Island on this collection as he described the “sepals very silky” which also applies to this species and not to other specimens of *H. platyphylla* in the area. In the original description Black (1912) referred only to type specimen from Port Lincoln.

Etymology

The epithet “*villifera*”, Latin, “*villi*” “long weak hairs”, “*-fera*” “bearing” refers to the presence of long thin hairs particularly on the leaves, which distinguish this species from *H. sericea*, the only other species known to Tepper at the time.

Voucher specimens (46 examined)

SOUTH AUSTRALIA: *H. Eichler* 15147, at the Shackle, 3.xi.1958 (AD, CANB); *P. Martensz* 312, 324, 426, Kangaroo Island, 2/3.x.1970 (AD, CANB, K, L); *D.E. Murfet* 827, near Ashburn, 9.ix.1989 (AD); *A.G. Spooner* 10856, Cox Scrub, 3x.1987 (AD).

Putative hybrid

H. paeninsularis × *H. villifera*, see *H. paeninsularis*.

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A grant from the Helen Leitch Foundation assisted in creating a databank of the South Australia specimens of *Hibbertia* for research on endangered species. Interstate collecting and field studies of these species were made possible by a grant from ABRIS. I also acknowledge the loan of a great number of *Hibbertia* specimens from CANB, BRI, HO, K, MEL and NSW.

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