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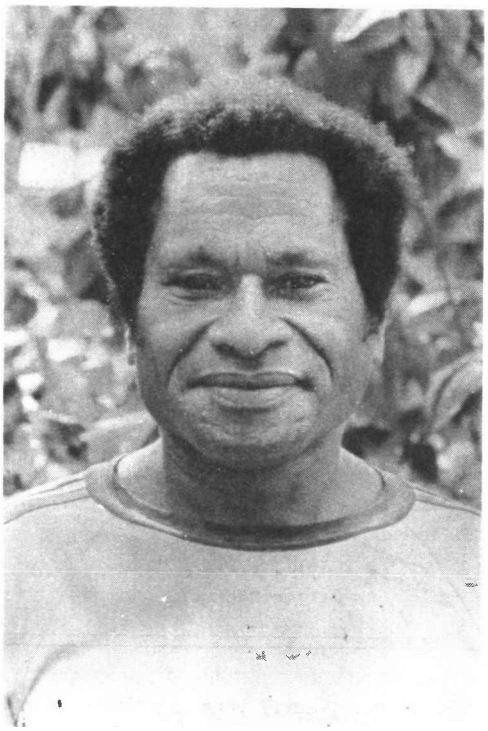
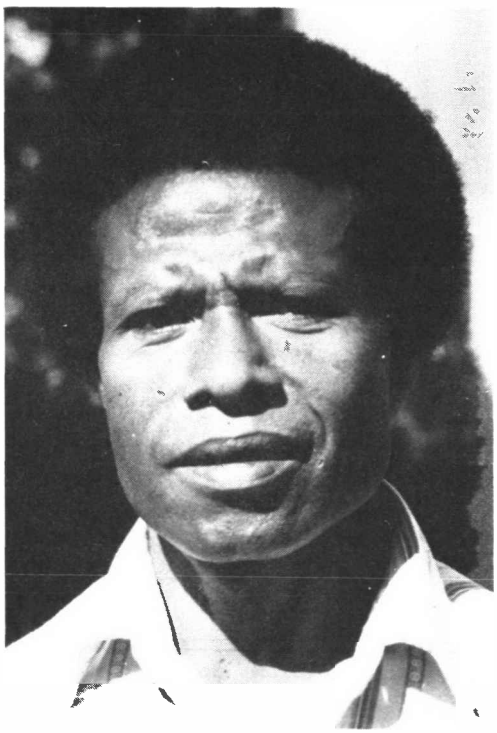
DEDICATION

This revision is dedicated to Mr Aubeto Kairo, Forestry College, Bulolo and Mr Paul Katik, The Herbarium, Botanic Garden, Lae. Their remarkable knowledge of the flora of New Guinea has enriched the visits and collections of many botanical visitors to the region.



Mr A. Kairo
(photo per B. Tegler)



Mr P. Katik
(photo per E.E. Henty)

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THE SOLANACEAE OF NEW GUINEA

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Abstract

An account of the family Solanaceae in New Guinea is presented. The following genera are naturalised and are represented by 1-2 species only *Browallia*, *Brugmansia*, *Capsicum*, *Cestrum*, *Cyphomandra*, *Datura*, *Lycopersicon*, *Nicandra*, *Nicotiana* and *Physalis*. *Lycianthes* is treated as a subgenus of *Solanum*. The genus *Solanum* with 59 species includes 7 alien species either cultivated, naturalised or weedy. Of the 52 native species, the following are described as new: *S. abortivum* Symon *S. anfractum* Symon, *S. atheniae* Symon, *S. bitterianum* Symon, *S. borgmannii* Symon, *S. dendropilosum* Symon, *S. denseaculeatum* Symon, *S. expedunculatum* Symon, *S. incanoalabastrum* Symon, *S. infuscatum* Symon, *S. mankiense* Symon, *S. missimense* Symon, *S. multivenosum* Symon, *S. nolense* Symon, *S. papuanum* Symon, *S. pustulatum* Symon, *S. rivicola* Symon, *S. saruwagedensis* Symon, *S. umbonatum* Symon.

Contents

Introduction

No comprehensive taxonomic account of the family Solanaceae appears to have been made for the whole of New Guinea. Partial accounts of limited areas may be found in Schumann & Hollrung (1889), Warburg (1891), Schumann (1898), Schumann & Lauterbach (1901), van Royen (1959), Whitmore (1966), Foreman (1971), Johns & Stevens (1971), Streimann (1983) and Peekel (undated). With the possible exception of *Physalis minima* all the introduced genera can be considered garden escapes. Some are still localised e.g. *Datura*, *Cestrum* and *Browallia* while others are now widespread, e.g. *Brugmansia* and *Capsicum*. Further additions to both species and genera can be expected in the future.

The concept of New Guinea is here broadened to include in addition to the main island also the adjacent off shore islands especially the eastern group including the Solomon Islands. It would thus include the present political territories of Irian Jaya, Papua New Guinea and Solomon Islands. However, in some cases, as for instance in *Solanum dunalianum* it seemed relevant for an understanding of the distribution of the species to cite specimens from the islands to the north and east of this area.

Notes on *Solanum*

A comprehensive account of the genus *Solanum* in New Guinea was published by G. Bitter in 1917. In this account Bitter described 26 species of which 13 belonged to the subgenus *Lycianthes*. He transferred these to the genus *Lycianthes* in his monograph of *Lycianthes* in 1919. Bitter's account was based substantially on early German collections from Kaiser Wilhelmsland and was no doubt made more difficult by the turmoil of the first world war. One of the great tragedies of taxonomic botany was the loss of most of the Berlin herbarium in the second world war. In that disaster many type specimens from New Guinea were lost. Duplicates of some of these have been traced but types of the following species have not yet been found:

S. dallmannianum Warburg, *Warburg 21245*, Sattelberg.
S. dammerianum Lauter. & Schum. *Dahl Feb. 1897*, Wunakukur.
S. ornans Witasek, *Rechinger 1775*, Upolu, Samoa.
S. peekelii Bitter, *Peekel 523*, Buragamata bei Namatanai.
S. balanidium Bitter, *Ledermann 11332*, Hunsteinspitze.
S. bambusarum Bitter, *Ledermann 12129*, Schraderberg.
S. kaernbachii Lauter. & Schum., *Kaernbach 77*, Sattelberg.
S. ledermannii Bitter, *Ledermann 9124*, Etappenberg.
S. moszkowskii Bitter, *Moszkowski 368*, Van Rees, Naumoni.
S. patellicalyx Bitter, *Ledermann 11272, 11483,* Hunsteinspitze.

I would be glad to hear from any herbaria that hold duplicates of the type collections of any of these species. Their loss has made more difficult the correct application of names in a number of cases.

Since the second world war there has been extensive plant collecting in the area but this is still woefully inadequate considering the diversity of the area, the richness of the Flora and the difficulty of making good collections under tropical conditions. This applies particularly to Irian Jaya where access has not been freely available. The establishment of the Botany Unit and Herbarium during 1944 at Lae enabled collections to be made and kept in New Guinea for the first time. I am very grateful to Mr M. Galore for an opportunity to work at Lae and to make collections during a field trip in 1977, and to Mr E.E. Henty, my host for a visit in 1984. Not surprisingly many new species have been recognised.

Solanum species occur in most areas of New Guinea but are rare in swamps and are absent from alpine regions. None for example are included in van Royen's "Alpine Flora of New Guinea".They are less common in the lowland rainforest than in the middle uplands.

Life forms vary from herbs (the ubiquitous sect. *Solanum*) to small or large shrubs, lianes (Bitter writes of trunks as thick as a man's arm) and small trees. Some species are occasionally epiphytic. Species may be armed or unarmed. The tomentum is often sparse particularly in comparison with species from Australia. In contrast the range and diversity of fruit form and colour occurring in New Guinea is much narrower than in Australia though a number of ripe fruits remain undescribed in the subgen. *Lycianthes*. No plants with enlarged calyces occur and red, succulent fruit forms outnumber all others. The red fruits suggest that seed dispersal is primarily by birds.

The major vertebrate herbivores must be marsupials, as in Australia, and some very prickly forms have evolved e.g. *S. rivicola*, although the proportion of prickly species is lower than in Australia. All species of subgen. *Lycianthes* are unarmed and some are epiphytes or lianes and thus escape predation except perhaps from tree kangaroos or cuscus. Some fruits are heavily infested with fruitfly larvae.

Very little appears to be known of the alkaloid content of native species of *Solanum*. Hartley (1973) lists eleven species on which field tests were done, of these only one (*S. dunalianum*) was positive. However, in view of the fact that alkaloids have been found in three of the species elsewhere (*S. lasiocarpum=S. ferox*, *S. torvum* and *S. erianthum*, Schreiber [1968]) more extensive and critical testing is still needed. It is most unfortunate that so little is known of the alkaloid content of species of the subgen. *Lycianthes* which may or may not support its generic separation from *Solanum*.

Very few native species of *Solanum* have been recorded as being used by the indigenous population. This is in marked contrast to the widespread use of *Solanum* species in Australia, Peterson (1979). True, *S. americanum* and possibly *S. opacum* were widely used as green vegetables (this use also extended to the Pacific) but none appear to be used as fruits. Only four species are listed by Powell in Paijmans (1976). Two of these, *S. melongena* and *S. tuberosum*, are relatively recent introductions, *S. americanum* (=*S. nigrum* sens. lat.) is used as a green vegetable and *S. torvoideum* is given an unspecified use in "fighting". The reason for the small number is not clear, possibly it was the relative abundance of more palatable plants. Holdsworth and Mahana (1982) record the use of *S. (Lyc.) kaernbachii* in local medicine.

The family Solanaceae is one of the Southern Hemisphere families with its main centre of development in South America. The number of genera are fewer in Australia, about 12, George (1982) and are further reduced in Africa and in areas north of the equator. In New Guinea only *Solanum* is well developed though 10 genera have become established as aliens.This includes *Physalis* and *Datura* whose status in South East Asia and Australia may still be debated. Despite the few genera present the species are of great interest not only for their own sake but for phytogeographical reasons, particularly the subgenus *Lycianthes* for which New Guinea is undoubtedly the East Malesian centre of diversity. An intriguing aspect is the trans-Pacific nature of the connections with Central America. This is not readily explained as related species do not occur in the mid-Pacific islands. The palaeobiogeography and origin of the New Guinea flora is discussed by Axelrod and Raven (1982).

Life form

Six species may be described as herbs. Under New Guinea conditions they are probably short lived, soft wooded shrubs lasting several years. Two species *S. melongena* (egg plant) and *S. tuberosum* (potato) are comparatively recent introductions to domestic gardens. Two species belong to sect. *Solanum*, *S. americanum* and *S. opacum*. The first is definitely used as a green vegetable and is available in local markets. It is probable that *S. opacum* is also used as a vegetable. Both these species will persist for several years under some conditions. The last two herbs, *S. (Lyc.) biflorum* and *S. (Lyc.) bitterianum* are not known to be used; both may make sub-woody herbs to 2 m high.

The transition from shrubs to small trees, climbers and lianes is often not easy to define, especially in subgen. *Lycianthes* where species may be sprawling shrubs, or weak scramblers. The most general forms in New Guinea are shrubs 1-3 m tall. There are few records whether the clonal habit so widespread in Australia is common or not. Until more field work is done this will remain unknown as it is so rarely noted with herbarium collections.

Apart from subgen. *Lycianthes* there are few climbers. *S. schefferi* is one, although I suspect that this is an early introduction to New Guinea. About six species may reach small tree size. Two are introductions from tropical America, *S. erianthum* (tobacco tree) is

widespread and weedy, *S. grandiflorum* from Colombia and Peru is cultivated as an ornamental. These two may be equalled in size by *S. dunalianum, S. incanoalabastrum and S. torvoideum* all of which make large shrubs or small trees often over 2 m high. By far the largest is *S. (Lyc.) vitiense* which is commonly a tree to 12 m tall and may reach 15 m. It must be one of the largest species of *Solanum*. Subgen. *Lycianthes* contains a number of sprawling subshrubs and larger climbers or lianes. The small climbers include *S. (Lyc.) cladotrichotum, dendropilosum, moszkowskii, pustulatum, rostellatum* and *umbonatum*. The larger vines include *S. (Lyc.) impar, kaernbachii, memecylonoides, oliverianum* and *peranomalum*. Bitter (1917) writes of substantial lianes with trunks as thick as a man's arm (e.g. *S. oliverianum*) but none of the collectors' notes seen by me indicate such massive plants. *Solanum (Lyc.) multifolium* appears to be a shrub.

Tomentum

Tomentum is less obvious than in Australian species, the main exceptions being introduced species. Many species are glabrescent with tomentum visible only on young tips, corolla lobes in the bud, etc. Several species belonging to subgen. *Leptostemonum* are effectively glabrous and the stellate hairs which characterise the section may be difficult to find, e.g. *S. incanoalabastrum*. Almost all species of subgen. *Lycianthes* are effectively glabrous except for minute simple hairs on young tips. Only on *S. (Lyc.) dendropilosum* (high altitude), *S. biflorum, S. bitterianum, S. cladotrichotum* and *S. kaernbachii* can hairs be seen readily. In all other cases they have to be searched for and a lens is necessary.

Prickles

Prickles and pubescence undoubtedly perform several functions on a plant such as defence against insect and vertebrate herbivores, influencing water loss and reducing solar radiation. Observations on herbarium specimens suggest that prickles are not a primary defence against insects for which dense and especially glandular hairs are more effective. If prickles are a defence against larger herbivores the situation in New Guinea is similar to that in Australia where the major herbivores are all marsupials. In comparison with species in Australia, the New Guinea species are, with only a few exceptions, much less prickly. Densely prickly native species are *S. atheniae, S. borgmannii, S. denseaculeatum, S. gibbsiae, S. heteracanthum, S. infuscatum, S. rivicola* and *S. saruwagedensis* and of these only *S. rivicola* is at all common. The lower level of prickliness means that more species are unarmed on their distal shoots and therefore appear unarmed on herbarium sheets. These species have been taken out twice in the keys.

Inflorescence and flowers

The inflorescence is generally a reduced cyme sometimes divided and then generally with a condensed axis. Only rarely and then in the introduced species *S. schefferi* and *S. seaforthianum* is it paniculate. Extreme reduction of the inflorescence occurs in the whole of subgen. *Lycianthes* and in several prickly, stellate-haired species, e.g. *S. expedunculatum*, and *S. anfractum* where the peduncle is effectively reduced to a pulvinus or short vermiform axis and the flowers appear pedicellate. In a few extreme cases in subgen. *Lycianthes* they are cauliflorus. The inflorescence of *S. (Lyc.) kaernbachii* is striking and consists of hundreds of pedicellate cauliflorus flowers along the stems.

None of the native species has large, showy, rotate flowers and in this there is considerable contrast to species in Australia. The two species *S. aviculare* and *S. multivenosum* have broadly stellate to subrotate corollas, but most others have deeply divided corollas with relatively narrow lobes. Corolla colour is also subdued ranging from white through pale lavender to pale purple. The reasons for this difference compared with Australia are unknown.

The flowers still retain the prominent yellow anthers on short filaments and their exsertion is emphasised by the reflexed corolla lobes.

The subgen. *Lycianthes* is of interest as the petioles adjacent to the flowers become purple at anthesis and the pedicel and calyx may also be coloured.

Fruits

The range of fruit types is limited. Most common are red or orange-red berries. *S. opacum* and *S. multivenosum* have green fruits—the first are small, aromatic, readily shed and not displayed and may be distributed by small mammals. The second are large, seemingly not aromatic and prominently hung along the sparsely leaved limbs on the only plant seen by me. Method of dispersal is not known. The coloured fruits are probably bird dispersed and there is a single record of *Ptilinopus*; a pigeon, eating fruits of *S. dammerianum*. The infructescence of *S. torvoideum* is a prominent fan-like array of vertically presented orange-red fruits, probably distributed by birds. The bony, censer and dry forms known in Australia are absent.

Unfortunately the fruits of subgen. *Lycianthes* are poorly known and there are still many gaps in our knowledge. *S. moszkowskii*, *S. belense*, *S. multifolium* and *S. biflorum* are known to have red fruits—the first two relatively large. *S. oliverianum* is reported to have blue-black fruits. *S. bitterianum* and *S. americanum* are black at maturity and the orange-red fruits of several species may darken to almost black when ripe to overripe, e.g. *S. anfractum*, *S. papuanum* and *S. trichostylum*.

Dispersal

The species of *Solanum* excluding subgen. *Lycianthes* are overwhelmingly plants of disturbed habitats. It is unusual to find them in mature rainforest. They are found in cut-over forest, along logging roads, in old garden sites, on landslips, and in lightbreaks in the forest. Their ability to get about is intriguing and as yet there are few records of dispersal agents in New Guinea. The common occurrence of orange or red succulent berries suggest bird dispersal and I have found a single label detail stating that a species of *Ptilinopus* (pigeon) was eating the fruits of *S. dammerianum*. An extensive study by Frith, Crome & Wolfe (1976) on the food of fruit pigeons in New Guinea made no mention of any species of Solanaceae in their diet but it was done in lowland forest not far from Port Moresby, an area not rich in Solanaceae. Crome (1975a) records that Torres Strait pigeons feed on two introduced species of *Solanum* (*S. torvum* and *S. mauritianum*) in northern Queensland.

In another study on fruit pigeon ecology in north-eastern Queensland Crome (1975b) records that fruits of the weedy *S. torvum* were consumed during the entire three year study period, in fact the only plant species of 55 listed that was so steadily produced and eaten. The native species *S. viridifolium* (as *viride*) was eaten for much more restricted periods. Crome states that *S. torvum* was a consistently significant food source for brown pigeons (*Macropygia amboinensis*). They must also have eaten *S. viridifolium* as the brown pigeon is the only one recorded as eating Solanaceae. His tables, example Table 5, show interesting degrees of botanical specialisation by the six species of pigeon studied.

Two studies on cassowary in Queensland, Crome (1976) and Stocker and Irvine (1983) record that the introduced *S. torvum* and *S. mauritianum* as well as the native *S. dallachii* were eaten. As cassowary were common in New Guinea it is likely that they were effective dispersal agents there. Mr H. Bell (in correspondence) also states that he has seen them taking *Solanum* fruit off the plants. Bell (1982) shows that there is a suite of bird species which occur more commonly in secondary rainforest in New Guinea, his list from one locality included *Chalcophaps indica* (diamond dove) and honeyeaters some species of which are known to eat fruit. He states that "the fruit doves *Ptilinopus* . . . seem to occur regularly in extensive tracts of

secondary vegetation. Notably, in the New Guinea highlands where long established agriculture has created vast areas of secondary habitat".

The ability of *Solanum* species to 'find' lightbreaks and old garden sites is probably explained by the studies above though specific details are sparse. No information on dispersal of subgen. *Lycianthes* has been noted. Nor have I found information on the green fruited species e.g. *S. opacum* and *S. multivenosum* that may be dispersed by mammals.

It was recorded by Ratcliffe (1931) that the flying foxes, *Pteropus,* in north-eastern Australia fed on "Wild Tobacco Bush a *Solanum* species" (probably *S. erianthum* or *S. mauritianum*) and there is every reason to expect them to do so on appropriate species in New Guinea.

Taxonomic arrangement

There has only been one comprehensive monograph of the genus *Solanum* that by Dunal (1852). In this, Dunal established some of the infrageneric taxa, but was overwhelmed by the number of species (then 901) and subsequent work has brought to light numerous discrepancies. Though the descriptions are detailed the work lacks a key and as a result is difficult to use.

Bitter (1911-1923) published extensively on the genus in a long series of papers in Bot. Jahrb. Syst. and Rep. Spec. Nov. Regni Veg. He did not complete a monograph and his voluminous publications of meticulous detail mostly lack keys. He described many of the infrageneric taxa used by subsequent workers.

Seithe (1962), after a major study of hair types occurring in the genus, brought together the infrageneric taxa then available, chose some nomenclatural types and presented a conspectus of the genus, allocating many species to these taxa.

Danert (1970), after studying branching and flowering patterns in the genus, presented a further conspectus which contained some adjustments of nomenclature, but was based substantially on that presented by Seithe.

D'Arcy (1972) brought together and typified all published infrageneric taxa and presented a further conspectus for the genus.

Symon (1981b) in his monograph of the Australian species of *Solanum* attempted to group them into the infrageneric taxa then available. The Australian species had not been studied by Bitter and the application of his taxa to the Australian species was not wholly successful.

Whalen (1984) provides the latest attempt to order the numerous species of *Solanum*, but considers only the species belonging to subgen. *Leptostemonum* (i.e. stellate hairs, prickles usually present and attenuate poricidal anthers). There are about 450 species in the subgenus which he arranges into 33 informal groups with an added list of unusual species. Whalen gives published infrageneric names where applicable, but does not give formal descriptions nor types for his new groups. Eleven of his 33 groups lack formal status and include further subdivision of the Australian species or the re-allocation of some to different taxa. Some of Whalen's new groups or adjusted infrageneric taxa have been incorporated into this account and comments will be found under the appropriate sections.

I have included the species sometimes placed in *Lycianthes* in the genus *Solanum* at subgeneric level. As stated in Symon (1981) 71, I am not satisfied that these species justify generic status while the fundamental cleavage between the *Pachystemonum* and *Leptostemonum* species is accepted within a single genus. There are far more cogent arguments to separate the latter at generic level than to subdivide *Pachystemonum* into questionable genera e.g. *Lycopersicon*. This drastic step has not been contemplated by contemporary taxonomists.

Key to the genera of Solanaceae in New Guinea

1. Leaves deeply divided and lobed, with abundant glandular hairs; flowers yellow; fruit a red berry; straggling herb, tomato ..... 7. **Lycopersicon*, page 14
   Not as above 2
2. Flowers clearly tubular or trumpet shaped; plants never armed 3
   Flowers not obviously tubular, rotate or bell shaped, or deeply divided 7
3. Flowers 10-25 cm long, white, salmon or purplish 4
   Flowers less than 10 cm long, orange, pink, reddish or blue 5
4. Woody shrub; flowers 15-25 cm long, white or pale salmon; not fruiting in New Guinea ..... 2. **Brugmansia*, page 8
   Herb; flowers 10-15 cm long, semi double, purplish outside; fruits common, tuberculate .... 6 **Datura*, page 13
5. Erect herb; fruit a capsule; flowers blue or pink 6
   Woody shrub; fruit a berry; flowers orange or red ..... 4. **Cestrum*, page 11
6. Leaves rarely >5 cm; flowers blue; stamens 4 ..... 1. **Browallia*, page 7
   Leaves 15-30 cm long; flowers pink, stamens 5, tobacco ..... 9. **Nicotiana*, page 16
7. Flowers yellowish-cream or greenish-yellow, solitary or 1 or 2 in axils; plants never prickly 8
   Flowers white, blue, purplish, pink; some species prickly 9
8. Berry enclosed in inflated bladder-like calyx, finally yellowish; flowers with basal spot .... 10 **Physalis*, page 18
   Berry not enclosed in inflated calyx, erect, pendulous, mostly conical, pungently flavoured, finally red or yellow; flowers without basal spot. Chili pepper ..... 3. **Capsicum*, page 9
9. Large shrub or small tree with large malodorous leaves; flowers pale pink, sweet scented, berry egg-sized, drab red, Tree Tomato ..... 5. **Cyphomandra*, page 12
   Not as above 10
10. Herbaceous, flowers blue; berry enclosed in enlarged calyx lobes ..... 8. **Nicandra*, page 15
    Not as above 11
11. Inflorescence mostly pedunculate, often lateral on the stem and distant from the leaves, rarely axillary, if so then calyx lobes clearly developed, often with stellate hairs, often with prickles, leaves often lobed ..... 11. *Solanum*, page 20
    Inflorescence rarely clearly pedunculate, flowers pedicellate, mostly axillary, calyx lobes absent or obscure or 5 or 10, tomentum sparse, simple or dendritic, leaves usually entire, plant never prickly ..... 11. *Solanum* subgen. *Lycianthes*, page 32

1. BROWALLIA L.

L., Sp. Pl. (1753) 631; Gen. Pl. 5 edn (1754) 278. D'Arcy, Ann. Missouri Bot. Gard. 60 (1973) 576.

Erect, branching *herbs* to 1 m tall but usually less, pubescent with simple and glandular hairs. *Leaves* petiolate, simple, entire, sometimes geminate. *Flowers* solitary, axillary. *Calyx* tubular, lobed, the lobes sometimes sub-foliose, exceeding the capsule. *Corolla* salverform, zygomorphic, the tube swollen at the apex, the mouth of the tube contracted. *Stamens* usually 4, didynamous, a staminode or fifth anther sometimes present. *Ovary* 2-loculed, ovules numerous, stigma expanded. *Fruit* a 2-valved capsule. *Seeds* numerous, minute.

A small genus of six species native to tropical America. One species *B. americana* L. is very variable and widespread. Originally cultivated as an ornamental annual, it is now naturalised in the Old World tropics.

*1. **B. americana** L., Sp. Pl. (1753) 631.

Type citation: "Habitat in America australi".

Type material: not seen; D'Arcy (1973) gives "Hort. Cliff. BM, the original seed source was Panama".

A very variable, erect *herb* to 1 m, though usually less, sparsely or densely pubescent with simple multicellular hairs, unarmed. *Leaves* to 7 x 5 cm, more often c. 3.5 x 2 cm, ovate, apex acute to acuminate, base rounded, upper leaves often smaller and narrower; *petiole* 5-10 mm long. *Pedicels* erect, in the upper leaf axils. *Calyx* 10-12 mm long, 4, 5-partite, strongly angled, the lobe 1/4-1/3 of the total length. *Corolla* tube 1.5-2 cm long, swollen on one side in the region of the anthers, the limb bowl shaped 10-15 mm diam., shallowly lobed, shades of purple-blue or white, if coloured often with a contrasting pale centre. *Stamens* 4, didynamous; filaments with the upper pair very short, broad, attached to the rim of the tube, curved over so the broad filament substantially blocks the orifice of the corolla tube, the anther cells unequal, the upper reduced; the lower filaments attached further down, their apices inverted, the anthers with equal cells. Style simple, the stigma flattened, elaborated and placed between the two sets of anthers. *Fruit* an erect capsule enclosed within the persisting calyx. *Seeds* 0.75-1 mm long, prismatic, minutely reticulate, numerous.

Note

Apparently locally naturalised near Kainantu. Only one collection has been seen.

Specimen seen

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: Eastern Highlands District: *Henty NGF 49170*, 27.v.1971, Aionura near Kainantu, 6° 15′ 145° 55′, 615 m alt., (LAE)

2. **BRUGMANSIA Pers.**

Pers., Syn. Pl. 1 (1805) 216. Lockwood, J. Ethnopharm. 1 (1979) 147.

Large *shrubs* or small *trees*, indumentum of sparse or dense simple hairs. *Leaves* alternate, petiolate, lamina simple or with a few shallow lobes. *Inflorescence* a solitary pendulous flower. *Flowers* pedicellate, regular. *Calyx* tubular, 5-lobed or spathaceous either falling off entire or persisting as an envelope about the fruit. Corolla single or double, large, trumpet shaped, tube long and slender, the limb plicate, the lobes often cuspidate. Stamens 5, adnate to the tube towards the base, filaments slender, anthers linear, free. *Ovary* 2-celled, style slender; stigma 2-lobed. *Fruit* a dehiscent 4-valved capsule, smooth (cf. *Datura*). *Seeds* numerous, compressed laterally.

Brugmansia differs from *Datura* in its woody habit, vegetative reproduction, flowers remaining open during anthesis, calyx often spathe-like, not circumscissile, fruit a large pendulous unarmed berry on a long pedicel, seed large with a thick corky seed coat and lacking a caruncle.

A small genus of six species confined to the Andes in South America, now widely cultivated in the tropics and subtropics with a long history of psychotropic use in South America.

*1. **Brugmansia candida** Pers., Syn. Pl. 1 (1805) 216.

Based on *Datura arborea* Ruiz & Pavon, Fl. Peru 2 (1799) 15, tab. 127., non L., Sp. Pl. (1753) 179.

Type material: Peru, *Pavon s.n.* (not seen); D'Arcy (1973) gives MO lectotype; B-W, isolectotype.

Large *shrub* or small *tree* to 4 m tall, often spreading clonally, all parts pubescent with dense erect simple crisped hairs. *Leaves*: lamina to 15 x 10 cm, ovate, margin entire or with sparse shallow lobes; base oblique, apex acute to acuminate; *petiole* to 6 cm long. *Pedicel*

3-5 cm long. *Calyx* to 12 cm long, tubular, spathe-like, split on one side and the calyx lobes not clearly separated. *Corolla* 25-30 cm long, the tube slender gradually flaring to limb, lobe apices broadly triangular and terminated by cusps 2-3 cm long, white or pale apricot. *Stamens*: filaments slender; *anthers* 2.5 cm long, linear, dehiscing longitudinally, not coherent. Style and stigma exceeding the anthers by about 1 cm, all enclosed in corolla throat. *Fruit* a large, pendulous, unarmed capsule with numerous seeds.

Notes

Widely cultivated and naturalised mainly in upland areas. Planted in gardens or as a living fence, every portion roots readily and large clonal thickets persist in many places. It is more widespread than herbarium collections indicate. The species is not known to fruit in Papua New Guinea and its uniformity suggests that plants were derived from limited introductions.

The leaves contain high concentrations of alkaloids, particularly hyoscine, and may prove toxic if eaten. The species is listed and illustrated in Henty (1980).

Specimens seen

IRIAN JAYA: None seen, but likely to be present.

PAPUA NEW GUINEA: Morobe: *Anon 30*, 4.v.1968, Bulolo, (BFC); *Hartley 10591*, 2.viii.1962, Patep River near Gurukor, 6° 50′ 146° 38′, (LAE, RSA); *Symon s.n.* 1977, Bot. Gard. Lae, 6° 44′ 147° 00′, (ADW); Eastern Highlands: *Symon 13862*, 11.vi.1984, Komperi Village 11 km before Henganofi, 6° 15′, 145° 38′, (ADW, L, LAE, MO); *Womersley NGF14178*, 15.i.1962, Nondugl, 5° 50′, 144° 45′, 1585 m alt., (LAE); *Hide 267*, 25.xi.1972, ½ mile NW of Koge, Sina Sina, 6° 07′, 145° 00′, 1810 m alt., (LAE): Central: *Gebo s.n.* 13.vii.1971, Musgrave River, (UPNG); *Haaren 23*, 9.v.1962, Bisianumu 9° 23′, 147° 24′, 548 m alt. (LAE); *Symon 13809*, 20.v.1984, Variarata National Park 9° 25′ 147° 24′, (ADW).

SOLOMON ISLANDS: *Mauriasi BSIP 17204*, 4.xi.1969, NW. Santa Cruz, Graciosa Bay area, (LAE).

3. CAPSICUM L.

L., Sp. Pl. (1753) 188; Gen. Pl. 5 edn (1754) 86. Heiser & Pickersgill, Baileya 19 (1975) 151.

Erect or spreading *herbs* or short-lived soft-wooded shrubs, glabrous or sparsely pubescent with simple hairs. *Leaves* simple mostly entire, ovate or elliptic often geminate. *Inflorescence* of 1 or few pedicellate flowers from leaf axil, often decurved at anthesis and erect in fruit. *Flowers* 5-partite. *Calyx* shortly tubular, truncate, lobes short or reduced to marginal teeth or absent. *Corolla* deeply or broadly stellate, white or pale bluish. *Stamens* equal, *filaments* inserted at the base of corolla tube, *anthers* yellow or purplish, dehiscing by slits. *Ovary* 2-loculed, numerous ovules, style erect; stigma capitate. *Fruit* a dryish or sub-fleshy berry, mostly bright orange-red when ripe (less often purple, yellow or white). *Seeds* flattened, yellow or pale buff in colour.

A small genus of 10-12 species originally from tropical America. Several species are widely grown as chili, green or sweet pepper, cayenne pepper, as a vegetable or pungent condiment. The numerous cultivars have received many names and only in recent times has the taxonomy approached stability.

The two species described here are closely related morphologically. D'Arcy (1973) states that herbarium specimens of *C. annuum* and *C. frutescens* may be indistinguishable. However, both species are consistently maintained by all recent workers on the genus and it is reported that their interfertility is low.

Key to *Capsicum* species

Adapted from D'Arcy (1973) and Gentry (1974)

1. Pedicels, two or more per node, after first flowering, rarely less; corolla white or greenish white, fruit ellipsoid-lanceolate or lanceolate, c. 0.5 cm diam. ..... 2. *C. frutescens*

2. Pedicels, mostly one per node, after first flowering, rarely more, corolla white or bluish white; fruit globose, ovoid or oblong-conical, large, mostly more than 1 cm across ..... 1. *C. annuum var. annuum*

*1. **C. annuum** L., Sp. Pl. (1753) 188 var. **annuum**.

Type citation: "Habitat in America meridionali."

Type material: not seen.

C. longum DC., Cat. Hort. Monsp. (1813) 86.

Type citation: not seen.

Type material: not seen.

Common name: green pepper; red pepper; cayenne pepper; chili.

Annual or short lived *herb* to 1 (2) m, stems striate, glabrous or sparsely pubescent with simple hairs on young growth, in the leaf axils and at vein junctions below. *Leaves* to 10 x 5 cm, more often c.6 x 3 cm, smaller on aged and distal twigs, ovate to broad lanceolate, acute to acuminate, base subcuneate, oblique, *petiole* 1-3 cm long, narrowly winged above. *Flowers* solitary in leaf axil and stem forks. *Pedicel* 1-1.5 cm long. *Calyx* 3-4 mm long, cupular, truncate, lobes minute. *Corolla* c. 1.5 cm diam., deeply stellate, the lobes triangular, white. *Stamens*: filaments c. 2 mm long; *anthers* 2-2.5 mm long, oblong, opening by slits, bluish. *Ovary* 2-2.5 mm long, ovate, *style* c. 2 mm long, erect; *stigma* small, terminal. Fruit an erect or pendant *berry*, ovoid varying greatly in size in horticultural cultivars, but usually greater than 1.5-2 cm wide and long, at first green then flushed purplish, finally bright red, sweet or pungent. *Seeds* 3-4 mm long, flattened, yellowish.

Note

Widely cultivated as a crop and occasionally persisting. The name *C. longum* DC. was applied to the collection *Hollrung 470* by Schumann & Hollrung (1889) and Warburg (1891). The specimen has not been seen but the name is a synonym of *C. annuum*.

Specimens seen

IRIAN JAYA: None seen, but likely to be cultivated.

PAPUA NEW GUINEA: Eastern Sepik Province: *Leach NGF 34206*, 16.x.1972, Kundiman Yauyang village near Amboin, 4° 37′, 143° 27′ 30 m alt., (CANB, LAE). Madang: *Symon 13813*, 24.v.1984, about Baku village 5° 15′, 145° 35′, (ADW, LAE). Morobe: *Symon 10654*, 30.v.1977, Bulolo 7° 11′, 146° 39′ (ADW, LAE); *Symon 10656*, 11.vi.1977, Erap Expt. Stn. 6° 35′, 146° 42′ (ADW). Western Highlands: *Symon 10684*, 23.vi.1977, Laiagam 5° 30′, 143° 30′ (ADW). Bougainville: *Nachman 437*, x. 1971, Nissan Island 4° 30, 154° 15′, (LAE). New Britain: *Floyd 6478*, 6.viii.1954, Koimumu village near Cape Hoskins W. Nakani, (L, LAE).

*2. **C. frutescens** L., Sp. Pl. (1753) 189

Type citation: "Habitat in India."

Type material: not seen.

Common name: bird pepper, birds-eye chili.

Herb or *subshrub* to 2 m tall, sometimes woody below, glabrous except for minute simple hairs on young points and in leaf axils. *Leaves* to 10 x 5 cm, usually somewhat less particularly on distal shoots, ovate-lanceolate, apex acuminate, base subcuneate, often oblique; *petiole* 1-3 cm long. *Flowers* several, pedicellate from the leaf axil. *Pedicel* 1-1.5cm long. *Calyx* 2-3 mm long, cupulate, truncate, lobes minute or absent. *Corolla* c. 8 mm long, stellate, lobes triangular. *Stamens*: filaments c. 1 mm long; *anthers* 1.5-2 mm long, oblong, opening by slits. *Ovary* 1.5-2 mm long, bluntly conical; *style* 3-4 mm long, erect, slightly exceeding the anther; *stigma* small, terminal. *Fruit* an erect *berry* 1-1.5 cm long, c. 5 mm diam., narrow conical, fusiform or ellipsoidal, red, pungent. *Seeds* c. 4 mm long, flattened, with slightly thickened margin, yellowish.

Note

Cultivated as a pungent condiment the fruits of spontaneous plants also being harvested, it is widely naturalised. Although the fruit shape is known to vary considerably elsewhere the New Guinea material is largely uniform.

Specimens seen

IRIAN JAYA: None seen, but undoubtedly grown there.

PAPUA NEW GUINEA: Madang: *Symon 13815*, 24.v.1984, about Baku village, 5° 15′, 145° 35′, (ADW, K, LAE, MO). Morobe: *Hartley 11880*, 20.v.1963, near Yalu village 12 miles W of Lae 30 m alt., (LAE, RSA);*Rau 373*, 15.iii.1979, Patep, 7° 00′, 147° 35′, 700 m alt., (BFC, LAE). Western Highlands: *Vinas s.n.*, 7.iii.1981, NE of Minj, 5° 54′, 144° 41′, 1200 m alt., (UPNG). Central: *Heyligers 1207*, 13.v.1965, Tovobada Hills 12 miles W of Pt Moresby, (LAE); *Frodin s.n.*, s.d., near Ovorokia quarry, Brown River road, (UPNG); *Kwapena s.n.*, 12.ii.1974, Waigani area 9° 22′, 147° 10′, (UPNG); *Symon 13799*, 15.v.1984, 10 km before Old Rigo 9° 48′, 147° 33′, (ADW); *Symon 13802*, 15.v.1984 near Kapogere Agric. Stn. 9° 48′, 147° 43′, (ADW); *Symon 13805*, 16.v.1984, at Veimauri Plntn. 9° 02′, 147° 03′, (ADW). Milne Bay: *Frodin s.n.*, 28.x.1972, Kiriwina, Trobriand Island 8° 29′, 151° 04′, (LAE, UPNG); *Lawton s.n.*, 22.viii.1972, Kiriwina, Trobriand Island, (UPNG); *Mann NGF 43276*, 31.iii.1969, Bwagaoia, Misima Island 10° 42′, 152° 50′, (LAE); New Britain: *Ridsdale NGF 30374*, ridge above Kilenge, 5° 25′, 148° 25′, 800 m alt., (LAE). New Ireland: *Cropley & Katik NGF 29602*, Lavongai 2° 42′, 151° 03′, sea level, (LAE).

SOLOMON ISLANDS: Guadalcanal: *Morrison 280*, 2.v.1965, slopes of Lengakiki ridge, 9° 30′, 160° 00′, (LAE).

4. CESTRUM L.

L. Sp. Pl. (1753) 191; Gen. Pl. 5 edn (1754) 88. D'Arcy, Ann. Missouri Bot. Gard. 60 (1973) 594.

Woody *shrubs* or small *trees*, glabrous or with simple or dendritic hairs. *Leaves* simple, entire, petiolate, sometimes geminate. *Inflorescence* axillary or terminal, often a congested raceme or panicle. *Calyx* tubular, divided less than half its length, lobes sometimes unequal. *Corolla* tubular, sometimes slightly zygomorphic, tube obconic or slightly inflated, lobes short. *Stamens* 5 mostly sub-equal; filaments inserted on corolla tube, variously pubescent, anthers included. *Ovary* on a small disc, glabrous, 2-loculed; *style* simple, erect; *stigma* capitate, about the level of the anthers. *Fruit* a succulent berry. *Seeds* prismatic, embryo straight or curved in the endosperm.

A large genus with many species in both Central and South America, several of which have been widely cultivated as ornamentals.

*1. **C. elegans** (Brongn. ex Neumann) Schldl., Linnaea 19 (1847) 261. *Habrothamnus elegans* Brongn. ex Neumann, Annales de Flore et de Pomone Jan. (1844) 118. *Basionym.*

Type citation and type material: not seen.

A woody *shrub* 2-3 tall, pubescent with simple, forked and dendritic hairs which are dense and purple in the region of the inflorescence. *Leaves* alternate; lamina to 17 x 9 cm, commonly about 9 x 4.5 cm, broad lanceolate, entire, acuminate, base rounded, principal veins impressed above, conspicuous below; *petiole* 1-3 cm long, grooved above. *Inflorescence* a congested terminal panicle of subspicate racemes, one to three racemes from each leaf axil, lower flowers subtended by bracts; bract 3-7 mm long, lanceolate, often coloured, *pedicel* 0.5 mm long, or absent. *Calyx* tube c. 5 mm long, lobes c. 3 mm long, triangular acuminate. *Corolla*: tube 2 cm long, c. 1.5 mm diam. at the base, 5 mm diam. just below the lobes, glabrous; lobes c. 4 mm long, long triangular, pubescent, strongly reflexed close to Spiraea Red R.H.S. 025/1. *Stamens*: filaments 1 cm long, attached just below middle of tube, swollen, sparsely retrorsely pubescent above point of attachment, inflexed at summit; *anthers* 1-1.5 mm long, minutely papillose. *Ovary* 1.5 mm diam., glabrous, pink above, surrounded below by yellowish annular disc; *style* c. 17 mm long, erect, minutely papillose above; *stigma* capitate, yellowish green, included but

exceeding the anthers. *Berry* to about 1 cm diam. (but few seen), ± globular, succulent, red. *Seeds* c. 4 mm long, irregular prismatic.

Note

Apparently locally naturalised at high altitudes. Undoubtedly a garden escape as species of *Cestrum* are widely grown as ornamental shrubs.

Specimens seen

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: Chimbu: *Hide 268*, 25.xi.1972, ½ mile NW Koge Mission, Sinasina, 6° 07′, 145° 00, 1810 m alt., (LAE); *Rogers s.n.*, vi.1981, Mt Wilhelm, SE slopes above Pindaunde Lake. 5° 45′, 145° 00′, 3500 m alt. (UPNG); *Smith ANU 15360*, 4.v.1972, Keglsugl, Mt Wilhelm track, 5° 50, 145° 06′, 2667 m alt. (LAE); *Wade ANU 7484*, 11.x.1966, Gembogl, 5° 53′, 145° 05′, 2103 m alt. (LAE).

***C. aurantiacum** Lindl., Bot. Reg. 30 (1844) 71, n. 65 and 31 (1845) t. 22.

Type citation: "The Horticultural Society raised it from Guatamala seeds communicated by G.V. Skinner, Esq. and it lately flowered (August 1844) in the Chiswick Gardens. Its native place is said to be Chimalapa".

Type material: not seen.

Common name: orange cestrum.

A garden grown specimen of this orange-yellow flowered species is in the Herbarium at Lae, but there is no suggestion that it has become naturalised. It is weedy in eastern Australia.

5. CYPHOMANDRA Mart. ex Sendt.

Sendt., Flora 28 (1845) 161-176. Sandwith, Chronica Bot. 4 (1938) 225. Child, Feddes Repert. 95 (1984) 283-298.

Trees, *shrubs* and *vines*, unarmed, pubescent with simple, glandular or dendritic hairs. *Leaves* simple or compound, entire or lobed, often foetid, very variable within the genus, petiolate. *Inflorescence* of simple or branched raceme-like cymes often from a stem dichotomy. *Flowers* mostly 5-partite. *Calyx* campanulate, shortly lobed. *Corolla* mostly deeply lobed. *Stamens*: filaments free or connate extending into an elaborate connective at the back of the anther (one of the few distinctive features of the genus); anthers opening by pores or with longitudinal slits. *Ovary* with many ovules. *Fruit* a succulent berry. *Seeds* flattened, embryo circinnate.

An ill-defined genus of about 40 species badly in need of revision. The species are largely confined to the tropical mountainous regions of South America.

*1. **C. betacea** (Cav.) Sendt., Flora 28 (1845) 172, pl. 6. *Solanum betaceum* Cav., Icon, 6 (1800) 15, t. 524. *Basionym.*

Type citation: "Habitat . . . h. Floret et fructificat in Regis horto Matritensi Julis et Augusto".

Type material: not seen, possibly MA.

Common name: tree tomato; tamarillo.

A small *tree*, branching above, pubescent with minute simple hairs mixed with short glandular hairs, malodorous, clammy. Lower and juvenile *leaves* to 35 x 30 cm, adult leaves commonly c. 15 x 12 cm, ovate, entire, apex acute to shortly acuminate, base cordate, basal

lobes often overlapping; *petiole* 5-15 cm long, terete. *Inflorescence* a pendulous cyme from stem fork or leaf axil; *pedicel* 1-2 cm long. *Calyx* c. 5 mm long including the broad rounded lobes, densely glandular pubescent. *Corolla* c. 2 cm diam., deeply stellate, lobes cut almost to base, somewhat fleshy, pink, scented. *Stamens*: filaments c.2 mm long, attached to base of corolla tube; *anthers* 4-5 mm long, stout, erect, connective broad and thick along the back of the anther. *Ovary* bluntly conical; *style* 5-6 mm long, stout, erect; *stigma* not expanded at apex. Fruit a succulent *berry*, 5-7 cm long, ovoid, dull dark red. *Seed* 3.5-4 mm diam., discoidal, the surface hirsute if not vigorously cleaned, shallowly reticulate-foveate, margin with a narrow wing, 0.25 mm wide, pale reddish brown, numerous.

Notes

Widely cultivated and naturalised in upland areas. Fruits may be seen in the local markets. Probably more widespread than collections indicate. Introduced at Aiyura Agric. Station before 1940 and naturalised in forest edges by 1949 (J. Womersley pers. com.).

Specimens seen

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: Morobe: *Streimann 8710*, 19.i.1983, Salamaua track, 14 km NE of Wau, 7° 18′, 146° 49′, (BFC, CBG, L); *Symon 13835*, 1.vi.1984, Salamaua track, 14 km NE of Wau, 7° 18′, 146° 49′, (ADW, L, LAE, MO). Western Highlands: *Vink 16343*, 22.viii.1963, Uinba, Kubor Range, Nona-Minj divide, 5° 59′, 144° 37′, 1950 m alt., (BISH, LAE); *Vinas UPNG 3294*, 29.vi.1981, Block A, Baiyer River Sanctuary, 5° 26′, 144° 04′, (L, UPNG). Chimbu: *Hide 218*, 7.x.1972, 2 miles SSW of Koge Mission, Sinasina, 6° 06′, 145° 01′, 2340 m alt., (LAE); *Whiteman s.n.*, Jan. 1961, Gumine, 6° 12′, 144° 58′, (LAE). Eastern Highlands: *Symon 10674*, 21.vi.1977, Daulo Pass 5° 59′, 145° 29′, (ADW). Central: *Frodin 657*, 20.vi.1971, Goilala near Kerau Mission, 8° 14′, 147° 03′, (LAE, UPNG); *Kanai LAE 52878*, 17.x.1975, Woitape, 1600 m alt., (LAE).

6. DATURA L.

L., Sp. Pl. (1753) 179. Haegi, Austral. J. Bot. 24 (1976) 415.

Coarse, malodorous, *herbs* or short lived perennials; *Indumentum* of simple glandular or eglandular hairs, present at least on young tips. *Leaves* alternate, petiolate, lamina simple often shortly lobed. *Inflorescence* of solitary flowers in the branch forks. *Flowers* shortly pedicellate, regular. *Calyx* tubular, generally 5-lobed, circumscissile near base after anthesis; calyx base later accrescent and forming a frill subtending the mature fruit. *Corolla* single (semi-double in species below) trumpet shaped consisting of a tube and throat abruptly expanded into a shortly lobed limb with distinct acumens. *Stamens* 5; *filaments* filiform and adnate to corolla in lower third; *anthers* narrow ellipsoid, basifixed, dehiscing longitudinally. *Ovary* superior, 2-locular or 4-locular in lower part with false septum, beset with many fleshy spines (tubercles in species below) which become rigid in fruit, surrounded by an annular nectary at base, placentation axile, ovules numerous, *style* slender, *stigma* saddle-shaped, bilobed. *Fruit* an ovoid or globose 2-4 celled capsule, at first green sometimes tinged purple, brown on drying, dehiscent by 4 valves from apex or bursting irregularly. *Seeds* numerous, compressed, more or less D-shaped, surface finely pitted and/or coarsely sculptured; *embryo* curved within endosperm.

A relatively small genus of about 10 species occurring in warm temperate America, Asia and Australia. All species are toxic containing alkaloids and a number are agricultural weeds.

*1. **Datura metel** L., Sp. Pl. (1753) 179.

Type citation: "Habitat in Asia, Africa."

Type material: not seen, Hort. Cliff. 55.2 (BM).

D. fastuosa L., Syst. nat. ed. 10, 2 (1759) 932.

Type citation: "D. pericarp. tuberculatis nutantibus globosis."

Type material: not seen.

Annual *herb* to 1 m or short lived perennial, plant parts often tinged purple. Tomentum of minute, appressed, simple hairs, soon glabrescent. *Leaves*: *lamina* to 10-14 x 5-12 cm ovate to angularly broad-ovate, margin entire or coarsely serrate, the lobes more or less triangular with acute apices and broad shallow sinuses, base oblique, apex acute to acuminate, *petiole* 4-7 cm long; *inflorescence* a solitary pedicellate flower from a leaf axil or stem fork; *pedicel* 10-12 mm. *Calyx* 4-7 cm, rounded, 5 (-9) lobed; lobes 8-13mm long. *Corolla* generally double, 15-20 cm long, deep purple outside, pale lavender or white inside, lobes 5 (-9) rounded and with acumens 10-25 mm long, separated by short sinuses. *Stamens* 5 (-9), adnate to corolla below; anthers 10-12 mm long, purple; style 10-14 cm long, stigma more or less capitate, terminating 2-4 cm below anthers and included in corolla throat. *Capsule* deflexed, breaking irregularly when ripe; pedicel 1.5 (-3) cm long; calyx base 2-3 mm long, coriaceous; capsule more or less globose 3-4 cm diam., with numerous conical tubercles of approximately equal length. *Seed* D-shaped, 4-5 mm long, thickened and rounded towards outer margin, surface finely pitted in reticulate-foveate pattern, otherwise smooth, brownish yellow.

Note

This species may be of Asian origin and it is now widely, if sparingly, cultivated as an ornamental in warmer regions of the world. It has recently been collected in Papua New Guinea in the vicinity of Matuka village, NW of Madang where it is cultivated and naturalised along the main road. Henty (1980) lists it and provides an illustration of the species as a toxic plant, stating that it is occasionally grown at low altitudes. An account of the genus in Australia with discussion of nomenclatural problems may be found in Haegi (1976). The name *D. fastuosa* L. was applied by Schumann & Lauterbach (1901) to the collections *Hollrung 845* and *Lauterbach 460* (? now lost) which indicate its early cultivation in New Guinea.

Specimens seen

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: Madang: *Symon 13818*, 27.v.1984, Along the road and about the villages near Matuka, NW of Madang, 4° 53′, 145° 46′, almost sea level, (ADW, L, LAE, MO).

7. LYCOPERSICON Mill.

Mill., Gard. Dict. abbr. edn (1754). Rick, Scientific Amer. 239 (1978) 66.

Perennial sprawling *herbs* sometimes subwoody towards base, pubescent with simple or glandular several-celled hairs and abundant usually shorter glandular hairs, unarmed, aromatic. *Leaves* pinnately lobed or divided, smaller interstitial leaflets often present, leaflets sessile or stalked, entire or lobed. *Inflorescence* lateral, a several flowered raceme-like cyme or sub-paniculate; pedicels articulate in the upper half. *Calyx* deeply divided, lobes lanceolate. *Corolla* 5-partite (6-9 in cultivars) stellate, yellow. *Stamens*: filaments short, *anthers* erect, cohering in a tube about the style, dehiscing introrsely by longitudinal slits, each anther with sterile, conical terminal appendage. *Ovary* 2-loculed, with enlarged placenta (multilocular in cultivars). Fruit a *berry* generally red. *Seeds* compressed, pilose, embryo coiled.

A small genus centred on the Pacific coast of western South America (Chile to Colombia) and extending to the Galapagos Islands. The ten or so species are closely related to the genus *Solanum*.

*1. **L. esculentum** Mill., Gard. Dict. edn 8 (1768).

Type material: not seen.

Solanum lycopersicum L., Sp. Pl. (1753) 185.

Common name: tomato.

Sprawling short lived *herb* 50-150 cm tall, often densely pubescent with simple and glandular hairs, clammy, aromatic. *Leaves*: lamina to 30 x 20 cm, ovate in outline but deeply pinnatisect into 7-9 major lobes which are petiolulate, the lobes themselves entire or with petiolulate or sessile lobes, sessile or petiolulate interstitial leaflets also occur along the leaf midrib, leaflet apices acute to acuminate, base oblique, often subcordate; *petiole* 2-5 cm long. *Inflorescence* lateral, a raceme-like cyme sometimes forked, of few to many flowers; *pedicel* articulate in the upper half. *Calyx* deeply divided, the lobes c. 1 cm long, narrowly lanceolate. *Corolla* 2-2.5 cm diam., stellate, lobes narrowly triangular, often reflexed, often 6-9 partite in cultivars, yellow. *Stamens*: filaments sparsely pubescent on the margin; *anthers* 8-10 mm long including the sterile apex 2-3 mm long, lanceolate, cohering in a cone, pubescent within and united by marginal hairs, introrsely dehiscent by slits. *Ovary* glabrous or pubescent; *style* erect; *stigma* terminal, included. Fruit a succulent *berry*, usually red, globular or depressed globular, 1-2 cm diam. in naturalised forms, 5-10 cm diam. smooth or furrowed in cultivars. *Seeds* numerous, 2-3 mm long, compressed, pilose (with ruptured cell walls) drab buff-grey.

Notes

Widely cultivated and naturalised, the feral forms usually having small fruit and reputedly of superior flavour. The species is more widely distributed than the herbarium specimens indicate. There has been no recent revision of the genus, but a succinct account may be found in Rick (1978). There is still controversy over the use of the specific name i.e. *Lycopersicon esculentum* Mill. or *Lycopersicon lycopersicum* (L.) Karsten ex Farwell. The first is widely used, but the latter is technically correct. A proposal to conserve the first name has been made, Terrell *et al.*, Taxon (1983).

Specimens seen

IRIAN JAYA: *Atastrip 56*, 1903, Niew Guinea, (BO).

PAPUA NEW GUINEA: Madang: *Symon 13812*, 21.v.1984, Baku For. Res. Stn, 5° 15′, 145° 35′, (L, LAE, ADW). Morobe: *Symon 10627*, 29.v.1977, Aseki road from Bulolo, 7° 20′, 146° 10′, (ADW); *Symon 10648 & Kairo*, 1.vi.1977, Stoney Creek, foot of Mt Missim, (ADW, LAE); *Symon 13832*, 1.vi.1984, middle Salamau track out of Wau, 7° 03′, 147° 04′, (ADW); *Wells NGF 7396*, Jan. 1957, Bulolo plantation area, 7° 10′, 146° 40′, 914 m alt., (BFC, BRI, CANB, LAE). Eastern Highlands: *Buderus NGF 23911*, 26.v.1965, Fatima river above Marafunga, 6° 04′, 145° 25′, 2743 m alt., (LAE). New Britain: *Dissing 2719*, 24.vii.1962, Bismark Archipelago, (LAE).

8. NICANDRA Adans.

Adans., Fam. Pl. 2 (1763) 219, nom. cons. Horton, J. Adelaide Bot. Gard. 1 (1979) 351. Generic description see below under species. A monotypic genus, taxonomic and nomenclatural problems are discussed by Horton (1978).

*1. **Nicandra physalodes** (L.) Gaertn., Fruct. Sem. Pl. 2 (1791) 237. *Atropa physalodes* L., Sp. Pl. 1 (1753) 181. *Basionym.*

Type citation: "Habitat in Peru. D.B. Jussieu."

Type material: not seen.

Annual *herb* with upright, glabrous stems, to 2 m high. *Leaves* alternate, petiolate; *lamina* (2-) 4-21 (-31) cm long, (1-) 2-10 (-18) cm wide, narrowly to broadly ovate apex acute to acuminate, base cuneate to narrowly cuneate or attenuate, margin usually widely, irregularly and shallowly dentate or sinuate-dentate, or almost entire; upper laminal surface sparsely covered with short, inflated, eglandular trichomes 2-4 cells long, basal cell subglobular, lower lamina surface glabrous or nearly so; *petiole* (0.5-) 1.5-6.5 (-9) cm long, usually narrowly winged distally to almost terete proximally. *Inflorescence* pseudaxillary or rarely interfoliar,

flowers solitary, pedicellate and somewhat cernuous; *pedicel* 6-24 mm long (longer in fruit), recurved and sparsely to moderately puberulent (becoming glabrous in fruit). *Calyx* usually glabrous, 5-lobed; *lobes* (7-) 9-20 (-22) mm long, ovate, acute to acuminate and often slightly mucronate at apex, sagitate at base and often mucronate at basal tips, lobes mutually adpressed along margins to form longitudinal wings (and also fused along margins for 1/3 (-1/2) their length from basal tips). *Corolla* 5-lobed, broadly campanulate, pale blue to mauve on limb and upper tube, and on lower part of tube whitish with blue spot near base of each lobe;*limb* slightly lobed, plicate in bud; *lobes* alternate with calyx-lobes, 12-23 (-30) mm long, 5-15 (-22) mm wide, margin usually entire and obtuse. *Stamens* 5, included, alternate with corolla lobes; *filaments* 3-5.5 mm long, inserted near base of corolla tube, densely pubescent on dilated bases; *anthers* yellow, ovate or oblong-ovate with 2 parallel thecae, 1.8-4 mm long, dorsifixed, longitudinally dehiscent. *Ovary* divided (often irregularly) into 3-5 locules; ovules numerous; *disc* hypogynous, flattened, annular; *style* 3-6 mm long, relatively thick; *stigma* capitate with 3-5 prominent stigmatic areas. *Fruit* a globular, pale yellowish, almost dry berry, outer wall chartaceous and when ripe splitting irregularly at base (which is usually uppermost in the pendulous fruit), (5-) 11-22 mm diameter, enclosed in the accrescent, chartaceous, reticulate calyx. *Seeds* brown, numerous, compressed, subdiscoid to broadly reniform and usually asymmetrically so, 1.2-2.1 mm long, testa reticulate-foveate.

Notes

Henty (1980) states that the species occurs at Pabarabuk in the Western Highlands and I have also seen it at Baiyer River Reserve.

Specimens seen

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: Eastern Highlands: *Henty NGF 49183*, 21.xii.1971, Aiyura, 6° 20′, 145° 55′, 1524 m alt., (CANB, LAE); *Symon 13861*, 11.vi.1984, outskirts of Goroka, 6° 03′, 145° 24′, (ADW, L, LAE, MO).

9. NICOTIANA L.

L., Sp. Pl. (1753) 180; Gen. Pl. 5 edn (1754) 84. Horton, J. Adelaide Bot. Gard. 3 (1981) 1.

Annual or short-lived perennial *herbs* rarely shrubby, often malodorous, *indumentum* varied, stems and leaves glabrous to pubescent with simple, multicellular, eglandular or glandular trichomes, often eglandular on proximal parts and becoming glandular more distally along stem; pedicels and calyx often with inflated cells; corolla pubescent outside with short, usually eglandular trichomes, and glabrous inside except for eglandular trichomes near base of tube. *Leaves* alternate, exstipulate, petiolate or lower leaves petiolate to subpetiolate and upper leaves sessile, usually numerous radical leaves in basal rosette merging into cauline leaves; *Lamina* simple, entire; *petiole* very narrowly to broadly winged, wing continuous with lamina, becoming shorter the more distal the leaf. *Inflorescence* usually a loose, elongate panicle, flowers subtended by bracts; flowers pedicellate; *bracts* lanceolate to linear, or occasionally leafy; *pedicels* erect or cernuous. *Calyx* regular or slightly irregular, tubular or narrowly campanulate, shorter than corolla, usually enlarging slightly in fruit; *lobes* 5, short or long, usually slightly unequal. *Corolla* regular, salverform, often sweetly-scented; *tube* differentiated into throat cup, throat cylinder and tube proper; *throat* cup often asymmetrically swollen; *limb* 5-lobed, contorted-plicate in bud and spreading at anthesis, thereafter loosely folding in light and expanding in shade or darkness. *Stamens* 4+1, included or rarely slightly exserted, the 4 upper ones at mouth of or in throat cup and often subdidynamous or didynamous, the lower

one below the throat cup, (or all 5 in throat cup); *anthers* 2-celled, elliptic, dorsifixed, longitudinally dehiscent; *filaments* filiform, those of upper 4 stamens fused to corolla for all but their distal fraction and that of lower one fused for a considerably shorter length, or filaments all fused to corolla near base only. *Ovary* superior, bilocular, *placentation* of numerous ovules axile; *disc* hypogynous, annular, often orange-red; *style* terminal on ovary, filiform, extending to distal end of corolla tube; *stigma* slightly 2-lobed. *Fruit* an ellipsoid or ovoid, thin-walled, 2-celled capsule, surrounded by persistent calyx, dehiscence septicidal-septifragal and loculicidal (i.e. splitting the capsule into 4 valves). *Seeds* minute, numerous, almost straight, angled, reniform or tightly curved; ornamentation of testa reticulate, with or without wavy ridges, or of round-edged wrinkles.

A genus comprising about 65 species mostly in North and South America but extending to SW Africa, southern Pacific islands and to Australia where it is well developed.

*1. **Nicotiana tabacum** L., Sp. Pl. (1753) 180.

Type citation: "Habitat in America, nota Europaeis ab 1560".

Type material: Herb. Linn. 245.1 (LINN); microfiche AD!

A leafy, viscid, *annual* or short lived perennial to 2 m high, sparsely branched. *Leaves* to 45 x 20 cm generally decreasing in size up stem, reduced to linear bracts at inflorescence, petiolate, elliptic or ovate to lanceolate; *petiole* winged, somewhat auriculate and decurrent down stem. *Inflorescence* a dense or expanded panicle; pedicel 5-7 mm. *Calyx* tubular to 2 cm long including acuminate lobes. *Corolla* to 5 cm long, tube enlarging to distinct throat cup and expanded limb, lobes triangular-acute to acuminate, usually pink. *Stamens*: upper filaments upper 4 long, the fifth shorter, all inserted at base of throat cylinder, pubescent below; anthers 1.5-2 mm long, exserted c. 5 mm. *Ovary* 5-6 mm long, conical-ovate, glabrous, surrounded by an orange-yellow disc below; style 3.5-4 cm long, erect, pale green, glabrous; stigma 2 mm diam, capitate, green, at about the level of the anthers. *Capsule* largely enclosed in calyx, calyx tube c. 1 cm long, lobes 0.5-1 cm long, capsule 1-1.5 x 0.8 cm, ovate to ovate-elliptic, brown, opening in upper portion by 4-valves. *Seeds* 0.5-0.75 mm long, spherical to oblong with serpentine reticulation, very numerous.

Notes

N. tabacum is a major world drug crop. In New Guinea it is widely cultivated in gardens and commercially grown in the Markham valley. Locally grown and cured tobacco leaf is available in many village markets. It is mostly smoked as cigarettes. The species is not known to be naturalised, but may be found far more widely than the following herbarium collections indicate. Horton (1981) has revised the genus in Australia, and while some species occur in Northern Australia but are not abundant, native species have not been located in New Guinea.

Specimens seen

IRIAN JAYA: None seen, but species undoubtedly grown there.

PAPUA NEW GUINEA: Sepik: *Holdsworth 487*, s.d. Magiendo IV, (UPNG). Madang: *Symon 13814*, 24.v.1984, about Baku village, 5° 15′, 145° 35′, (ADW, LAE). Morobe: *Blackwood s.n.*, 16.ii.1937, Andorova village, 7° 12′, 146° 31′, 1524 m alt., (K); *Buderus NGF 24012*, Dec. 1965, Warabum near Garaina, 7° 53′, 147° 09′, 609 m alt., (LAE); *Symon 13836*, 2.vi.1984, lower slopes Mt. Missim, 7° 13′, 146° 49′, (ADW, LAE). Western Highlands: *Hainsworth 77*, 25.vii.1966, 2 miles ESE on Jimi Patrol Post Tabibuga airstrip, 5° 32′, 144° 38′, 1219 m alt., (LAE); *Hoogland 7364 & Schodde*, 9.viii.1960, near Kepilam village Lagaip valley, 5° 21′, 143° 00′, 2433 m alt., (LAE). Chimbu: *Hide 5657*, 6.iv.1972, 1.5 miles N of Koge Mission, Sina Sina, 6° 07′, 145° 00′, 1800 m alt. (LAE); *Smith ANU 15455*, 3. vii. 1972, Keglsugl, 5° 50′, 145° 06′, 2634 m alt., (LAE). Eastern Highlands: *Hayes 268*, 21.iii.1972, 10 miles SE of Obura, 6° 40′, 146° 00′, 1920 m alt., (LAE); *Pullen 503*, 6.ix.1957, Asaro-Marifatia divide, 5° 59′, 145° 30′, 2439 m alt., (LAE); *Wheeler ANU 5723*, iv.1966, Noreikora Swamp near Kainantu, 6° 17′, 145° 52′, 1646 m alt., (LAE). Western: *Hyndman 44*, 1974, 40 km NE of Ningerum, 6° 07′ 141° 17′, (LAE). Southern Highlands: *Bowers* 34, 30.iii.1962, Alipe, Kebaka, upper Kaugel Valley, 5° 50′, 144° 01′, 2332 m alt., (LAE); *Schodde 2334*, 29.ix.1961, Lake Kutubu Wasemi Island, 6° 22′, 143° 17′, 762 m alt., (LAE). Northern: *Holdsworth s.n.*, s.d. Agenobambo, (UPNG).

10. PHYSALIS L.

L., Sp. Pl. (1753) 182; Gen. Pl. 5 edn (1754) 85. Symon, J. Adelaide Bot. Gard. 3 (1981) 149.

Plants *annual* or rhizomatous herbaceous *perennial* to subwoody short lived shrubs, glabrous or pubescent with simple, forked, stellate or glandular hairs. *Leaves* linear to broad ovate, alternate, often geminate, petiolate. *Flowers* solitary, pedicellate, in leaf axils or stem forks. *Corolla* campanulate to rotate with an expanded limb, mostly yellowish, often with darker spots towards the base. *Stamens* 5; filaments attached near the base of the corolla tube; anthers oblong, opening by slits, yellow or bluish. *Ovary* bicarpellate, ovules numerous on enlarged placenta; style simple, erect. *Fruit* a berry enclosed in the enlarged calyx tube. *Seeds* lenticular, numerous.

A large genus of probably more than one hundred species well represented in North and South America with a few species recorded from temperate and tropical Asia and Africa. Several species are cultivated for their fruit and are now adventive, while several others are weedy in tropical and warm temperate areas.

Many nomenclatural problems will remain until the names and taxa in Africa and Asia are studied and compared with those in America. There is little doubt that cultivated and sub-weedy species of American origin were distributed at an early date and there are many superfluous names in existence.

Key to *Physalis* species

Plant sparsely pubescent to glabrescent; corolla 15-16 mm diam. with diffuse brownish basal spot ..... 1. *P. minima*

Plant obviously pubescent; corolla 15-20 mm diam. with dark basal spot ..... 2. *P. peruviana*

*1. **P. minima** L., Sp. Pl. (1753) 183.

Type citation: "Habitat in Indiae aridis sordidis".

Type material: not seen. Lectotype chosen by Heine (1976) 130: in Herb. Hermann (BM, photo. ADW!).

A bushy *annual* rarely to 50 cm long, pubescent on young tips, calyces, with minute (lens needed) simple, antrorse hairs, becoming glabrous. *Leaves*: lamina to 10 x 6 cm, more often 4-6 x 2-3 cm, ovate-lanceolate, entire or with up to c. 7 teeth (to 5 mm long) or shallow angular lobes on each side, apex acute to acuminate, base rounded to cuneate, often oblique; *petiole* to 6 cm long, more often c. 1-3 cm. *Flowers* solitary from leaf axil. *Pedicel* 2-2.5 cm long at anthesis. *Calyx* c. 5 mm long, divided about half way into acutely triangular lobes, minutely pubescent. *Corolla* 7-8 mm long, c. 15-16 mm diam. pentagonal, pale creamy-yellow with five relatively large brownish spots, diffuse on their outer margin and cut off below by a ring of hairs, centre of corolla appearing slightly greenish yellow, corolla tube slightly swollen into shallow pouches each containing a nectary, corolla tube glabrous between the filament bases. *Stamens*: filaments 4-5 mm long, erect, glabrous, slightly speckled brown; *anthers* 2-2.5 mm long, grey-blue or pale blue, pollen white. *Ovary* 1-1.5 mm long, bluntly conical, disc pale yellow-green; *style* 4-5 mm long, erect, tinged green; stigma green, just equal to the height of the anthers. *Berry* 8-14 mm diam., globular, enclosed in the inflated calyx 25-30 mm long, with five principal and five minor veins. *Seeds* 1.5 mm long, flattened, pale yellow, minutely reticulate, numerous; *cotyledons* 8-9 x 5-6 mm, ovate, glabrous; hypocotyl 1-1.5 cm, minutely pubescent.

Notes

I believe *P. minima* to be an early introduction to South-East Asia from America. The species is closely related to the weedy and widespread *P. angulata* L. *P. minima* is widely established as a weedy plant of disturbed areas. It is a plant of generally lower altitudes ranging

from sea level to 1600 m with a mean of 293 m. The berry is not favoured for eating. A revision of the genus in Australia is presented in Symon (1981).

Specimens seen

IRIAN JAYA: Vogelkop: *Pleyte 355*, 26.vii.1948, Sorong, 0° 50′, 131° 15′, 20 m alt., (L.); *Royen 3290*, 2.iv.1954, Batanta Island, Radjah Ampat, 1° 45′, 129° 55′, (CANB, L, LAE); *van Royen 3371*, 8.iv.1954, Sorong Sorong, 0° 50′, 131° 15′, (CANB, L, LAE). Geelvink Bay: *Versteegh & Vink BW 8349*, s.d. Siapsis, Biak Island, 1° 00′, 136° 00′, 50 m alt., (CANB, L, LAE). Fakfak: *Brass 11652*, Dec. 1938, Baliem River, 3° 05′, 132° 45′, 1600 m alt., (BRI). Jayapura: *McKee 1803*, 27.xii.1954, Ifar Sentani, 2° 35′, 140° 28′, (L, LAE); *van Assem 7*, 7.x.1956, Ifar, 2° 35′, 140° 28′, (L).

PAPUA NEW GUINEA: West Sepik: *Darbyshire & Hoogland 7820*, s.d. near Aitape, 3° 08′, 142° 21′, (LAE). East Sepik: *Pullen 1742*, 16.ix.1959, Timbunke Mission, 4° 10′, 143° 30′, 30 m alt., (CANB). Madang: *Pullen 1114*, 6.ix.1958, Josephstaal, 4° 44′, 145° 00′, 76 m alt., (CANB, LAE); *Symon 13810*, 22.v.1984, nr. Baku village, Gogol River, 5° 15′, 145° 35′, (ADW, L, LAE). Morobe: *Kairo NGF 44473*, 23.xii.1969 Sawmill Creek, 4 miles W of Bulolo, 7° 10′, 146° 10′, 853 m alt., (BFC, BISH, CANB, L, LAE); *Reeder 878*, 26.ii.1944, Finschhafen, 6° 36′, 147° 51′, (US). Western Highlands: *Frodin UPNG 5481 & Leach*, 31.viii.1982, Lagaip Valley, (UPNG). Chimbu: *Hide 564*, 22.ii.1981, 5 km SSE of Karimui, 6° 30′, 144° 51′, (UPNG). Eastern Highlands: *Schlenker 1909*, Boku, 6° 05′, 145° 07′, (BRI). Gulf: *Schodde 4541 & Craven*, 27.ii.1966, Tapala village, 8° 06′, 146° 09′, (BRI, CANB, L, LAE, US); *Schodde 4658 & Craven*, 12.iii.1968, SE bank of junction of Tauri and Kapau Rivers, 7° 48′, 146° 08′, 76 m alt., (CANB, L, LAE); *Womersley & Simmonds NGF 5064*, 15.i.1955, Omati, 7° 20′, 143° 35′, (BRI, L, LAE). Central: *Carr 11101*, 2.ii.1935, Kanosia, 9° 01′, 146° 53′, sea level, (L, CANB); *Carr 14280*, 29.ix.1935, Boridi, 9° 05′, 147° 38′, 1432 m alt. (CANB, L.); *Darbyshire 730*, 25.vii.1962, Aroa river, 5.5 miles W of Kanosia, (BRI, CANB, L, LAE); *Kwapena 49*, 7.i.1972, Waigani Swamp, (LAE, UPNG); *MacGregor s.n.*, 1889, Mt Musgrave, 8° 56′, 147° 29′, (MEL); *Paijmans 1869*, 19.v.1975, Galley Reach, 9° 06′, 146° 57′, sea level, (LAE); *Schiefenhoeval 22*, 10.ix.1970, Babiko village, 8° 41′, 146° 32′, (CANB, LAE); *Stevens s.n.*, 29.ii.1972, Pt Moresby, 9° 28′, 147° 09′, (UPNG); *Symon 13806*, 18.v.1984, Cape Suckling, 9° 01′, 146° 37′, sea level, (ADW). Northern: *Hoogland 4593*, 26.viii.1954, Budi Budi, 9° 20′, 153° 40′, 75 m alt., (CANB, LAE); *Pullen 6853*, 30.iv.1967, Tavai Crk, Rigo area 8° 06′, 147° 44′, (CANB, L, LAE). New Britain: *Floyd NGF 3533*, 1.viii.1954, Galilo village, West Nakani, 5° 19′, 150° 35′, (BRI, CANB, L, LAE). *McKee 1555*, 2.xii.1954, Keravat, (L). Bismarck Archipelago: *Koie & Olsen s.n.*, 4.xi.1962, Mussau, (LAE). Bougainville: *Nachman 440*, x.1971, Nissan Island, 4° 30′, 154° 15′, (LAE).

SOLOMON ISLANDS: *Brass s.n.*, s.d., San Cristobal, (BRI).

*2. **P. peruviana** L., Sp. Pl. 2 edn 2 (1763) 1670.

Type citation: "Habitat Limae. Alstroemer 45".

Type material: (Microfiche Herb. LINN, AD!).

Common Name: Cape gooseberry

Soft wooded, short lived *shrub* to about 1 m tall, straggly with age, unarmed; all parts densely pubescent with tomentum of erect simple or glandular hairs to 1 mm long. *Leaves* in alternate pairs, one larger than the other; lamina to 13 x 13 cm but mostly about 6 x 4 cm, ovate-acuminate, base cordate, margin entire or with few blunt angular lobes or the lobes developed, triangular, c. 0.5 cm long, apex acuminate; *petiole* to 5 cm long, commonly about 2-3 cm. *Inflorescence* a solitary pedicellate flower in the leaf axil. *Calyx* 1-1.5 cm long, densely pubescent, purplish, divided about half way into acuminate-triangular lobes. *Corolla* 1.5-2 cm diam. rotate to shallowly 10-lobed, the inter-acuminal tissue exceeding the acumens, sparsely pubescent outside on the main veins, yellow with well defined purple-brown blotches towards the base, swollen into shallow nectary pouches between the filaments and densely pubescent with pale yellowish dendritic hairs below the blotches and around the nectaries. *Stamens*: filaments 3-5 mm long, purplish; *anthers* 4-4.5 mm long, bluish, pollen pale. *Ovary* 2-2.5 mm diam. rounded, glabrous, disc pale orange-yellow; *style* 5-7 mm long, erect, purplish; *stigma* capitate, expanded. *Berry* 1.5-2 cm diam. globular, aromatic, pale ochre-yellow when ripe, totally enclosed in the inflated angular calyx tube c. 3-3.5 cm long, the veins often prominent, the calyx lobes free at the apex up to 1 cm, acuminate, the whole pale yellowish-green when ripe finally drying pale brown. *Seeds*1.75-2 mm long, discoidal, light bright brown, minutely shallowly reticulate, 106 and 111 in two fruits counted; *cotyledons* 7 x 4-5mm, ovate, sparsely pubescent, hypocotyl c. 1 cm long, densely pubescent.

Notes

P. peruviana is undoubtedly an introduction to the area. It is widely established and fruit from spontaneous plants are gathered and eaten. Fruits also appear to be removed readily by local animals. It is found generally in upland areas at altitudes from 800 to 2804 m with a mean of 2002 m.

Specimens seen

IRIAN JAYA: None seen, but likely to be present.

PAPUA NEW GUINEA: Madang: *Sayers NGF 21470*, 19.xi.1964, Finisterre Mntns, 5° 48′, 146° 05′, 1585 m alt., (LAE). Morobe: *Conn et al. s.n.*, s.d. S of Boana, 6° 30′, 146° 50′, 900 m alt., (BFC); *Hartley 11577*, 8.v.1963, Kauli Creek 5 miles S of Wau, 7° 21′, 146° 45′, (BRI, CANB, L, LAE); *Henty & Laravita s.n.*, 8.vi.1976, Bulolo, 7° 12′, 146° 39′, 800 m alt., (LAE); *Streimann & Kairo NGF 39126*, 15.x.1960, Sawmill Creek, Bulolo, 7° 10′, 146° 40′, (BFC, BISH, BRI, CANB, LAE); *Symon 10640*, 30.v.1977, Mt Kaindi, (ADW); *Symon 13834*, 1.vi.1984, Upper Salamaua track, 7° 00′, 147° 00, (ADW); *Womersley & van Royen NGF 5893*, 30.vi.1954, Edie Creek, 7° 19′, 146° 41′, 1920 m alt., (BFC, BRI, L, LAE). Western Highlands: *Conn et al. s.n.*, s.d. Tambitanis nr. 5° 08′, 142° 21′, 220 m alt., (BFC, LAE). Chimbu: *Brass 30646*, 22.vii.1959, E slopes Mt Wilhelm, 5° 47′, 145° 02′, 2650 m alt., (LAE); *Pullen 581*, 13.ix.1957, Upper Omakeya valley, 2256 m alt., (CANB, L, LAE); *Simonett 99*, 20.vi.1962, 2 miles NNW of Mingende Mission Stn, 5° 59′, 144° 53′, 2073 m alt., (LAE); *Smith ANU 15179*, 30.ix.1971, Mt Wilhelm, 5° 40′, 140° 01′, 2804 m alt., (CANB, L, LAE). Eastern Highlands: *Hayes 179*, 10.ii.1972, 10 miles SE of Obura, 6° 34′, 146° 01′, (LAE); *Hide 58*, 6.v.1972, 1 mile N of Koge Mission Sina Sina, 6° 07′, 145° 00′, 1830 m alt., (LAE); *Paijmans 1382*, 26.v.1971, 5 km N of Kundiawa, 6° 01′, 144° 58′, 2100 m alt., (CANB); *Symon 10671*, 21.vi.1977, slopes of Daulo Pass, 5° 59′, 145° 30′, (ADW); *Wheeler ANU 5847*, Oct. 1966, Noreikora Swamp nr. Kainantu, 6° 17′, 145° 53′, 1646 m alt., (CANB, LAE). Southern Highlands: *Bowers 163*, 8.xi.1962, Alipe, Kebaka, upper Kaugel, 6° 00′, 144° 03′, 2332 m alt., (CANB, LAE); *Bowers 587*, 21.i.1969, Alipe Manya, upper Kaugel, 6° 00′, 144° 03′, 2317 m alt., (CANB, LAE); *Vandenburg et al. NGF 39718*, 23.ix.1968, 4 miles from Kagaba camp, 6° 05′, 143° 50′, 2621 m alt., (BRI, CANB, LAE). Central: *Carr 16504*, 5.v.1936, Kokoda, 1200′ alt., (L); *Cheeseman 23*, 21.vi.1933, Kokoda, 1200′ alt., (L).

11. SOLANUM L.

L., Sp. Pl. (1753) 184; Gen. Pl. 5 edn (1754) 85.

Lectotype species: *S. nigrum* L.

Annual or perennial *herbs*, *shrubs* or small *trees* sometimes *trailing* or *climbing*; unarmed or with straight or curved prickles, rarely glabrous, usually pubescent with simple, branched, glandular or stellate hairs. *Roots* fibrous, tuber-bearing or effectively rhizomatous by producing adventitious buds from widespreading shallow roots. *Leaves* very variable, usually alternate, petiolate, simple and entire, or lobed, pinnatisect or imparipinnate. *Inflorescence* terminal but usually becoming apparently lateral by sympodial growth, often extra-axillary, less commonly in the axils of the leaves or stems, or leaf opposed, a variously developed cyme, appearing racemose, subumbellate or paniculate, rarely reduced to a solitary flower. *Flowers* usually hermaphrodite but some species andromonoecious or dioecious, rarely cleistogamous. *Calyx* campanulate, rotate or cupular, mostly 5 (rarely 4-10)-toothed or lobed, sometimes enlarged to enclose the fruit. *Corolla* deeply stellate, rotate-stellate, rotate or campanulate mostly 5 (rarely 4-10)-lobed; lobes plicate in the bud, most often shades of violet, purple or blue, less often white or yellow, sometimes slightly zygomorphic. *Stamens* 5 (rarely 4), inserted on the corolla throat, alternating with the corolla lobes, usually exserted; filaments usually much shorter than the anthers; anthers oblong or lanceolate in outline, often connivent and forming a cone around the style or free and divergent, sometimes unequal with one or several anthers enlarged, opening by terminal pores or slits or splitting down the anther sac, usually conspicuously yellow. *Ovary* superior; locules 2 (rarely 3 or 4), with many ovules; style simple, erect or sigmoid; stigma usually small or slightly enlarged, capitate or bifid. *Fruit* a berry, usually globose but sometimes ovoid and rarely conical, when ripe succulent, papery or bony, rarely dry and subcapsular, pale green, yellow, orange, red, purple, black or ivory white, sometimes aromatic. *Seeds* orbicular or subreniform, compressed, often minutely pitted or reticulate, less

often muricate or pubescent, pale buff to brown or black, few to many (1500) per fruit; embryo curved, submarginal; endosperm present. Stone cell concretions occur in the fruit of some species. Germination epigeal, cotyledons ovate to linear-lanceolate in shape; the first true leaves usually entire, later leaves with or without lobes and prickles.

The basic chromosome number is n=12 and diploid, tetraploid and hexaploid levels occur; the sect. *Archaesolanum* has the base number n=23, and includes both diploids and tetraploids.

Key to *Solanum* in New Guinea

1. Inflorescence rarely or not obviously pedunculate; flowers pedicellate, axillary or on a pulvinus; calyx lobes absent or obscure, or 10 or less or emerging below rim of calyx tube; tomentum simple or dendritic hairs (mostly sparse); leaves entire, plants never prickly. See Key subgen. *Lycianthes*. page 24.

   Inflorescence generally pedunculate, (often lateral on the stem and distant from the leaf); flowers rarely axillary, if so then calyx lobes clearly developed; often with stellate hairs (lens often needed), often with prickles; leaves often lobed 2

2. Plants without stellate hairs (lens may be needed) 3

   Plants with stellate hairs 14

3. Flowers small <1 cm long, white; herbs, never prickly 4

   Flowers larger mostly >1 cm, mostly coloured; shrubs, climbers or trees (except *S. tuberosum* a herb). 5

4. An erect herb, inflorescence umbelliform, ripe fruit black ..... 1. *S. americanum*

   A sprawling herb; inflorescence shortly cymose, ripe fruit green ..... 2. *S. opacum*

5. Pubescence with simple, erect, mostly gland tipped hairs, minute stellate hairs (lens needed) on corolla and young leaf tips, prickly plants 6

   Pubescence otherwise, prickles mostly absent (sometimes present in *S. dallmannianum* and *S. incanoalabastrum*) 8

6. Stems densely prickly, leaves prickly above and below, glandular hairs scattered, leaves mostly solitary ..... 45 *S. saruwagedensis*

   Stems and leaves with scattered prickles, glandular hairs abundant, leaves mostly paired 7

7. Aspect brownish; flowers purple; pedicel to 12 mm long and to 2.5 cm long in fruit ..... 39. *S. infuscatum*

   Aspect green; flowers white; pedicels 2.5-4 cm long and to 6-8 cm in fruit ..... 41. *S. missimense*

8. Leaves lanceolate, entire, deeply pinnatisect or pinnate 9

   Leaves elliptic to ovate, never deeply divided 12

9. Leaves pinnate, plant herbaceous, tuberbearing, cultivated ..... 24. *S. tuberosum*

   Leaves entire or pinnatisect, plant not tuberbearing 10

10. Climber, fruit globular, <1 cm diam. ..... 25. *S. seaforthianum*

    Shrubs, fruit elliptic, >1.5 cm long 11

11. Fruit drab green to 4 cm long, mostly solitary or few per truss, lateral veins on leaf c. 2 per cm ..... 23. *S. multivenosum*

    Fruit vermillion, rarely >2 cm long, generally several per truss, lateral veins on leaf c. 1 per cm ..... 22. *S. aviculare*

12. Inflorescence usually 5-flowered; pedicels slender 2-2.7 cm long ..... 34. *S. dallmannianum*

    Inflorescence 7-30-flowered; pedicels <1.5 cm long 13

13. Leaves often paired or ternate, the 2nd and 3rd leaves smaller; buds glabrous, corolla 1 cm diam; berry orange ..... 3. *S. antillarum*

    Leaves alternate, if paired then ± equal size, buds with stellate hairs, corolla 1.5-2 cm diam; berry deep red ..... 49. *S. incanoalabastrum*

14. Plants without prickles 15
Plants with prickles 33
15. Stellate hairs obvious, at least dense below (rays overlap) 16
Stellate hairs sparse, mostly on young tips or buds, (rays not overlapping) 28
16. Inflorescence erect, 1-2-3 times divided; flowers numerous; fruit ± erect 5 mm or more in diam. 17
Inflorescence simple, few flowered, fruit mostly pendulous 22
17. Leaves entire 18
Leaves with shallow angularly lobed margin or distinct lobes 20
18. Leaves densely pubescent above and below; peduncle 3-5 cm to fork; flowers white; fruit yellow ..... 26. *S. erianthum*
Leaves glabrescent above; peduncle <2 cm; flowers lavender; fruits orange-red 19
19. Inflorescence 5-20 flowered, usually unbranched; plants unarmed ..... 52. *S. tetrandrum*
Inflorescence to 100 flowered, branched; plants armed below ..... 50. *S. mankiense*
20. Aspect usually rusty; leaves ovate-lanceolate, leaf apex long ..... 57. *S. torvoideum*
Aspect drab green; leaves ovate in outline, leaf apex short 21
21. Stalked glandular hairs common on pedicels ..... 58. *S. torvum*
Stalked glandular hairs not common on pedicels ..... 56. *S. dammerianum*
22. Large solitary hermaphrodite flower with few smaller male flowers above (or absent); fruit large >5 cm long, purple or yellowish, cultivated ..... 59. *S. melongena*
Several flowers fertile, fruit never >3 cm 23
23. Fruit and ovary conspicuously pubescent, yellow, c. 2 cm diam; flowers white; leaves large, rarely <15 cm long, angularly lobed 24
Fruits glabrous, red, rarely 2 cm diam.; flowers mostly lavender or purple; leaves entire or only shallowly lobed 25
24. Plants usually with prickles; most hairs stellate on leaves above; widespread ..... 29. *S. lasiocarpum*
Plants never armed; some or many simple hairs on leaves above; Solomon Islands ..... 30. *S. repandum*
25. Flowers 4-partite ..... 52. *S. tetrandrum*
Flowers 5-partite 26
26. Leaves densely pubescent above and below; peduncles and rhachis rarely >1.5 cm ..... 42. *S. nolense*
Leaves glabrous or sparsely pubescent above; peduncle and rhachis >1.5 cm long 27
27. Leaf margin entire, 9-10 principal lateral veins ..... 34. *S. dallmannianum*
Leaf margin undulate to repand, 4-5 principal lateral veins ..... 47. *S. turraeaefolium*
28. Fruiting and flowering rhachis simple, few flowered 29
Fruiting and flowering rhachis divided, may be congested, few to many flowers 30
29. Leaves mostly paired, entire; stem slightly zigzag; tomentum of minute spidery stellate hairs; seeds to 5 mm diam. ..... 32. *S. anfractum*
Leaves mostly alternate, broadly shallowly lobed; stem straight; tomentum of minute stellate hairs; seeds large to 7 mm diam. ..... 40. *S. leptacanthum*
30. Leaves lanceolate, rarely >3 cm broad ..... 51. *S. peekelii*
Leaves broader lanceolate, mostly >3 cm broad 31
31. Leaves mostly 10 x 4 cm; inflorescence simple or divided, lax, relatively few flowered ..... 54. *S. viridifolium*
Leaves mostly >10 x 4 cm; inflorescence divided, congested with numerous flowers 32
32. Leaves mostly <15 x 6 cm; plants unarmed, fruits 5-6 mm diam. ..... 53. *S. torricellense*
Leaves often >15 x 6 cm; plants with occasional prickles; fruits 6-10 mm diam. ..... 48. *S. dunalianum*
33. Leaves broadly ovate, mostly angularly lobed, large, mostly >10-15 cm long 34
Leaves narrower or smaller, (very large in *S. dunalianum, S. mankiense*) 40
34. Upper leaf hairs simple 35
Upper leaf hairs stellate 36

35. Corolla deeply divided almost to base, lavender; inflorescence a cluster of few flowers; fruit orange with basal lobes and/or nipple like apex; herb or shrub ..... 27. *S. mammosum*

Corolla rotate to pentagonal, large, blue soon fading; inflorescence furcate, many flowered; long pale calyx hairs conspicuous, fruit drab green, globular, fruiting calyx, thickened and collar-like; cultivated tree ..... 60. *S. grandiflorum*

36. Ovary and fruit densely pubescent, flowers stellate, white ..... 29. *S. lasiocarpum*

Ovary and fruit glabrous or nearly so 37

37. Upper leaf hairs with long central ray; aspect leaf purple below, fruit solitary ..... 28. *S. atheniae*

Upper leaf hairs without long central ray, aspect leaf rusty or drab; fruits several 38

38. Leaves broad ovate; aspect drab, somewhat discolorous; ripe fruit yellowish green to over-ripe brown; weedy ..... 58. *S. torvum*

Leaves broad lanceolate, aspect rusty or drab, scarcely discolorous, ripe fruits orange-red; not weedy 39

39. Dried fruits wrinkled, 1-1.5 cm diam. ..... 56. *S. dammerianum*

Dried fruits smooth, 1 cm diam. ..... 57. *S. torvoideum*

40. Tomentum obvious at least below 41

Tomentum sparse and confined to young tips, buds 50

41. Stem prickles hooked or curved 42

Stem prickles straight 44

42. Inflorescence branched, subpaniculate when well developed; berry ovoid; relatively large scrambler ..... 55. *S. schefferi*

Inflorescence simple, cymose; berry globular; shrubs 43

43. Prickles abundant on most parts ..... 44. *S. rivicola*

Prickles sparse, hooked on stem, straight on leaves ..... 38. *S. heteracanthum*

44. Tomentum of mostly glandular hairs, stellate hairs not conspicuous, minute and confined to young leaf tips ... 45

Stellate hairs abundant or sparse, glandular hairs not conspicuous 47

45. Densely pubescent with glandular hairs; leaves often paired or ternate 46

Scattered glandular hairs; stems densely prickly; leaves abundantly prickly above and below; leaves solitary ..... 45. *S. saruwagedensis*

46. Flowers purple ..... 39. *S. infuscatum*

Flowers white; pedicel of lower fruit 6-8 cm long ..... 41. *S. missimense*

47. Tomentum abundant above and below 48

Tomentum sparse on one or both sides of leaf 50

48. Peduncle generally less than 1 cm long; inflorescence 5-25 flowered 49

Peduncle generally present and >1 cm long; aspect drab, not usually intensely rusty, tomentum often sparse above ..... 46. *S. trichostylum*

49. Tomentum intensely rusty ..... 43. *S. papuanum*

Tomentum pale yellowish green ..... 42. *S. nolense*

50. Tomentum dense below, sparse above 51

Tomentum sparse above and below 56

51. Inflorescence from upper internodal position 52

Inflorescence from sub-axillary or mid-internodal position 53

52. Adult leaves >5 cm long, lobes developed; prickles mostly >1 cm long ..... 33. *S. borgmannii*

Adult leaves <5 cm long, entire or lobes obscure; prickles to 5 mm long ..... 36. *S. expedunculatum*

53. Stem densely prickly 54

Stem sparsely prickly 55

54. Leaves often paired ..... 35. *S. denseaculeatum*

Leaves solitary ..... 37. *S. gibbsiae*

55. Inflorescence congested with numerous (>30) flowers; leaves somewhat rugose above ..... 50. *S. mankiense*
Inflorescence lax with fewer (<20) flowers; leaves not rugose above 56
56. Leaves ± solitary; pubescence sparse ..... 40. *S. leptacanthum*
Leaves often paired; pubescence dense below ..... 47. *S. turraeaefolium*
57. Flowering rhachis generally short, simple, few flowered 58
Flowering rhachis generally forked, congested, flowers few to many 62
58. Leaves mostly paired, entire 59
Leaves mostly solitary, broadly, shallowly lobed 60
59. Stems slightly zigzag; prickles sparse, straight; leaves elliptic ..... 32. *S. anfractum*
Stem straight; prickles on stems and leaves common; leaves broad ovate-elliptic ..... 31. *S. abortivum*
60. Prickles sparse on stems; seeds large to 7 x 4 mm ..... 40. *S. leptacanthum*
Prickles abundant on stems and leaves; seeds smaller 61
61. Prickles straight, slender ..... 37. *S. gibbsiae*
Prickles mostly hooked on stems, or curved, stout ..... 44. *S. rivicola*
62. Leaves lanceolate rarely greater than 3 cm broad ..... 51. *S. peekelii*
Leaves broad lanceolate or elliptic, mostly >3 cm wide 63
63. Peduncle and fruiting pedicel relatively long c. 3 cm ..... 34. *S. dallmannianum*
Peduncle short, often divided 64
64. Leaves mostly >15 x 6 cm, sparsely pubescent; flowers often 4-partite ..... 48. *S. dunalianum*
Leaves rarely as large, often drying blackish, glabrous except corolla lobes; flowers 5-partite ..... 49. *S. incanoalabastrum*

Key to subgen. *Lycianthes*

1. Calyx with 3-10 distinct subulate lobes (not umbos) 2
Calyx truncate or very shortly lobed (umbos), without subulate teeth 3
2. Calyx with 10 lobes; flowers 1-6; indumentum of simple and/or branched hairs; berry red ..... 4. *S. biflorum*
Calyx with 3-5 lobes; flowers 4-40; indumentum of abundant branched hairs; berry black ..... 5. *S. bitterianum*
3. Indumentum with branched hairs, sometimes sparse 4
Indumentum of simple, acute or minute crisped hairs or glabrous, hairs often sparse and only on young tips, (lens usually necessary) 5
4. Leaves densely pubescent, relatively small, 3-5 cm long; flowers solitary ..... 9. *S. dendropilosum*
Leaves sparsely pubescent (hairs mostly on stems) generally larger, >5 cm long; flowers several (4-?10) ..... 8. *S. cladotrichotum*
5. Second or minor leaf usually well developed, mostly >4 cm long 6
Second or minor leaf usually smaller (<4 cm long), sometimes minute (few mm) or absent 8
6. Flowers few (<10) per axil; shrub or small tree, Solomon Islands ..... 20. *S. vitiense*
Flowers numerous (>10) per axil; scrambler or climbers 7
7. Plant virtually glabrous, minutely pubescent with brownish crisped hairs on young tips ..... 15. *S. oliverianum*
Plant densely pubescent on younger parts ..... 11. *S. kaernbachii*
8. Minor leaf mostly >2 cm long 9
Minor leaf usually <2 cm long, may be minute or absent 13
9. Flowers (2-) 6-12 (-19); fruits ?blue 10
Flowers few (±1-6); fruits red 11
10. Almost glabrous or with short erect hairs; large ± falcate leaves, minor leaf ± orbicular ..... 10. *S. impar*
Sparse pubescence of minute, crisped, brownish hairs, large elliptic leaves, minor leaves elliptic ..... 12. *S. memecylonoides*

11. Fruiting pedicels >2 cm long; indumentum of simple, acute, appressed, long hairs, leaves ± coriaceous ..... 13. *S. moszkowskii*

Fruiting pedicels <2 cm long 12

12. Indumentum of minute, brownish ± crisped hairs; leaves ± membranous; flowers several ..... 7. *S. belense*

Indumentum of dense, short ± erect curved hairs; leafy plant with numerous short internodes; leaves often in threes; flowers usually 1 ..... 14. *S. multifolium*

13. Minor leaf absent; flowers 4-partite ..... 6. *S. bambusarum*

Minor leaf present 2-10 mm long or diam.; flowers 5-partite 14

14. Minor leaf broad ovate to orbicular 15

Minor leaf trowel shaped (angular-ovate) 17

15. Flowers several (>7) ..... 16. *S. peranomalum*

Flowers few (1-5) 16

16. Wholly glabrous, calyx with umbos, minor leaf to 18 mm long ..... 21. *S. wollastonii*

Indumentum of long, simple, antrorse hairs; minor leaf 4-8 mm long ..... 18. *S. rostellatum*

17. Flowers 1-2; fruiting pedicel 1.5 (-2.5 cm) long; of simple long antrorse hairs on pustulate base ..... 17. *S. pustulatum*

Flowers 3-4 (-10); fruiting pedicel short <1 cm; indumentum of minute brownish crisped hairs; bud with 4 umbos ..... 19. *S. umbonatum*

Sect. 1 (subgen. *Solanum)* **Solanum** L., Sp. Pl. (1753) 184-188.

Annuals, herbaceous perennials or soft-wooded short-lived *shrubs.* Unarmed, pubescent with simple or glandular hairs. *Leaves* simple margin entire or lobed. *Inflorescence* a condensed or subumbellate cyme of generally small, stellate flowers, white or tinged lavender or purple in colour. *Filaments* and *style* usually pubescent; *anthers* oblong, opening by pores which may develop into short slits. *Berry* succulent, green, yellow, reddish or purple-black in colour; stone cell masses may be present. Diploid, tetraploid and hexaploid species occur, base chromosome number is n = 12.

The section is undoubtedly cosmopolitan in its distribution (except boreal, alpine or aquatic habitats); however, it has been further spread by man and weedy aliens now occur on all continents. The principal centre of speciation is South America. Many species have been described and the problems of nomenclature and synonymy are considerable.

Two species occur in New Guinea both of which occur elsewhere.

1. **Solanum americanum** Mill., Gard. Dict., 8 edn (1768) Art. Solanum No. 5.

Type citation: "Cultivated Chelsea Physic Garden, and said to have been introduced from Virginia, North America."

Type material: Lectotype BM! (photo ADW), Miller s.n. proposed by Edmonds (1971)

Derivation: the original material was believed to have come from America.

Solanum nodiflorum Jacq., Coll. Bot. 2 (1789) 288, Icon. Pl. rar. 2 (1789) t. 326.

Type citation: not seen.

Type material: BM!, photo ADW.

Derivation: The inflorescences arise on or close to the nodes of the type specimen.

Solanum microtatanthum Bitter, Bot. Jahrb. Syst. 55 (1919) 63.

Type citation: "Nordöstl. Neu-Guinea: Auf frisch gebrannten Flächen unweit Kelil, etwa 180 m ü.M. (R. Schlechter n. 16407!—bluhend und fruchtend im August)."

Type material: Holotype ?B (destroyed,) isotypes GH!, K 2 sheets! and photos ADW.

Derivation: the name refers to the very small anthers of the type collection.

Fig. 1. *S. americanum* Mill. Drawn from field grown plant (ADW 40796).

A short lived perennial or *herb* to 1.25 m tall, erect or widespreading, finally straggly with age, unarmed, general aspect bright or dark green or stems and leaves flushed with purple, glabrous or with sparse indumentum of curved, simple hairs; stems may be angled or narrowly winged with lines of tissue carried down from the base of the petioles; the wings may be smooth or with short soft teeth. *Leaves* varying greatly in size (vigorous young plants may have leaves 10-12 x 7 cm on petioles 6-9 cm long, later leaves more commonly c.6 x 3 cm, second year growth may be quite small and only 2 x 1 cm), lamina ovate or ovate-lanceolate, entire or with up to 8 short, blunt, rounded lobes on each margin, sinus shallow and rounded, leaf apex acute to acuminate, base truncate to cuneate and continued as a narrow wing along the petiole; petiole 1-4 (-9) cm. *Inflorescence* an umbellate cyme of 4-8 flowers from an extra-axillary position; peduncle 0.8-2.5 cm, slender, erect or ascending, internodes of the peduncle very condensed; pedicels 5-8 mm. *Calyx* 1-2 mm, campanulate at anthesis, the lobes about 1 mm, rounded or bluntly obtuse. *Corolla* 8-9 mm diam., deeply stellate, with basal yellow-green star; the lobes about 1.5 mm wide, white or flushed purple. *Stamens*: filaments c. 1-2 mm, with spreading hairs on the inner side; anthers 1.5-2 mm long, oblong, opening by terminal pores extending to lateral slits. *Ovary* 1 mm diam., globular, glabrous; style 2.5-4 mm long, erect, spreading hairy in the lower half; stigma capitate at about the level of the anther tips, pale green. Fruiting peduncle enlarged up to 4 cm long; pedicels erect or decurved in fruit; calyx somewhat enlarged and the lobes reflexed; *berry* globular, 6-9 mm diam., purplish-black, glossy, readily shed when ripe; sclerotic granules 0-4 (-8), c. 0.5 mm diam. *Seeds* 1-1.5 mm long, mature cleaned seed a light bone colour but often stained and tinged purple, (40-) 50 (-100) per fruit. (Fig. 1; Map 1).

Chromosome number: n = 12 Randell & Symon (1976). Further counts by Randell on New Guinea collections, *Symon 10624*, *10653* and *10665* agree with this.

Note

Solanum americanum (= *S. nodiflorum*) is widely grown and used as a vegetable. Bundles of cut tops are available at local markets. The use of this species as a green vegetable also extends to many Pacific Islands.

The species is now pantropic in its distribution and may at times become weedy, Henty & Pritchard (1973) (*sub S. nigrum*). There is a considerable literature dealing with the species much of which can be traced through the publications of Edmonds (all dates) and Henderson (1974) which have extensive discussion of taxonomic problems.

The species is widely accepted to be a diploid and the several counts on New Guinea collections agree with this. In the absence of ripe fruit it is often difficult to separate *S. opacum* and *S. americanum*.

The name *S. oleraceum* Dun. was used by Schumann & Lauterbach (1901) for specimens from New Guinea. In the absence of the original specimens one cannot be sure whether it was applied to *S. americanum* or to *S. opacum*.

Selected specimens (50 collections seen)

IRIAN JAYA: Vogelkop: *Kostermans 2047*, x.1948, Angi Gita lake shore, 1800 m alt., (BO). Jayapura: *Versteegh BW 12516*, 28.vi.1961, Wiligimaan, 1600 m alt., (A, ADW, L). Snow Mountains: *Brass 11277*, xi.1938, 18 km NE of Lake Habbema 4° 15′, 138° 00′, 2200 m alt., (A, BO, L); *Eyma 4649*, iii.1939, Wissel Lakes, 3° 50′, 136° 15′, (BO, L).

PAPUA NEW GUINEA: Madang: *Sayers NGF 21473*, 19.xi.1964, Moro, 5° 50′, 146° 07′, 1585 m alt., (BM, L, LAE); *Jackson 103*, i.1968, Kaironk Valley, 5° 15′, 144° 30′, 1524 m alt., (LAE). Morobe: *Millar NGF 15825*, 13.viii.1963, Bulldog road Edie Creek 7° 20′, 146° 45′, 2256 m alt., (A, BFC, BISH, BO, BRI, CANB, K, L, LAE, NSW); *Millar NGF 22741*, 7.xi.1966, Mt Kaindi 7° 20′, 146° 43′ 2439m alt., (BRI, L, LAE). Western Highlands: *Vink 16311*, 20.viii.1963, Uinba, Nona-Minj divide, 5° 59′, 144° 37′, 1950 m alt., (A, BISH, K, L, LAE, MO, P); *Walker ANU 903*, 18.xi.1962, Sirunki, 5° 27′, 143° 32′, (L, LAE). Chimbu: *Borgmann s.n.*, 9.ix.1960,

Komanimambulo, 5° 53′, 145° 05′, (LAE). Eastern Highlands: *Wheeler ANU 5730*, iv.1966, Noreikora swamp near Kainantu, 6° 17′, 145° 52′, 1371 m alt., (L, LAE). Central: *Carr 12985*, 6.ix.1935, Boridi, 9° 05′, 147° 38′, 1432 m alt., (BM, CANB, K, L, NY); *Croft NGF 34532*, 13.ix.1973, E slope of Lake Myola, 9° 09′, 147° 43′, 1800 m alt., (A, BRI, CANB, K, L, LAE, NSW). Milne Bay: *Pullen 8005*, 15.viii.1969, between Bonenau & Mt Dayman, 9° 52′, 149° 23′, 1920 m alt., (CANB, L, LAE). New Britain: *Bateson 121*, s.d., Sulka, 4° 28′, 152° 19′, (K); *Dissing 2720*, 24.vii.1962, Rabaul, 4° 12′, 152° 11′, (LAE). Bougainville: *Waterhouse 691B*, 7.iii.1932, Namatoa, 5° 37′ 155° 03′, (K, L); *Womersley NGF 13346*, x.1960, Crown Prince mountains, 6° 15′, 155° 22′, (A, BRI, CANB, LAE).

SOLOMON ISLANDS: Guadalcanal: *Mauriasi BSIP 8109*, 14.ix.1967, Tina river, (K, L, LAE).

2. **Solanum opacum** A. Braun & Bouché, Ind. Sem. Hort. Berol. App. 8 (1853) 18, No. 39.

Type citation: Cultivated at the Berlin Botanical Gardens, the seed communicated by Listemann from New Holland.

Type material: Holotype ?B (not seen, probably destroyed). Neotype: Broad Sound, Sept. 1802, *R. Brown s.n.* (NSW 125341), Henderson (1974) 39.

Derivation: the name refers to the dull or opaque (not shining) appearance of the ripe berry.

Solanum brachypetalum Bitter, Bot. Jahrb. Syst. 55(1917)64.

Type citation: "Nordöstl. Neu Guinea: Ssigaun in Dörfern, 600 m, ü.M. (Lauterbach n. 2360°—blühend und fruchtend im Juni)."

Type material: Holotype ? B (destroyed), duplicates not traced.

Derivation: the name refers to the relatively short petals.

A sprawling annual *herb* to 1 m across, pubescent with appressed simple hairs, and minute, almost sessile, glandular hairs below these, internodes relatively long giving plant a 'stemmy' open appearance. *Leaves* on vigorous growth ovate-lanceolate, to 6 x 5 cm, commonly 3-5 x 1-2 cm, decurrent down petiole 1-4 cm, lobes almost always present, from 2-10 per leaf, only in extreme cases are short lobes cut more deeply than about 1/5 of width of leaf. *Inflorescence* a very short raceme or subumbel of 2-5 white flowers; peduncle relatively long and slender, 1.5-2 cm long, sometimes divided, rhachis of inflorescence 2-3 mm long; pedicels 7-10 mm long. *Calyx* 2-3 mm long. *Corolla* c. 1 cm diam., stellate. *Stamens*: filaments 1.5 mm long, pilose below; anthers 2 mm long, oblong, pale yellow. *Ovary* 1 mm diam. globular; *style* pilose below; stigma projecting just above anther pores. Mature *fruit* 6 mm diam. 1-5 per truss, green, close to R.H.S. Willow green 000862/1, readily deciduous with pedicel, aromatic, (25-) 45 (-60) seeds per fruit; sclerotic stone cells 1-4, 0.75 mm diam. *Seeds* c. 2 mm long, mature cleaned seed pale bone colour with faint green tinge. (Fig. 2; Map 14).

Chromosome number: n = 36, P. Sharp unpublished from *Symon 10628, 10639.*

Notes

In the absence of any type material, the name *S. brachypetalum* is tentatively placed in synonymy here. In his original description Bitter refers to the short stature of the plant (20 cm), the peduncle simple or furcate with rhachis of 3-4 mm, and the presence of two sclerotic granules, all of which tend to distinguish the species from *S. americanum.* The New Guinea collections of this species seem consistently smaller in fruit than the Australian examples. *Solanum opacum* is generally found at higher altitude, from 1189 m to 2774 m with the mean of 16 collections being 2090 m alt.

Selected specimens (25 collections seen)

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: West Sepik: *Henty et al. NGF 41506*, 14.x.1968 Oksapmin, 5° 20′, 142° 15′, 1675 m alt., (L, LAE). East Sepik: *Bowers 257*, 1968, Upper Karawari river, 4° 23′, 143° 23′, (LAE). Madang: *Bulmer 11*,

Fig. 2. *S. opacum* A. Braun & Bouché. Drawn from live plant, *Symon s.n.* (ADW 40795).

30.x.1963, North Kaironk, valley 5° 13′, 144° 23′, 1951 m alt., (LAE). Morobe: *Streimann & Kairo NGF 44518*, 25.xi.1970, Otetei village, 7° 12′ 146° 14′ 1676 m alt., (A, BO, K, LAE); *Symon 10639*, 30.v.1977, Mt Kaindi, (ADW, LAE). Western Highlands: *Symon 13878 & Kerenga*, 13.vi.1984, Mur Mur Pass near Tomba Pass, (ADW, L, LAE, OXF); *Hoogland & Pullen 6014*, 27.viii.1956, Tomba village, 5° 50′, 144° 01′, 2650 m alt., (A, BM, L, LAE, US). Eastern Highlands: *Coode & Katik NGF 32920*, 12.ix.1968, Kagoba, 6° 05′, 143° 45′ 2743 m alt., (L, LAE); *Hoogland & Schodde 7444*, 16.viii.1960, Yabobos grassland upper Lagaip river, 5° 30′, 143° 30′, 2591 m alt., (A, BM, L, LAE). Southern Highlands: *Vandenburg et al NGF 40062*, 21.ix.1962, Kagoba campsite, Hagen-Mendi road, 6° 05′, 143° 50′, 2743 m alt., (A, K, L, LAE). Central: *Croft LAE 61910*, 22.vii.1964, E side Lake Myola, 9° 10′, 147° 45′, 2000 m alt., (A, BISH, K, L, LAE). Milne Bay: *Brass 22934*, 15.vi.1953, N slope Mt Dayman, 9° 50′, 149° 17′, 2030 m alt., (A, L, LAE).

Sect. 2 (subgen. *Solanum)* **Leiodendra** Dunal, Solan. syn. (1816) 20.

Lectotype species: *S. nudum* Dunal.

Shrubs and small *trees*, unarmed, pubescent with simple or branched hairs, generally glabrescent. *Leaves* simple, mostly entire. *Inflorescence* condensed fascicle or cincinnus in a subaxillary position. *Corolla* stellate, often white flowers. *Anthers* are oblong, opening by terminal pores. Berry succulent, orange-red or black in colour.

The species of this section are concentrated in Central and South America. Three species are known to occur in Asia and Australia, i.e. *S. callium* White ex Henderson, in Australia, *S. spirale* Roxb. in north east India and *S. superficiens* Adelb. in Java. It is likely that these are all early introductions from America, and *S. spirale* has now been found to be conspecific with *S. antillarum* O.E. Schulz from Central America.

A single species occurs in New Guinea and to date has only been found in the immediate vicinity of Bulolo.

*3. **S. aff. antillarum** O.E. Schultz in Urb., Symb. Antill. 6 (1909) 164-166.

Type citation: not seen.

Type material: D'Arcy (1973) gives Cuba, *Eggers 5039* (P); Cuba, *Wright 388* (P); Grenada, *Eggers 6072* (MPU, P). Not seen.

Derivation: the name refers to the islands of the West Indies on several of which the species grows.

Woody *shrub*, 2 (-4) m tall, unarmed, glabrous except for sparse, minute, scabridulous, antrorse, simple hairs on young stems, visible only under a lens. *Leaves* often geminate or ternate, larger leaf to 10 x 5 cm, broadly elliptic, entire, apex acute, base cuneate; *petiole* c. 5 mm long; second leaf 3-4 x 2-2.5 cm, obovate, apex rounded; petiole 2-3 mm long; third leaf c. 1-1.5 cm long, broad ovate, apex rounded, petiole 1-2 mm long. *Inflorescence* a condensed simple cyme of 10-12 flowers opposite the leafy node; peduncle 0-5 mm long, floral rhachis c. 1 cm long; pedicel c. 7 mm long. *Calyx* 2 mm long, including the broadly triangular lobe 1 mm. *Corolla* c. 9 mm diam. deeply divided, lobes 4-5 mm long, broad elliptic, pale lavender. *Stamens*: filaments 1 mm long, *anthers* 2.5 mm long, stout, oblong, apical pores introrse. *Ovary* 0.75 mm diam.; style 4 mm long, the terminal 1 mm bent at an angle; stigma small, capitate. Fruiting cluster of 2-5 berries, peduncle and rhachis not much enlarged, pedicel 10-12 mm long slender, calyx little enlarged; *berry* 10-13 mm diam., orange-yellow. *Seeds* 3 mm long, subreniform, pale brown. *Seedling*: cotyledons 16 x 7-8 mm oblong, apex acute, base cuneate; petiole 5-6 mm long. First leaf 15-20 x 15-18 mm broad ovate, apex rounded. Hypocotyl and first node with minute, retrorse-erect simple hairs. (Fig. 3; Map 4).

Note

This species which clearly belongs to sect. *Leiodendra* was reputedly introduced to Bulolo as an ornamental and has now become established about the area. The inadequacy of compre

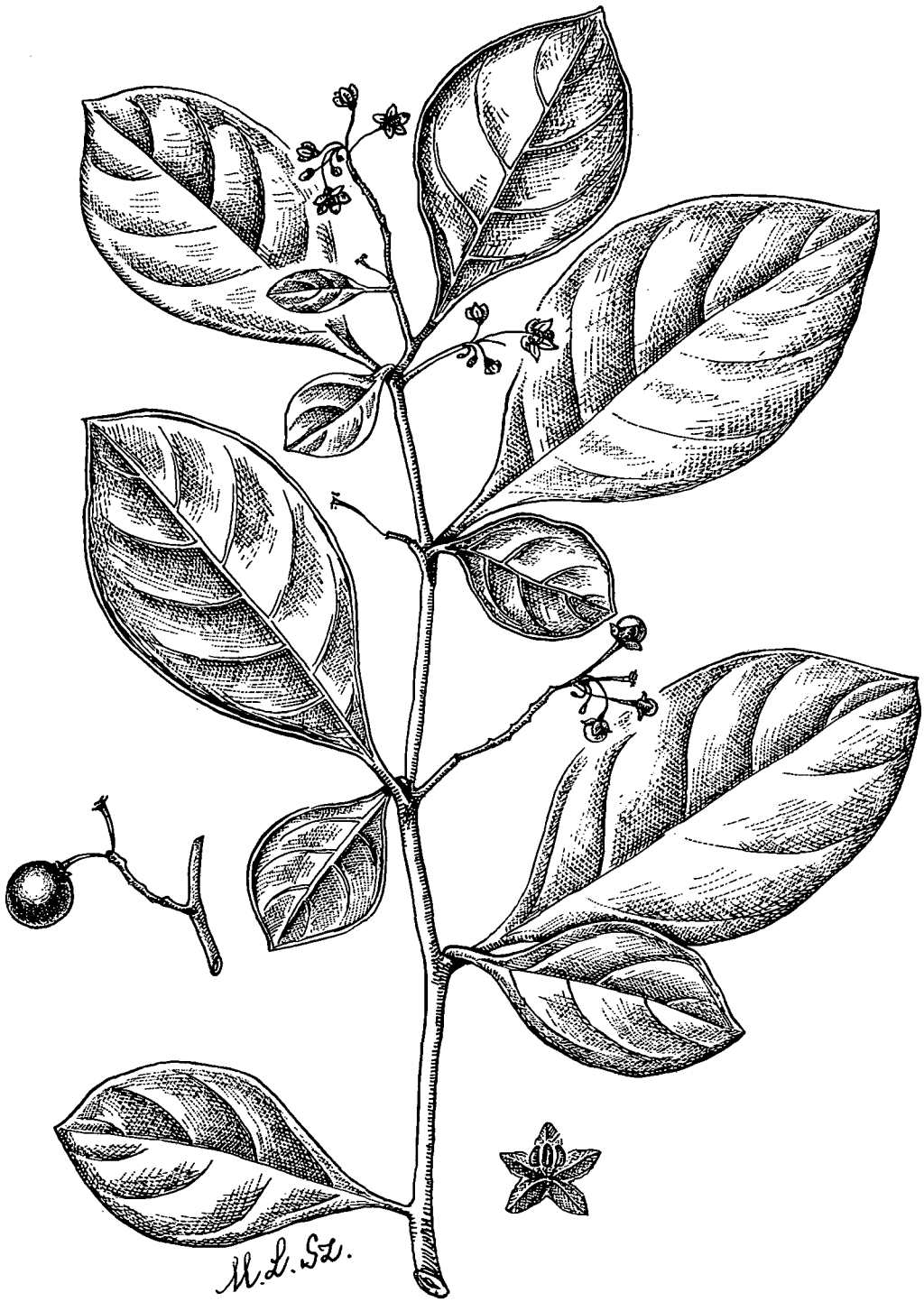

Fig. 3. *S. aff. antillarum* O.E. Schultz. Drawn from herbarium specimen, *Symon 13819* (ADW).

hensive accounts of *Solanum* in South America where there are still unnamed species makes the identification of alien weedy material difficult.

The New Guinea material seems most closely related to *S. antillarum*, but the leaves are scarcely as large or as acuminate as D'Arcy describes there and lack tufts of hairs in the leaf axils below. However, the species occurs on many Antillean islands and some variation can be expected.

Specimens seen

IRIAN JAYA: none seen.

PAPUA NEW GUINEA: Morobe: *Kairo 292*, 20.v.1980, Bulolo, pine plantation, 200 m alt., (CBG, L, BFC, LAE, A, K); *Symon 13819*, 27.v.1984, about Bulolo Forestry College, (ADW, L, LAE, MO).

Sect. 3 (subgen. *Lycianthes* (Dunal) Bitter) **Asiomelanesia** (Bitter) Symon, stat. nov.

Lycianthes sect. *Asiomelanesia* Bitter, Abh. Naturwiss. Vereine Bremen 24 (1919) 460. *Basionym.*

Type species: *Solanum biflorum* Lour.

Herbs or soft wooded *shrubs*, pubescent with simple or branched hairs or glabrescent, unarmed. *Leaves* simple, entire, often geminate. *Inflorescence* of pedicellate flowers from an axillary pulvinous. *Calyx* with 0-5-10 subulate teeth often from below the truncate rim. *Corolla* deeply divided, white or lavender. *Anthers* oblong with apical pores. *Berry* succulent, orange, red or black.

A complex of species centred in South-East Asia (India, China, Philippines, Indonesia to New Guinea) not extending to Australia or the Pacific. They are taxonomically difficult and one species *S. biflorum* Lour. is widespread in the area and occurs in New Guinea. The second species is newly described here and is endemic.

4. **Solanum biflorum** Lour., Fl. cochinch. 1 (1790) 129.

Type citation: "Habitat in Cochinchina and China".

Type material: ? BM, ? P (not seen).

Derivation: the name refers to the common occurrence of two flowers at each node.

Lycianthes biflora (Lour.) Bitter, Abh. Naturwiss. Vereine Bremen 24 (1920) 461.

Solanum decemdentatum Roxb., Hort. bengal (1814) 16, nom. nud.; Fl. ind. edn 1832, 1 (1832) 565.

Type citation: "China, Mr Kerr 1803".

Type material: not seen.

A *herb* or *subshrub* (0.2-) 1-1.5 m tall, woody towards base, unarmed, variable indumentum of simple (uniseriate, multicellular) and dendritic hairs, concentrated on twigs and on leaf veins below, at times sparsely pubescent with simple hairs on leaf surface and dendritic hairs on twigs. *Leaves* often paired, lamina minor leaf smaller and about half the length of larger, major leaf lamina (15.5-) 9.5 (-6) x (7-) 4 (-3) cm, ovate to ovate-lanceolate, base cuneate or tapering to petiole, often oblique, apex acuminate *petiole* 1-2 cm long; minor leaf (6-) 4.5 (-3.5) x (3.5-) 3 (-2) cm, ovate-acuminate, *petiole* 3-5 mm long. *Inflorescence* (1-) 2-4 (-6) pedicellate flowers from area of leaf axil or stem fork, peduncle or pulvinous generally absent; pedicel c. 5-7 mm long. *Calyx* tube c. 2.5 mm long, c. 10 ribbed, lobes resembling linear teeth 1-3 mm long. *Corolla* c. 7-8 mm long, lobes deeply divided, elliptic, to 3.5 mm wide, interacuminal membrane narrow, relatively thick and fleshy, white to pale mauve, glabrous. *Stamens*: filaments 1-1.5 mm long; anthers 2.5-3 mm long, lanceolate-oblong, pores apical, introrse. *Ovary* c. 1.5 mm long, ovate, glabrous; style 4-5 mm long, straight, erect; stigma capitate. *Berry* c. 6-8 mm diam., succulent, red, readily shed with pedicel when ripe,

Fig. 4. *S. biflorum* Lour. Drawn from herbarium specimen, *Symon 10652 & Kairo* (ADW)

pedicel c. 1.5 cm long. *Seeds* 1.5-2 mm long, irregularly triangular, flattened, pale yellow, eight fruits counted from *Symon 10652* gave a mean of 120 seeds. Seedling hypocotyl pubescent with long simple hairs, cotyledons 5 x 4 mm ovate acute, petiole 1.5-2 mm long; first leaf broad ovate 8-10 x 7-8 mm, pubescent with erect simple hairs, no dendritic hairs seen. (Fig. 4; Map 17).

Chromosome number: n=24 counted by P. Sharp from *Symon 10652*.

Note

The *S. biflorum* complex is geographically widespread reaching Japan, China, India, Sri Lanka, Malesia, Philippines and New Guinea. It has not been found in Australia nor in the principal Pacific Islands. A great many taxa have been described cf. Bitter (1920) 461-468, Deb (1980) 33-54 and Wu et Huang (1978) 78, reflecting both a genuine variability and the diverse political units from which they have been named. About 80 names have been published to date. The subweedy nature of some taxa, frequently found in disturbed sites, also contributes to the difficulties. Unfortunately the collections from many of the island areas are inadequate in number and data content.

S. biflorum differs from *S. bitterianum* in having 10 rather than 5 calyx teeth, sparser pubescence with fewer dendritic hairs, red rather than black fruit and fewer flowers per axil.

In New Guinea it is a plant of moderate altitudes ranging from sea level to 1219 m with a mean 709 m alt. from 21 collections.

Specimens seen

IRIAN JAYA: Vogelkop: *Moll BW 9529*, 7.ix.1959, Andjai, 0° 46′, 132° 06′, 600 m alt., (L, LAE). Geelvink Bay: *Schram BW 10645*, 24.ii.1962, Wondiwoi mountains, 3° 00′, 134° 40′, 300 m alt., (ADW, BISH, L); *Schram BW 10744*, 28.ii.1962, Wondiwoi mountains, 3° 00′, 134° 40′, 300 m alt., (ADW, L, LAE); *Atastrip 24 s.n.*, s.d., North New Guinea, (L).

PAPUA NEW GUINEA: West Sepik: *Wiakabu & Mamalai LAE 70476*, 9.ix.1977, near Daunda Bridge, Bewani highway, 2° 44′, 141° 16′, 120 m alt., (BISH, LAE). Madang: *Henty & Coode NGF 29203*, s.d., Kassam Pass, (CANB, K, L, LAE); *Schlechter 17305*, 19.ii.1908, Djamu, 5° 29′, 145° 50′, 700 m alt., (P, UC). Morobe: *Floyd NGF 7459*, 9.vi.1955, Bulolo Valley, 7° 10′, 146° 30′, 1067 m alt., (A, BFC, BM, BO, BRI, CANB, K, L, LAE, MEL, NSW, US); *Floyd NGF 7509*, 15.vi.1955, Bulolo, 7° 11′, 146° 39′, 1067 m alt., (A, BFC, BISH, BRI, BM, BO, CANB, K, L, LAE, NSW); *Kairo & Streimann NGF 27869*, 10.viii.1966, Middle logging area Bulolo, 7° 10′, 146° 40′, 854 m alt., (A, BO, BRI, CANB, K, L, LAE); *Kairo & Symon 10652*, 1.vi.1977, Stoney Creek, base of Mt Missim, (ADW, BRI, K, LAE); *Millar NGF 11795*, 3.ii.1960, Oomsis Creek, 6° 45′, 146° 45′ 152 m alt., (A, BO, BRI, CANB, K, L, LAE); *Rau 380*, 15.vii.1978, Finschhafen, 6° 35′, 147° 50′, 300 m alt., (BFC); *Streimann & Kairo NGF 25853*, 15.iii.1971, Hump logging area 5 miles SE of Bulolo, 7° 11′, 146° 42′, 1067 m alt., (A, BFC, BISH, BO, CANB, K, L, LAE); *Symon 10634*, 29.v.1977, Bulolo 7° 11′, 146° 39′, (ADW); *Symon 10664 & Katik*, 16.vi.1977, Upper Sankwept, 6° 30′, 147° 00′, (ADW); *Wells 7569*, i.1957, Plantation area? Bulolo, 7° 10′, 146° 40′, 914 m alt., (A, BFC, BO, BRI, CANB, K, L, LAE, NSW). Central: *Carr 14991*, 16.xi.1923, Boridi, 9° 05′, 147° 38′ 914 m alt., (A, BM, CANB, K, L, NY); *Carr 15965*, 5.iii.1936, Isuarava, 8° 59′, 147° 43′, 1067 m alt., (BM, L); *Forbes 882*, 10.iv.1886, Sogeri, 9° 28′, 147° 31′, (BM, L, MEL, P); *Foreman & Vinas LAE 60242*, 1.x.1973, below Boridi village, 9° 05′147° 38′, 920 m alt., (A, CANB, L, LAE); *Isles & Vinas NGF 33899*, 16.ix.1973, NE Nanumu village, 9° 05′, 147° 34′, 450 m alt., (BRI, CANB, L, LAE). Milne Bay: *Brass 23978*, 12.viii.1953, Biniguni camp Gwariu river, 9° 46′, 149° 53′, 200 m alt., (A, LAE); New Britain: *Parkinson s.n.*, 1901, New Britain, (NSW); *Schlechter 13748*, xi.1901, Massava, 4° 13′, 151° 50′, (BM, K, P); *Schlechter 13749*, xi.1901, Massava, 4° 13′, 151° 50′, (BM, K); *Stevens & Lelean LAE 58668*, 9.vi.1973, Mengen massif, (A, BRI, CANB, K, L, LAE); *Warburg 21250*, 1889, Bismarck Archipelago, (BM).

5. **Solanum bitterianum** Symon, sp. nov.

Herba magna aut suffrutex ad 2 m. *Inermis*, pilis minutis subfuscis dendriticis dense undique. *Folia* geminata inaequalia usque ad 12 x 7 cm ovata integra acuminata; petiolus 2-3 cm. *Inflorescentia* cymosa multis floribus (ad 50); pedunculus ad 5 mm longus condensatus furcatus; pedicellus circa 1 cm; *calyx* ad 1.5-2 mm longus, cupulatus, 5 dentibus 0.5-1.5mm longis sub margine. *Corolla* circa 1.5 cm diam. late stellata alba aut violacea glabra; filamenta circa 1 mm longa; antherae 2.5 mm longae late ellipticae sulphureae; *ovarium* circa 1 cm diam. glabrum; stylus circa 4 mm longus. Fructus fasciculatus 12-15 baccis. *Bacca* 5-6 mm diam. depressa globularis purpurea-nigrescens. *Seminia* numerosa 1.5 mm longa.

Fig. 5. *S. bitterianum* Symon. Drawn from herbarium specimen, *Symon 10651* (ADW).

Type citation: *Symon 10651 & Kairo*, 1.v.1977, C.N.G.T. Logging area, Stoney Creek, foot of Mt Missim (near Bulolo).

Lithocarpus/Araucaria forest, subdist. Wau. Dist. Morobe, 1067 m alt. Shrub to 2 m in roadside regrowth, leafy, spreading, soft wooded shrub, flowers stellate, white, fruits black.

Type material: Holotype ADW, isotypes CANB, F, K, L, LAE, MO, US.

Derivation: The name commemorates G. Bitter (1873-1927) eminent German specialist on the Solanaceae.

Large *herb* or soft wooded *shrub* to 2 m, possibly lasting several years, *unarmed*, dense indumentum of minute, brownish, dendritic hairs on all parts, concentrated on veins below making the network conspicuous, twigs and older upper leaf surface glabrescent. *Leaves* geminate, unequal, the larger lamina (10-) 12 (-17) x (4-) 7 (-9) cm, ovate, entire, acuminate, base rounded to broadly cuneate, oblique; petiole 2-3 cm long; smaller leaf similar in shape but about half size. *Inflorescence* cymes in leaf axil bearing numerous (up to 50) flowers; peduncle to 5 mm long, condensed, once or twice furcate, vermiform, pulvinate; pedicel about 1 cm long. *Calyx* 1.5-2 mm long, cupulate, the rim entire but with 5 distinct teeth 0.5-1.5 mm long arising just below the rim and terminating the 5 principal veins. *Corolla* c. 1.5 cm diam., broadly stellate, lobes c. 5 mm long, broadly triangular, divided 1/3-1/2 way to tube, white or pale purple-blue, glabrous. *Stamens*: filaments c. 1 mm long attached high in corolla tube; anthers 2.5 mm long, broad elliptic, pale yellow, pores apical, introrse. *Ovary* c. 1 mm diam., glabrous; style c. 4 mm long, erect; stigma bent, just exceeding anthers. Fruiting cluster with (7-) 12-15 (-24) berries; peduncle about 1 cm long, calyx about 5 mm diam., membranous, shallowly patelliform; *berry* 5-6 mm diam., depressed globular, finally purple-black. *Seeds* numerous, 1.5 mm long, irregularly flattened and rounded triangular in shape, margin slightly thickened, minutely reticulate. Seven fruits counted yielded a mean of 109 seeds from *Symon 10651*. (Fig. 5 & 6; Map 5).

Notes

Although only collected from disturbed sites in the vicinity of Bulolo, and with all the appearance of an introduced plant, I have been unable to match it with any of the S.E. Asian collections. The dense dendritic hairs, numerous flowers and black fruits are distinctive. Of the numerous species and varieties described by Bitter (1920) only *S. denticulatum* Blume is reported to have black fruit and this has 1-5 flowers, usually 10 teeth and mostly simple pubescence. *S. bimense* Miq. from island of Sumbawa is reported to have 6-30 flowers, five teeth and simple pubescence. An isotype of *S. bimense* at GH, *Zollinger 3458* has only 8-11 flowers, short dense erect pubescence, and the calyx lobes are reduced to 5 very short knobs. Unfortunately there is no information on fruit colour, but *S. bimense* would appear to be the most closely related species. Specimens from my collection have been sent to Dr W. D'Arcy at St Louis and Dr A. Hunziker at Cordoba and neither has considered it an American species.

S. bitterianum differs from *S. biflorum* in its more woody nature, the greater abundance of dendritic hairs, the more numerous flowers in each inflorescence, the presence of 5 teeth on the calyx rather than 10, and its black rather than red berry.

Specimens seen

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: Morobe: *Symon 10651 & Kairo*, 1.vi.1977, C.N.G.T. logging area Stoney Creek, foot of Mt Missim, 7° 13′, 146° 49′, 1067 m alt. (type), (ADW, CANB, F, K, L, LAE, MO, US); *Streimann & Kairo NGF 25854*, 15.iii.1971, Hump logging area, 5 miles SE of Bulolo, 7° 07′, 146° 35′, (A, BFC, BISH, BO, BRI, CANB, K, L, LAE); *Wells 7565*, i.1957, Plantation area Bulolo, 7° 10′, 146° 40′, 914 m alt., (A, BFC, BO, BRI, CANB, K, L, LAE).

Fig. 7. Holotype of *S. dendropilosum* Symon (*Hoogland & Schodde 7291*, CANB).

Fig. 6. Holotype of *S. bitterianum* Symon (*Symon 10651*, ADW).

Sect. 4 (subgen. *Lycianthes* (Dunal) Bitter) **Cypellocalyx** Bitter, Bot. Jahrb. Syst. 55 (1917) 91.

Type species: Bitter did not nominate a type which must be selected from amongst the New Guinea species. The widespread species *S. oliverianum* Lauter. & Schumann is here proposed as lectotype and of which four isotypes are known to survive.

Shrubs, small *trees* or *lianes* sometimes epiphytic; indumentum of simple or rarely dendritic hairs, often sparse, or plants glabrescent, unarmed. *Leaves* simple, entire, often geminate, mostly very unequal, petiolate. *Inflorescence* of pedicellate flowers from an axillary pulvinous or short vermiform axis, rarely cauliflorus. *Calyx* truncate or rarely with short umbos. *Corolla* deeply divided. *Anthers* with apical pores. *Style* erect, stigma capitate or shortly bifid. *Berry* succulent or mucilaginous red, green or blue-black.

The species of this section occur in South-East Asia. They extend from New Guinea, which is the centre of speciation, to Sumatra just reaching the Asian mainland in southern Malaya thence to the Philippines and eastwards through the Solomon Islands to Fiji.

6. **Solanum bambusarum** Bitter, Bot. Jahrb. Syst. 55 (1917) 91-93, fig. 1.

Type citation: "Ledermann 12199, NE. New Guinea, Schraderberg im Gebirgswald, 1900 bis 2000 m üM, mit 15-20 m hohen bemoosten Baumen mit viel Epiphyten, *Pandanus* sp., ohne Palmen, mit viel Lichtungen und schmalblättrigen hochkletternden Bambus; Gelände lehmig und nass."

Type material: Holotype ?B destroyed, no duplicates traced, illustrated Bitter l.c. Fig. 1.

Derivation: the name refers to the bamboo like habit.

Lycianthes bambusarum (Bitter) Bitter, Abh. Naturwiss. Vereine Bremen 24 (1920) 503.

(*Description* adapted from Bitter, l.c.).

Shrubby, scandent, 2 m tall, glabrous. *Leaf* lamina (13.5-) 11 (-8) x (2.7-) 2.2 (-1.2) cm, solitary, subcoriaceous, dull green, lanceolate, narrowed on both sides, 8-10 principal lateral veins, base cuneate, oblique, apex long acuminate; *petiole* 5-8 mm long; (minor leaf reported by Bitter to be lacking). *Inflorescence* 1 or 2 flowered, pedicel 8 mm long, gradually thickened to calyx; *calyx* 2 mm long, 2.5 mm diam., cupulate, margin entire; *corolla* 12-13 mm diam., 4-partite, stellate, 4 deeply cut, lobes lanceolate, acute, c. 5 x 1.5 mm. *Stamens* 4; filaments 0.3 mm, relatively short, inserted low on corolla tube, glabrous; anthers c. 5 x 1 mm, lanceolate, pores oblique in apex. *Ovary* c. 2 x 1 mm, glabrous ovate; style 4.5 mm, erect, glabrous; stigma subclavate with decurrent papillae, apex obtusely bilobed. *Berry* not seen. (Fig. 8; Map 4).

Notes

I have not recognised any later collections as belonging to this species. The original description lacks mention of pubescence so this was probably absent or slight for Bitter was meticulous in detail in his descriptions: in his key the species is in a group described as glabrous. Nor does Bitter describe the minor leaf which is sometimes very small or lacking on developed shoots. If present it is likely to have been one of the small trowel shaped forms. If this was so the collection might belong to material I have described as *S. pustulatum* or *S. umbonatum*. However, the first may be discounted due to the presence of simple hairs often on a pustular base, and the second because there are usually 3 or 4 flowers per axil and the buds generally have four short umbos. In addition, the flowers are usually 5-partite rather than 4-partite. In *S. memecylonoides* and *S. cladotrichotum* 4-partite flowers do occur, but these species differ in many other details.

Fig. 8. *S. bambusarum* Bitter. Redrawn from original figure, Bitter (1917) 92, Fig. 1.

7. **Solanum belense** Merrill & Perry, J. Arnold Arb. 30 (1949) 50-51.

Type citation: "Netherlands New Guinea: Bele River, 18 km NE of Lake Habbema, *Brass 11223* (type), Nov. 1938, alt. 2300 m, Fagaceae forest, common in moist semi-shade (small shrub; pedicel and calyx violet, corolla white)".

Type material: Holotype A, isotypes BM, L, photos ADW.

Derivation: the name refers to the Bele River where the type collection was made.

A *shrub* 1-1.5m tall; unarmed; indumentum of antrorse, brownish hairs (simple, uniseriate, multicellular) sparse or dense on young twigs and growth, soon lost, then leaves glabrous above and below. *Leaves* solitary or paired, the major leaf lamina (14-) 12 (-10) x (6.2-) 5 (-3) cm, elliptic, entire with 5-7 principal lateral veins, base cuneate, oblique, apex acute to acuminate; petiole 1-1.5cm long; minor leaf lamina (8.5-) 3 (-1.5) x (3.5-) 2 (-1) cm, rather variable, present or absent, narrow elliptic to broad elliptic, base broadly cuneate to rounded, apex shortly acuminate, petiole 2-5 mm. *Inflorescence* 1 or 2 (5-6 on the type specimen) flowers from leaf axil, none available for dissection. Merrill & Perry state: 'pedicels up to 2 cm long; *calyx* cupular 3 mm long, apex 3 mm diam.; *corolla* tube 5 mm long, lobes 1 cm long, 4 mm broad, hooded at the apex and densely puberulous white; *stamens* inserted at the base of the corolla tube, filaments 1.5-2 mm long, anthers 3 mm long, oblong apex a little narrowed; *ovary* ovoid 1.5 mm long style 7 mm long'. Berries 1 or 2, pedicel 1-1.5 cm long, straight; calyx c. 5-9 mm diam.; *berry* 1-1.2 cm diam. globose, red. *Seeds* 4-5 mm long, somewhat rounded, triangular, relatively thick, minutely shallowly reticulate. (Fig. 9; Map 1).

Notes

Eight collections have come from altitudes of 780 m to 2300 m with a mean of 1432 m. The species has been collected from Fagaceae forest, upper mid-montane rainforest, primary forest, hill forest, lowland rainforest, and does not seem to be a plant of exposed sites. A single record states the flower is purple, three state white and four records give fruit colour as red. The species may be related to *S. moszkowskii* from which it differs in its more membraneous leaves, fewer minor leaves, shorter pedicels (particularly in fruit) smaller berries and different seeds.

Specimens seen

IRIAN JAYA: Snow Mountains:*Brass 11223*, xi. 1938, 18 km NE of Lake Habbema, 4° 15′, 138° 00′ 2300 m alt., (A, BM, L, LAE).

PAPUA NEW GUINEA: West Sepik: *Streimann LAE 52968*, 30.xi.1971, Vanimo, 2° 40′, 141° 15′ 500 m alt., (A, BRI, K, L, LAE); *Vinas & Wiakabu LAE 59477*, s.d., Tamanagabip on track to Busilmin, 4° 52′ 141° 05′, 2300 m alt., (BRI, K, L, LAE). Eastern Highlands: *Brass 32400*, 3.xi.1959, Kassam, 6° 13′ 146° 01′, 1370 m alt., (LAE, US); *Hays 83*, 14.xi.1971, 10 miles SE of Obura, 6° 33′ 146° 00′, 2103 m alt., (LAE); *Henty & Vandenberg NGF 29292*, 23.i.1968, Kassam Pass, 1280 m alt., (BRI, L, LAE); *Henty & Vandenberg NGF 29322*, 24.i.1968, as above, (LAE); *Symon 10667 & Katik*, 21.vi.1977, top of Kassam Pass, 6° 13′, 146° 01′, (ADW, L, LAE). Eastern: *Symon 13865*, 11.vi.1984, Mt Gahavisuka Res. above Goroka, 6° 03′ 145° 24′, (ADW). Milne Bay: *Katik et al. LAE 70928*, 18.iii.1979, Mt Rossel, Rossel Isl. 780 m alt., (BRI, CANB).

8. **Solanum cladotrichotum** Bitter, Bot. Jahrb. Syst. 55 (1917) 96-98, fig. 2.

Type citation: "*Ledermann 12606*, NE New Guinea, Sepikgebiet Felsspitze, 1400-1500 m, blühend und fruchtend im August."

Type collection: Holotype ?B (destroyed), isotype BM!, K!, L!, photos ADW.

The specimen at K is proposed as lectotype as it is the best preserved of those seen.

Derivation: the name refers to the stems bearing hairs, branched trichomes in this case.

Lycianthes cladotricha (Bitter) Bitter, Abh. Naturwiss. Vereine Bremen 24 (1920) 504.

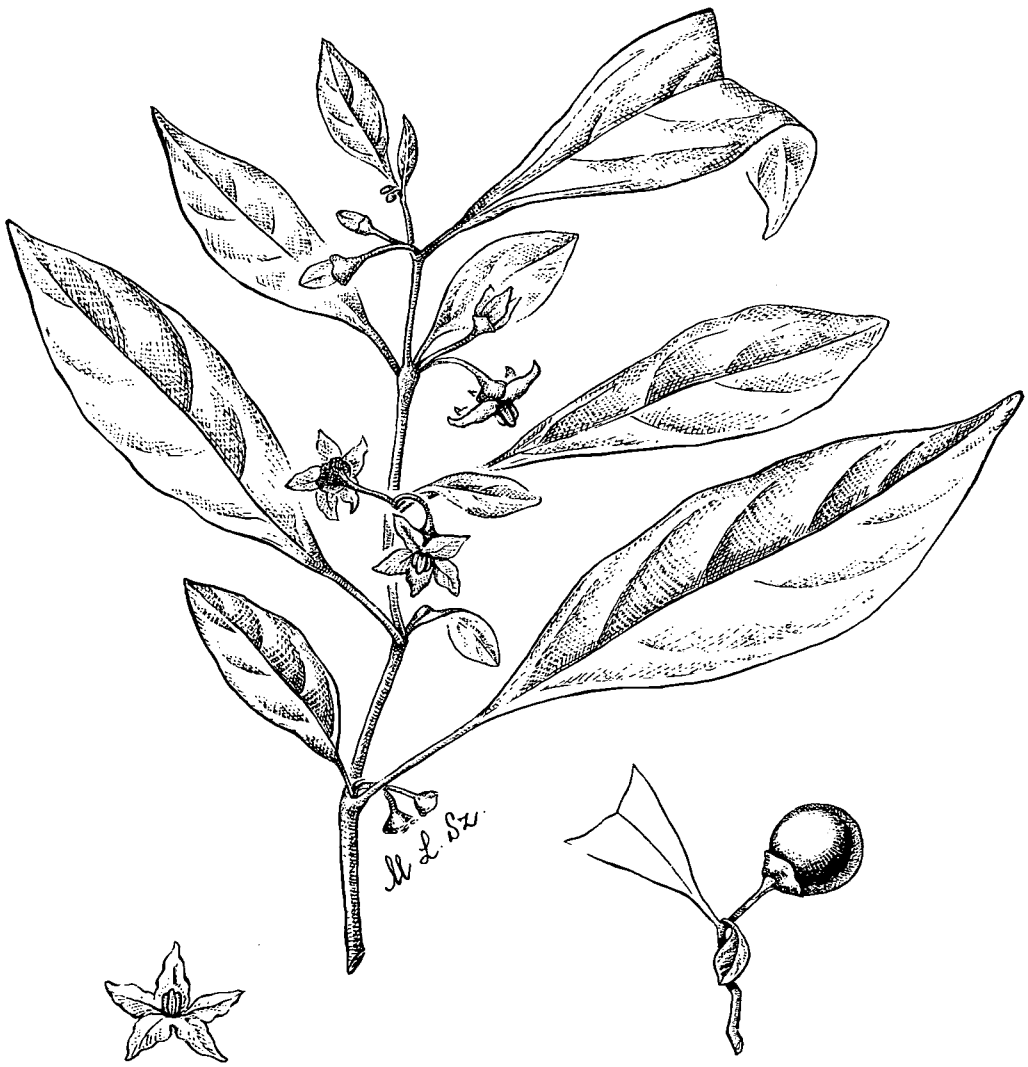

Fig. 9. *S. belense* Merrill & Perry. Drawn from herbarium specimens: flowers from *Hayes 83* (LAE); fruits from *Henty & Vandenberg NGF 29322* (LAE).

Solanum patellicalyx Bitter, Bot. Jahrb. Syst. 55 (1917) 99-101, fig. 3.

Type citation: "*Ledermann 11272* and *11483*, NE New Guinea, 1300 m, blühend und fruchtend im März."

Type collection: ?B destroyed, no duplicates traced, illustration fig. 3, loc. cit. above.

Derivation: the name refers to the plate or saucer-like calyx.

Lycianthes patellicalyx (Bitter) Bitter, Abh. Naturwiss. Vereine Bremen 24 (1920) 504.

A climbing or sprawling *vine* to 4 m high, indumentum of simple and dendritic brownish hairs (simple, uniseriate, multicellular and furcate and dendritic) abundant on young stems, petioles, sparse on leaves above and below, mainly on veins, largely lost on older surfaces. *Leaves* paired, very unequal, minor leaf greatly reduced, larger leaf lamina (14.5-) 11.5 (-6.5) x (6-) 4.5 (-2.5) cm, elliptic, with 6-8 principal lateral veins prominent below, coriaceous, base rounded to broadly cuneate, often oblique, apex acute to acuminate, leaf slightly falcate in some examples; petiole 5-12 mm; minor leaf 7-10 mm diam. sub-reniform to orbicular, apex rounded, base cordate, sessile. *Inflorescence* a cluster of numerous (4-) 8-12 (-20) pedicellate flowers from a pulvinous at leaf axil; pedicel 10-13 mm long, slender, slightly thickened upwards. *Calyx* cupular c. 3 mm deep and 3 mm diam. margin entire. *Corolla*: lobes c. 5 mm long, 1 mm wide, elliptic, thick and relatively fleshy, deeply divided to the calyx rim, apex with inflexed tip, pink or mauve purple. *Stamens*: filaments c. 2 mm long; *anthers* held erect, c. 4 mm long, oblong-elliptic. *Ovary* c. 1 mm long, glabrous; *style* c. 4 mm long, erect. Fruiting material not seen, Bitter l.c. states "fruiting calyx shortly cupuliform, nearly plate-like c. 6 mm diam. thickly coriaceous, densely verrucose outside; *berry* globose c. 6 mm diam. pale brown, probably becoming succulent" and for *L. patellicalyx* Bitter l.c. states "fleshy blue-violet, *seeds* moderately numerous, oblique-reniform, in dry state pale brown about 1.5 x 1 x 0.3 mm." (Fig. 10; Map 3).

Notes

This species is from moderate altitudes, the lowest 400 m, the highest 2800 m, and the mean of seven records 1240 m alt. It has been collected from forest edge, secondary forest, climber on tree boles, scrubby undergrowth of partly felled rainforest, and the lowland rainforest. The flower buds are cream or white before opening and the flowers are described as pink to deep lilac. Unfortunately there are no fruits on recent collections nor any comment on them. The dendritic hairs make this a distinctive species and it is readily separated from *S. dendropilosum* by its larger leaves and more numerous flowers. Bitter published the two names at the same time, but I am unable to see substantial differences between them. His illustrations of *S. patellicalyx* show a plant with broader leaves than *S. cladotrichotum*, but the differences between them are readily covered in the range of specimens now available.

Specimens seen

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: Eastern Highlands: *Brass 30845*, 6.viii.1959, S slopes Mt Otto, 5° 58′, 145° 29′, (CANB, K, L, LAE, US); *Cruttwell 1871*, 23.viii.1977, Mt Gahavisuka above Goroka, 6° 04′145° 23′, 2300 m alt., (LAE); *Cruttwell 1878*, 27.xii.1977, as above, (LAE); *Symon 10676 & Katik*, 22.vi.1977, top of Daulo Pass, (ADW, CANB, K, L, LAE, MO, US); *Symon 13866*, 11.vi.1984, Mt Gahavisuka above Goroka, 6° 03′, 145° 24′, (ADW, LAE). West Sepik: *Ledermann 12606*, s.d., Sepikgebiet (Sepiktrig) 5° 09′ 141° 23′, (BM, K, L). Central: *Carr 15946*, 4.iii.1936, Isuarava, 8° 59′, 147° 43′, 1067 m alt., (BM, CANB, K, L, P); *Carr 16109*, 15.iii.1936, as above, (BM, CANB, K, L). Northern: *Hoogland 3979*, 23.ix.1953, near Pitoki, 8° 55′, 147° 44′ 400 m alt., (A, CANB, LAE); *Millar NGF 23549*, 28.vii.1964, Kokoda, 8° 50′, 147° 45′ 365 m alt., (BO, CANB, L, LAE). Milne Bay: *Streimann & Katik NGF 34091*, 25.vii.1972, junction Ugat & Mayu rivers near Mayu island, 9° 37′, 149° 10′, 400 m alt., (A, BISH,BO, BRI, K, L, LAE, NSW, US).

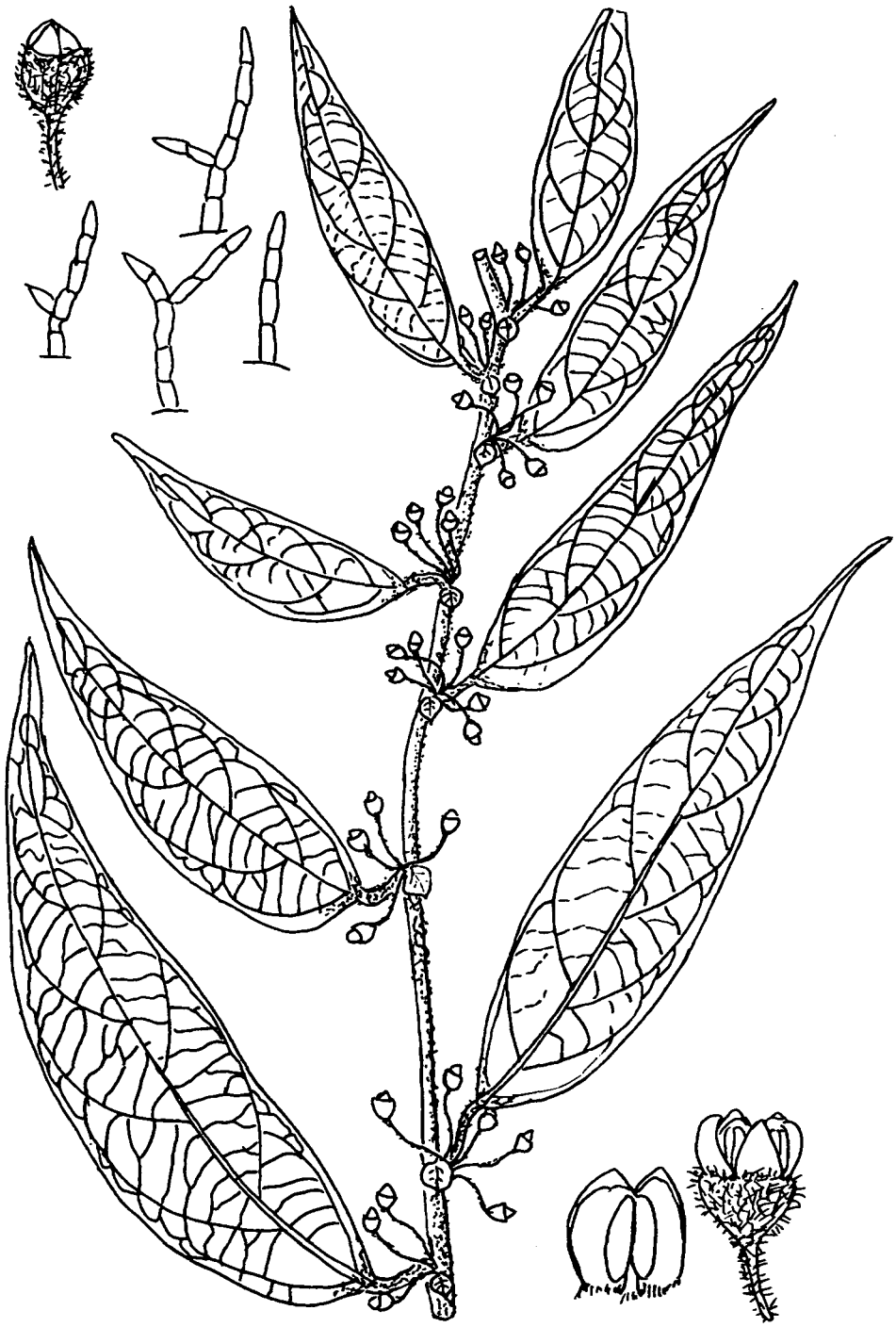

Fig. 10. *S. cladotrichotum* Bitter. Redrawn from original figure, Bitter (1917) 97, Fig. 3.

9. **Solanum dendropilosum** Symon sp. nov.

Frutex effusus aut scandens, internodiis circa 1.5 cm longis. Inermis, pilis densis dendriticis. *Folia* geminata inaequalia; maius ad 4 x 2 cm ellipticum integrum breviter acuminatum, petiolo circa 5-7 mm longo; minor subsessile suborbiculum circa 7 mm diam. apice rotundo aut acuto. *Flos* solitarius axillaris; pedicellus circa 1-1.5 cm; *calyx* 2 mm longus cupulatus integer undique dense pubescens; *corolla* circa 7-8 mm longa stellata dense pubescens lilacina; antherae 6 mm longae attenuatae; *ovarium* 3 mm longum, ovatum; stylus erectus; stigma bilobum. *Bacca* non visa.

Type citation: *Hoogland & Schodde 7291*, 2.viii.1960, near Kepilam village, Lagaip Valley, Laiagam, Western Highlands, on limestone rocks near village, 8000′ (2439 m), straggly shrub, flowers mauve with yellow stamens, local name Tannabugihm.

Type material: Holotype CANB!, isotypes BM!, BRI!, L!, LAE!, US!

Derivation: the name refers to the prominent branched tree-like hairs on this species.

Straggly *shrub* or *climber*, height or length unknown, internodes about 1.5 cm long, unarmed, dense indumentum on all parts of complex dendritic hairs with well developed stipe, older leaves and stems glabrescent but tomentum remaining dense below. *Leaves* paired, unequal, the major lamina (2.5-) 4 (-5) x (1.3-) 2 (-2.5) cm elliptic, entire or margin broadly sub-crenate or shallowly angularly repand, and recurved (in the dry state), shortly acuminate, midvein and principal lateral veins impressed above, conspicuous below; petiole about 5-7 mm, relatively thick; minor leaves sub-orbicular to broadly cordate (3-) 7 (-10) mm diam., apex rounded or acute, sessile or nearly so. *Inflorescence* a solitary flower from leaf axil, peduncle not seen, pedicel 1-1.5 cm long. *Calyx* 2 mm long, cupular, entire, all densely pubescent. *Corolla* 7-8 mm long, stellate, deeply divided at least to calyx rim, densely pubescent outside, mauve. *Stamens*: filaments short; anthers about 6 mm long, attenuate, pores apical, extrorse. *Ovary* 3 mm long, ovoid, style erect, stigma bilobed, just exceeding anther tips. *Fruit* not seen. (Figs 7 & 11; Map 17).

Notes

Only few collections of this new species have been seen, all from high altitudes. The dense dendritic pubescence and relatively small leaves make this a distinctive species. It is possible that the *Symon 10691 & Katik* specimen belongs here but the leaves are larger, more membranous with a long acuminate tip;it may be a shade form. It is also from a high altitude though this was not recorded at the time.

Specimens seen

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: Western Highlands: *Cruttwell & Reeve 1861*, 7.vi.1977, near Laiagam, 5° 30′, 143° 30′, 2700 m alt., (LAE); *Hoogland & Schodde 7291*, 2.viii.1960, near Kepilam village Lagaip valley, 5° 16′, 143° 01′, 2439 m alt. (type), (BM, BRI, CANB, L, LAE, US). Southern Highlands: *Robbins 3216*, 6.viii.1960, near Limbo river, Yobobus grassland, 5° 41′ 143° 38′, 2652 m alt., (CANB); *Symon 10691 & Katik*, 24.vi.1977, between Nol and Mendi, 6° 09′ 143° 40′, (ADW).

10. **Solanum impar** Warb., Bot. Jahrb. Syst. 13 (1891) 415-416.

Type citation: "*Warburg 21244*, s.d., Holl. Neu-Guinea, Sigar".

Sigar = Sekar in Macluer Gulf

Type material: Holotype ?B destroyed, no duplicates traced.

Derivation: the name refers to the strikingly unequal major and minor leaves.

Lycianthes impar (Warb.) Bitter, Abh. Naturwiss. Vereine Bremen 24 (1920) 504.

A small *tree* to 3 m (*Streimann & Katik LAE 51786*) or *scrambler* (*Brass 7696*) trunk to 5 cm diam., bark grey and slightly cracked (*S. & K. LAE 51786*), terminal twigs slightly zigzag, unarmed, glabrous. *Leaves* paired, unequal, the larger leaves 5-7 times as long as the

Fig. 11. *S. dendropilosum* Symon. Drawn from herbarium specimen, *Hoogland & Schodde 7291* (CANB).

smaller; major leaf lamina (32-) 18 (-14) x (8-) 5 (-4) cm, broad lanceolate, slightly falcate, entire, c. 9-12 principal lateral veins, apex acuminate, base broadly cuneate to sub-rounded, oblique; petiole 1-2 cm long, minor leaf (3.5-) 2 (-1) x (2.5-) 2 (-1) cm, broad ovate to sub-orbicular, c. 5 principal veins, apex rounded to shortly acuminate, base rounded; petiole 2-3 mm long. *Inflorescence* a cluster of 5-30 flowers from a simple or forked vermiform axis from about the leaf axil. Only one collection seen in flower; description after Merrill & Perry (1949). "The *calyx* is cup-shaped, truncate or slightly undulate, 2-3 mm high; the *corolla* tube is about the same length, the lobes 5 (-6), about 3.5 mm long, 1 mm broad, apex slightly cucullate and very slightly puberulous; *Stamens*: filaments inserted near the top of the corolla-tube, 1 mm long, glabrous, anthers oblong, 2.5 mm long; pistil sometimes minute (as described in *S. ledermannii* Bitter) or aborted, or normal with the style protruding beyond the stamens about 1.5 mm." *Berries* (immature) c. 7 mm diam., ovoid, finally blue (*Brass 7696 & Streimann & Katik LAE 51786*); pedicel 5-7 mm long, calyx c. 7 mm diam., possibly with a pale margin. (Fig. 12; Map 17).

Notes

The type of this handsome species has not been located. Only five collections give altitudes, 10, 24, 80, 760 and 850 m altitude. Three collections describe the species as a vine or climber and one as a small tree. The large and somewhat falcate leaves are distinctive and the species appears to have relatively short pedicels and possibly ovoid fruits. The species is mentioned by Merrill & Perry, J. Arnold Arb. 30 (1949) 52.

Specimens cited

IRIAN JAYA: Geelvink Bay: *Lam 706*, 23.vii.1920, Pioniers bivak river Mamberamo, 2° 15′ 136° 58′ 10 m alt., (BO, K, L). Snow Mountains: *Versteeg 1351*, 2.vii.1907, Sabangkamp, river Lorentz, ±5° 00, 138° 50′, (BO, L). Mimika: *Aet exp. Lundquist 407*, 4.vii.1941, near Oeta, ±4° 35′, 135° 55′ , (BO, L); *Versteeg 1137*, 19.v.1907, River Lorentz, ±5° 00′, 138° 50′, (BO, L).

PAPUA NEW GUINEA: Western: *Brass 7696*, May 1936, Fly river 528 mile camp, 80 m alt., (A, BM, BO, BRI, L); *Foreman & Galore, NGF 45764*, 2.xi.1969 Base camp Kiunga, near 6° 07′, 141° 18′, 762 m alt., (L, LAE); *Henty & Foreman & Galore NGF 42805*, 29.x.1969, Ok Tedi headwaters near Kennecott field camp, 5° 14′, 141° 10, 853 m alt., (L, LAE). *Streimann & Katik LAE 51786*, 9.viii.1971, Kiunga, 6° 10′, 141° 20′, 24 m alt., (BRI, L, LAE).

11. **Solanum kaernbachii** Lauterb. & K. Schum., Fl. Schutzgeb. Südsee (1901) 535.

Type citation: "Kaiser Wilhelmsland: Sattelberg, auf dem Wege nach Selileo, im Hochwalde bei 800 m ü.M. (*Kaernbach n. 77*, blühend am 10. Dezember 1893, nigukwaa der Eingeborenen)."

Type material: Holotype ?B (destroyed), no duplicate traced.

Derivation: the name commemorates L. Kaernbach (1864-1896-7) botanist, trader and traveller who made several botanical collections in New Guinea.

Lycianthes kaernbachii (Lauterb. & K. Schum.) Bitter, Abh. Naturwiss. Vereine Bremen 24 (1920) 504.

Solanum schlechterianum Bitter, Bot. Jahrb. Syst. 55 (1917) 111-113, fig. 5.

Type citation: "*R. Schlechter 17339*, NE New Guinea. Wälder am Djamu, etwas 700 m ü.M., als Liane, blühend im Februar.

Type collection: Holotype ?B (destroyed), isotype P!, photo ADW.

Derivation: the name commemorates F.R.R. Schlechter (1872-1925) German botanist and collector.

Lycianthes schlechteriana (Bitter) Bitter, Abh. Naturwiss. Vereine Bremen, 24 (1920) 504.

A woody *climber*, dense velutinous indumentum of minute, brownish, (simple, uniseriate, multicellular) hairs, dense on younger stems, petioles, upper and lower leaf surface, sparse with age on upper leaf surface, hairs more or less erect on plain surfaces and antrorse on the pedicels. *Leaves* paired, unequal; major leaf lamina (18-) 12-15 (-9) x (8.5-) 7 (-4.5) cm, ovate-

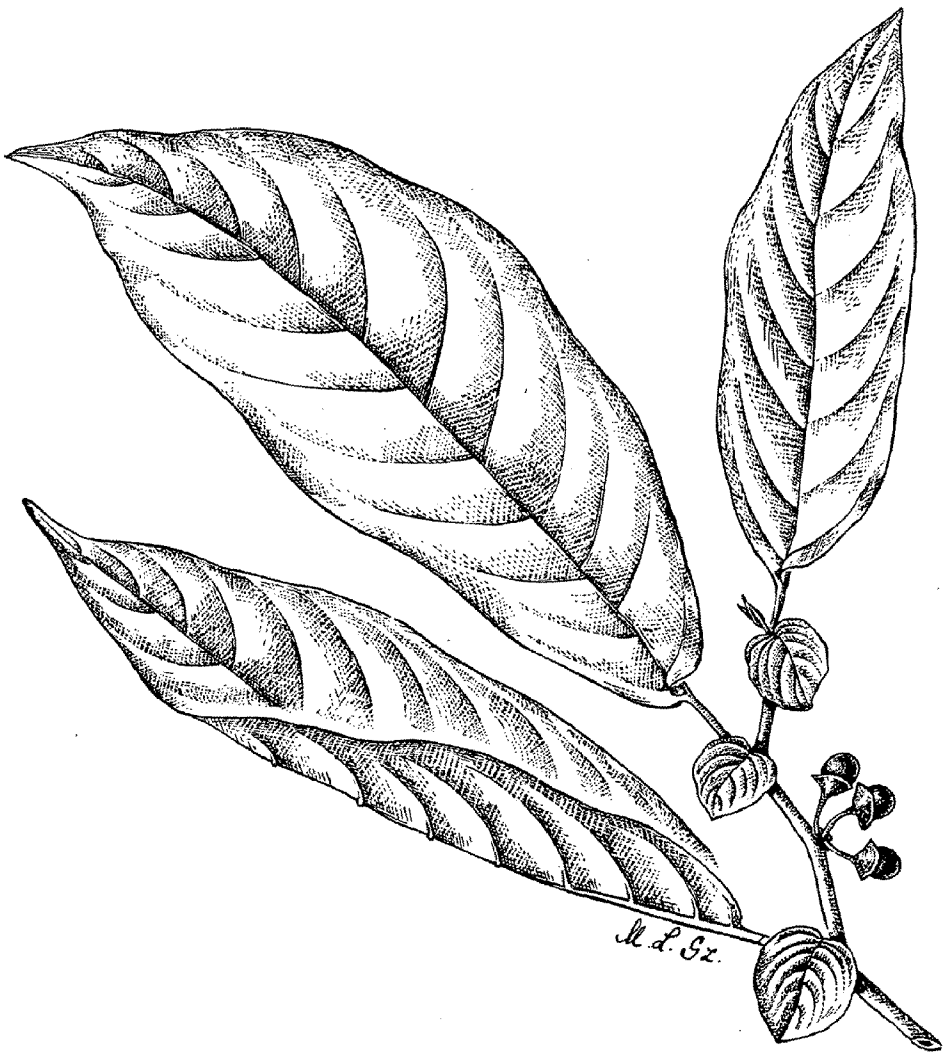

Fig. 12. *S. impar* Warburg. Drawn from herbarium specimen, *Streimann & Katik LAE 51786* (LAE).

lanceolate, entire, with 10-12 arcuate, main veins obvious below, base rounded, oblique, apex acute to shortly acuminate; petiole 7-8 (-12) mm long relatively short; minor leaf (4.5-) 3.5 (-3) x (3.75-) 3 cm, orbicular to broadly ovate with 5-6 main veins, base rounded, apex rounded to obtuse; petiole c. 5 mm long. *Inflorescence* of hundreds of cauliflorus pedicellate flowers extending along stems between nodes. Few collections have been available and the species may be dioecious as numerous flowers on *Kairo & Streimann NGF 30943* all appear male and the fruiting collection *Kairo & Emos NGF 30983* has not retained any female flowers. Male flowers: pedicel 6-11 mm long, slender, slightly enlarged towards the apex, pubescent with brownish hairs; *calyx* 1.5 mm deep, cupulate, margin entire; *corolla* relatively small, stellate, lobes divided to at least rim of the calyx, exposed lobes 2.5-3 mm long, elliptic, reddish cream, fragrant (*Kairo & Streimann NGF 30943*) creamy white (*Millar NGF 23260*), white with mauve tinge (*Millar NGF 23260*). *Stamens*: filaments 1-1.5 mm long, erect, holding anthers above calyx rim; anthers 1.5 mm long, stout, oblong, with relatively large terminal pores; style and stigma c. 1 mm long, vestigial. Female flowers not seen, but original description states ovary is globose and style strongly bilobed. *Fruits* numerous, pedicel 1 cm long, straight, slightly enlarged below calyx; calyx 5 mm diam., saucer-shaped, entire; *berries* 6-7 mm diam., globular, final colour and texture unknown. *Seeds* c. 3 mm long, flattened, sub reniform, finely reticulate, margin possibly a little thickened but seeds may not be fully mature, 25 in one fruit. (Fig. 13; Map 17).

Notes

The handsome leaves and numerous fragrant flowers make this a distinctive species, possibly worthy of cultivation as a tropical climber. Unfortunately the collections remain few and information on floral biology is inadequate.

Specimens seen

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: Morobe: *Clemens 1289*, 20.xii.1935, Sattelberg, 6° 30′, 147° 46′, 1006 m alt., (A, L); *Clemens 1426*, 1.i.1935, Wareo, 6° 25′, 147° 47′, 976 m alt., (L); *Holdsworth 10, 22*, s.d. Finschhafen, 6° 36′, 147° 51′, (UPNG); *Kairo & Emos NGF 30983*, 5.i.1963, Sankwep river, 6° 30′, 147° 10′, 30 m alt., (BISH, BO, BRI, CANB, K, L, LAE, NSW); *Kairo & Streimann NGF 30943*, 30.xi.1967, Sankwep logging area, 6° 30′, 147° 20′, 60 m alt., (A, BFC, BISH, BRI, CANB, L, LAE); *Millar NGF 23260*, 3.iii.1964, Bupu village above Wampit river, 762 m alt (possibly confused collection, elsewhere this no. is *S. oliverianum*), (BO, L); *Vinas & Kairo 307/308*, 18.vi.1984, midway along Buso river SE of Buso camp, 6° 21′, 147° 11′, 100 m alt., (ADW, BFC, CANB, K, L, LAE).

12. **Solanum memecylonoides** Bitter et Schltr., Bot. Jahrb. Syst. 55 (1917) 93-94.

Type citation: "*R. Schlechter 20256*, NE New Guinea: In den Wäldern des Torricelli-Gebirges, 800 m, blühend um Sept."

Type material: Holotype ?B (destroyed), isotype P!, UC! and photos ADW.

Derivation: the name refers to the similarity of this species to plants of the genus *Memecylon* (Memecylaceae).

Lycianthes memecylonoides (Bitter et Schltr.) Bitter, Abh. Naturwiss. Vereine Bremen 24 (1920) 504.

Solanum memecylonoides subsp. *finisterrae* Bitter, Bot. Jahrb. Syst. 55 (1917) 94-95.

Type citation: Nordöstl. Neu-Guinea: In den Wäldern des Finisterre-Gebirges, 1000 m ü.M. (*Schlechter n. 17961*—blühend im Juli)."

Type material: Holotype ?B (destroyed), isotypes P!, UC! and photos ADW.

Derivation: the name refers to Finisterre mountains where the type specimen was collected.

Solanum balanidium Bitter, Bot. Jahrb. Syst. 55 (1917) 95-96.

Type citation: "Nordöstl. Neu-Guinea: Hunsteinspitze, in bemoostem montanen Urwald, dessen etwa 20 m hohe Bäume sich kaum berühren, mit vielen überständigen schlanken Nipunpalmen, mit viel Rotang und Zwergpalmen im Unterholz, 1300 m ü.M. (*Ledermann n. 11332*—blühend im März)."

Fig. 13. *S. kaernbachii* Schum. & Lauterb. Drawn from herbarium specimen *Kairo & Streimann NGF 30943* (BRI), fruits from *Kairo & Emos NGF 30983* (CANB).

Type collection: Holotype ?B (destroyed), no duplicates traced.

Derivation: the name refers to the dull oily appearance of the leaves when fresh.

Lycianthes balanidium (Bitter) Bitter, Abh. Naturwiss. Vereine Bremen 24 (1920) 504.

A sprawling or *climbing plant*, glabrous or sparse indumentum of minute, crisped, brownish hairs (simple, uniseriate, multicellular) on young shoots, twigs and buds, soon lost. *Leaves* paired, the larger leaf about 2.5 times as large as the smaller leaf, major leaf lamina (11-) 8.5 (-4.5) x (4.5-) 2.7 (-1.5) cm, entire, coriaceous, elliptic, with 5-7 principal lateral veins, base cuneate, equal or oblique, apex acute to acuminate; petiole c. 1 cm long; minor leaf (4.5-) 3.25 (-1.5) x (2.5-) 1.5 (-0.7) cm, elliptic to broadly obovate-elliptic, base cuneate, apex acute to rounded; petiole c. 4 mm long. *Inflorescence* a cluster of (1-) 7 (-19) pedicellate flowers from pulvinus between two leaves, probably dioecious. Only one available collection has fruit, *Hyne 342*, this has fewer, larger 5-partite, bisexual flowers, i.e. pedicel c. 1 cm long, *calyx* 3 mm deep, c. 4 mm across, coriaceous, verrucose, margin entire, *corolla* tube cylindrical c. 2 mm long, lobes 5 mm long, oblong-elliptic, reflexed. *Stamens*: filaments c. 0.5 mm, anthers 4 mm long, oblong, pores apical, extrorse, *ovary* 3 mm long, style 5 mm long, stigma 1 mm decurrent. Male flowers: smaller and more numerous, possibly all 4-partite, pedicel c. 6 mm slender; calyx 2 mm long, margin entire, both may be purple;corolla tube 1 mm, lobes c. 3 x 1.5 mm, deeply divided to calyx rim, reflexed, thickish, inter-acuminal membranes absent, white (4 records) or purple (1 record). *Stamens*: filaments 1.5 mm long, the anthers held erect above calyx rim, anther 2 mm long, oblong, pores apical, extrorse; ovary, style and stigma vestigial, c. 1.5 mm long. Fruits in clusters of 1-4 (*Hyne 342*), pedicel 1.2 cm long, calyx c. 8 mm diam., saucer-shaped, together with abundant verrucose lenticels; *berry* c. 7 mm diam., slightly obovate, final colour and texture unknown. (Fig. 14; Map 11).

Notes

Altitudes of collection range from 275 m to 2350 m the mean of eight collections being 1436 m. The species has been collected from rainforest, primary forest and depleted *Castanopsis* forest. One collection, *Veldkamp 6790*, described the plant as an epiphyte.

The collectors notes on the size of the plant are all rather inadequate and there is no clear indication whether it is a large or small climber. In describing *S. balanidium*, Bitter (loc. cit.) describes the lower branches as attaining the diameter of a man's arm, but the collection *Ledermann 11332* on which the name was based has not been traced.

Bitter himself (1917) 96 questioned whether the three taxa were indeed distinct. The species appears related to *S. oliverianum* and differs from it in its generally smaller leaves, which are more coriaceous. The minor leaves are also smaller and of different shape and the taxon has fewer flowers per cluster. It occurs at higher altitudes than does *S. oliverianum*.

Specimens seen

IRIAN JAYA: Vogelkop: *Schram BW 6110*, 9.v.1958, Djitmau, S of Lake Ajamaroe, 1° 10′, 132° 15′ 275 m alt., (CANB, L, LAE). Snow Mountains: *Vink & Schram BW 8850*, 23.v.1960, Doglia, N of Kebo, 3° 50′, 136° 15′, 1805 m alt., (L, LAE).

PAPUA NEW GUINEA: West Sepik: *Kalkman 5230*, 11.ix.1966, Mt Amdutakin, Hindenburg Range, 5° 15′, 141° 40′, 2250 m alt., (L, LAE); *Schlechter 20256*, 18.ix.1909, Torricelli Range, 3° 23′, 142° 23′, 800 m alt., (P); *Veldkamp 6790*, 14.v.1975, above Folongonom, Star Mountains, 5° 00′, 141° 05′, 2350 m alt., (BISH, L, LAE). Madang: *Schlechter 17961*, 13.vii.1908, Finisterre Range, 5° 48′, 146° 05′, 1000 m alt., (P, UC). Western: *Hyne 342*, s.d., near Bakonabip, 1440 m alt., (LAE). Southern Highlands: *Vink 16847*, 10.vi.1966, Tigibi, Tari subdist. 6° 00′, 143° 00′, 1570 m alt., (A, CANB, L, LAE); *Womersley & Vandenberg NGF 37289*, 2.xi.1978, four miles from Kopiago on Koroba road, 5° 22′, 142° 33′, 1466 m alt., (A, K, L, LAE).

Fig. 14. *S. memecylonoides* Bitter & Schltr. Drawn from herbarium specimen, *Schram BW 6110* (LAE), fruit from *Hyn 342* (LAE).

13. **Solanum moszkowskii** Bitter, Bot. Jahrb. Syst. 55 (1917) 103-104.

Type citation: "*Dr. Max Moszkowski 368*, Van Rees, Naumoni im Oktober mit unreifen Früchten."

Type collection: Holotype ?B (destroyed), no duplicates traced.

Derivation: the name commemorates M. Moszkowski (1873-unknown), German physician, traveller and zoologist who collected in New Guinea.

Lycianthes moszkowskii (Bitter) Bitter, Abh. Naturwiss. Vereine Bremen 24 (1920) 504.

Solanum ridleyanum Wernham, Trans. Linn. Soc. London, Bot. 9 (1916) 119.

Type citation: "Camp III to IV, 1100 to 2500 ft". (Wollaston Expedition to Dutch New Guinea).

Type material: Holotype BM! and photo ADW.

The label on the sheet at BM states: "Utakwa River to Mt. Carstensz alt. 1100 to 2500 ft. Camp iii-iv. Dec.-Feb. 1912-1913." On a paper slip "pale violet darker at base".

Derivation: the name commemorates H.N. Ridley (1855-1956) British botanist who worked in South-East Asia.

Solanum acuminatissimum Merrill & Perry, J. Arnold Arbor. 30 (1949) 49-50.

Type citation: "Netherlands New Guinea: 15 km SW of Bernhard Camp, Idenburg River, *Brass 12290* (type), Jan. 1939, alt. 1800 m, one example on a small clearing in mossy forest (shrub 60 cm high; fruit green; pedicels, calyx and lower surface of leaves tinged with purple)."

Type material: Holotype A!, isotype L! and photos ADW.

Derivation: the name refers to the very long acuminate tips to the leaves.

A sprawling *shrub* or woody *scrambler* 1-4 m tall, sparse indumentum of simple, pale, antrorse hairs (simple, uniseriate, multicellular) only on young twigs and as tufts in some axils, soon lost, then stems and leaves glabrous. *Leaves* paired, major leaf well developed approximately 2.6 times the length of the minor leaf, major leaf lamina (17-) 13 (-9.5) x (6.5-) 5 (-2.75) cm, obovate-elliptic, with 5-6 principal lateral veins, prominent below, dull dark green above, base cuneate, apex acuminate; petiole 0.5-1 cm long; minor leaf (8-) 4.7 (-1.5) x (5.5-) 2.8 (-1) cm, obovate less often ovate, base broadly cuneate to rounded, apex acute to acuminate; petiole 3-5 mm long. *Inflorescence* 1-2 (-4) pedicellate, flowers from leaf axil, possibly dioecious as only male flowers seen on one collection (*Pullen 6011*); pedicel 2.3 cm long relatively slender. *Calyx* c. 4 mm deep, cupulate, margin entire. *Corolla* stellate, lobes deeply divided to calyx rim, c. 10 x 3-4 mm, elliptic, relatively thick, white. *Stamens*: filament c. 2 mm, anthers loosely erect; anther 3.5 mm long, subovate, relatively short and thick, pores apical. *Ovary*, style and stigma vestigial. *Berry* 1-2 (-4) pendent 1.2-1.7 cm diam., fleshy, bright red; pedicel 3.5-4 cm long slender at base, slightly thickened upwards; calyx 0.7-1 cm diam., *Seeds* 6 x 4 mm, flattened, oval, embryo surrounded by distinct winglike margin 1.5-2 mm wide, surface minutely shallowly reticulate. Four fruits counted yielded 37, 53, 53, 63, seeds from *Symon 10631*. (Fig. 15; Map 10).

Notes

The handsome leaves and large red fruits, looking rather like cherries, make this an attractive species. As is so often the case the flowering specimens are inadequate and female flowers have not yet been seen.

It is a species of moderate altitudes, 17 collections coming from between 600 m to 2286 m with a mean of 1727 m. The species has been collected from submontane *Lithocarpus* forest floor, mid-mountain rainforest, primary forest, regrowth vegetation, oak forest and disturbed forest.

Selected specimens (25 collections seen)

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: Madang: *Pullen 6011*, 21.x.1964, between Budamu & Moro villages, 5° 41', 146° 03',

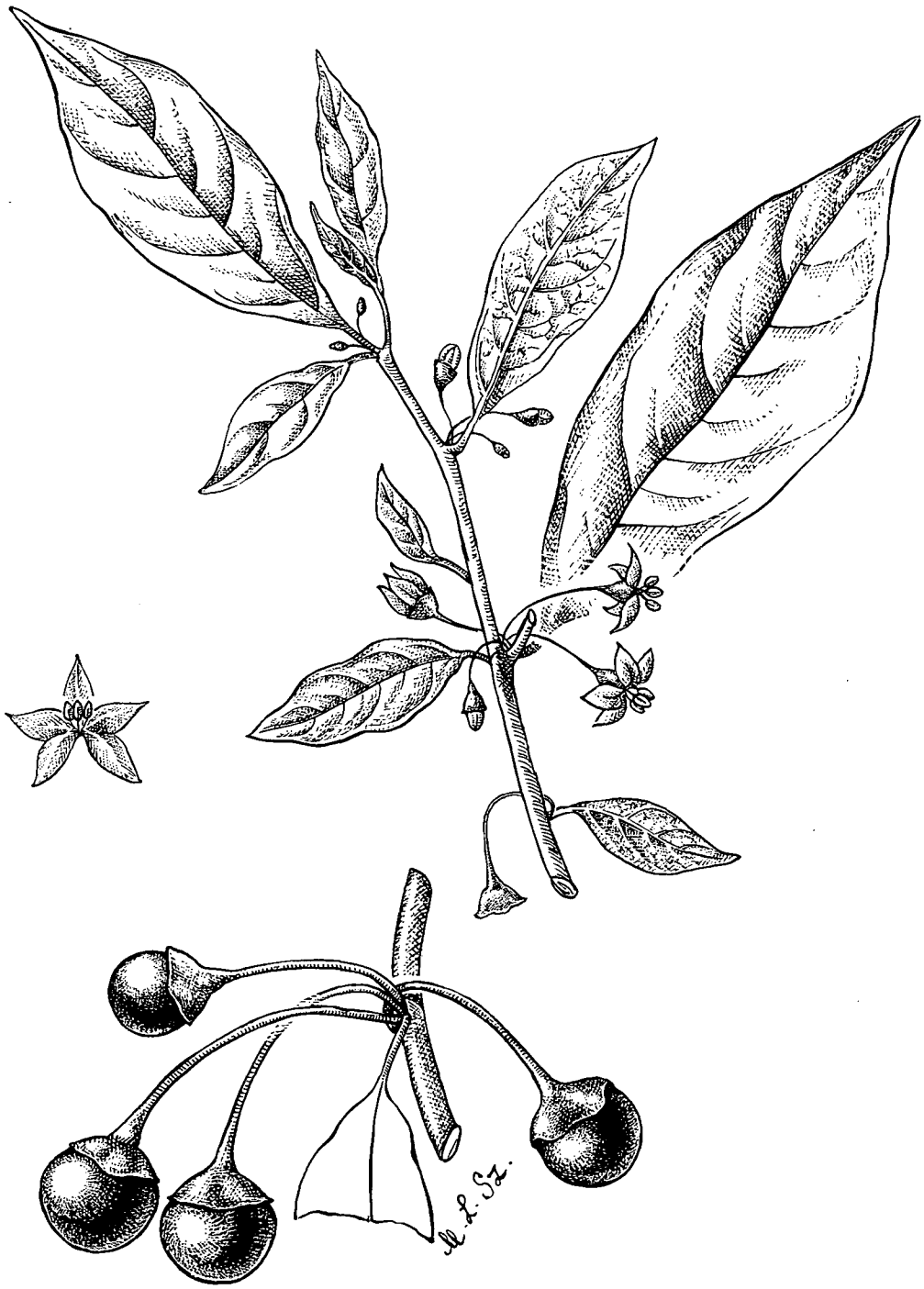

Fig. 15. *S. moszkowskii* Bitter. Drawn from herbarium specimen, *Pullen 6011* (CANB); fruit from *Symon 10631 & Cruttwell* (ADW).

1667 m alt., (BM, CANB, LAE); *Sayers NGF 19830*, 10.viii.1964, Sewe, 5° 50′, 146° 05′, 2286 m alt., (A, BO, BRI, CANB, K, L, LAE). Morobe: *Clemens 5104*, 23.i.1937, Ongeramnang, 6° 28′, 147° 21′, 1760 m alt., (A); *Hartley 12523a*, 12.xii.1963, Mt Shungol, 6° 52′, 146° 42′, (A, BRI, CANB, LAE); *Kairo 62*, 16.vii.1978, Mt Kaindi, 7° 20′, 146° 43′, 2200 m alt., (BFC, CANB, L, LAE); *Kairo 79*, 19.i.1979, Manki, 7° 11′, 146° 34′, (BFC, CANB, CBG, L, LAE); *Kerenga s.n.*, 28.v.1980, Mt Burman, 6° 10′, 146° 30′ 2000 m alt., (LAE); *Sayers NGF 21517*, 5.i.1965, Wagau, 6° 50′, 146° 50′, 1219 m alt., (BM, L, LAE); *Streimann & Kairo NGF 27634*, 16.v.1968, Tawa village near Aseki, 7° 24′, 146° 07′ 1676 m alt., (BFC, L, LAE); *Symon 10631 & Cruttwell*, 29.v.1977, Aseki road from Bulolo, 7° 11′, 146° 39′, 2286 m alt., (ADW, BH, BRI, CANB, K, L, LAE, MO); *Symon 13846 & Kairo*, 2.vi.1984, lower slopes of Mt Missim, 7° 13′, 146° 49′, (ADW, L, LAE, MO); *Symon 13854 & Vinas*, 3.vi.1984, Gumi, 7° 12′, 146° 25′, (ADW, L, LAE, MO). Eastern Highlands: *Glasse 123*, iv. 1963, Okapa, 6° 32′, 145° 37′, 1829 m alt., (BRI, LAE); *Hays 128*, 23.xii.1971, SE of Obura, 6° 40′, 146° 00′, 2103 m alt., (LAE).

14. **Solanum multifolium** Merrill & Perry, J. Arnold Arb. 30 (1949) 50.

Type citation: Netherlands New Guinea: "6 km SW of Bernhard Camp, Idenburg River, *Brass 12907* (type). Feb. 1939, alt. 1150 m, common in a rain forest gully (very slender tree 2-3 m high; fruit red; one white flower bud)."

Type collection: A!, isotypes BM!, BRI!, L!, LAE!, and photos ADW.

Derivation: the name refers to the numerous leaves of this species.

A slender *shrub* 1-3 m high, indumentum of minute, simple, curved, antrorse hairs (simple, uniseriate, multicellular) abundant on twigs and petiole, scattered on main veins below, absent on upper leaf surface. *Leaves* paired or ternate; major leaf lamina (12-) 7-9 (-3) x (4.2-) 2-3 (-1.5) cm, entire, elliptic, base cuneate, apex shortly acuminate; petiole 2-7 mm long, second leaf relatively broader (4.5-) 3-4 x (2.8-) 1.5-2 cm, broad elliptic, base broadly cuneate, apex broadly acute, petiole 2-4 mm long, third leaf (1.5-) 0.3-1 x 0.3-1 cm, ovate, apex acute to obtuse, petiole c. 1 mm long, or leaf nearly sessile. *Inflorescence* of 1-4 pedicellate flowers from leaf axil, possibly dioecious. *Pedicel* c. 5 mm long, slender, sparsely pubescent. *Calyx* 2-3 mm long, truncate, five veins distinct, calyx weakly 5-ribbed, leading to minute acumens. *Corolla* tube 2 mm long, relatively narrow, lobes c. 8 x 1.5 mm long, deeply divided to calyx rim, almost linear with minute acumen 0.5 mm long, white (*Kalkman BW 3479*). *Stamens*: filaments c. 1 mm long, *anthers* 3.5-4 mm long, oblong-attenuate, pores apical. *Ovary*, style and stigma vestigial. *Berry* solitary, pedicel 1-1.2 cm long; calyx 3-4 mm in diam., entire, 5-7 mm diam., red (*Brass 12907*). *Seeds* in original description stated as about 15, 2.5-3 mm long, 1.5 mm thick. (Fig. 16; Map 1).

Notes

Only three collections have been recognised. The species has a rather leafy appearance due to the frequently ternate leaves. The type represents the smallest leaved form of the three collections all of which come from Irian Jaya. No female flowers have been seen.

Specimens seen

IRIAN JAYA: Jayapura: *Brass 12907*, ii.1939, 6 km SW Bernhard camp Idenburg river, 3° 30′, 139° 20′, 1150 m alt., (A, BM, BRI, L, LAE); *Kalkman BW 3479*, 1.iv.1956, Nemo, E of Hollandia, 2° 37′, 140° 39′, (A, BO, CANB, K, L, LAE); *Kalkman BW 3480*, 1.iv.1956, as above, 5 m alt., (CANB, L).

PAPUA NEW GUINEA: none seen.

15. **Solanum oliverianum** Lauterb. & K. Schum. Fl. Schutzgeb. Südsee (1901) 535.

Type citation:

"(a) *Hollrung 776*, New Guinea, Kaiser-Wilhelmsland, Augustafluss blühend im September 1887.

(b) *Lauterbach 2861*, Nurufluss blühend am 13 September 1896.

Fig. 16. *S. multifolium* Merrill & Perry. Drawn from herbarium specimen, *Kalkman BW 3479* (LAE).

(c) *Rodatz & Klink 158*, Ramufluss am 30 Juni 1899."

Type collections: ?B (destroyed), isotypes *Hollrung 776*, K!, P!, L!, MEL!; *Lauterbach 2861*, WRSL!, photos ADW. *Rodatz & Klink 158*, not traced.

Lectotype: The specimen of *Hollrung 776* at K is here proposed as lectotype as it is the best preserved of the surviving collections.

Derivation: the name commemorates D. Oliver (1830-1916), British botanist and one time keeper at Kew Herbarium.

Lycianthes oliveriana (Lauterb. & K. Schum.) Bitter, Abh. Naturwiss. Vereine Bremen 24 (1920) 504.

Solanum ledermannii Bitter, Bot. Jahrb. Syst. 55 (1917) 107-109. Fig. 4.

Type citation: "*Ledermann 9214*, NE New Guinea, Etappenberg, 850 m, blühend im Oktober."

Type collection: Holotype ?B (destroyed), no duplicates traced. Illustrated by Bitter fig. 4 (above).

Derivation: the name commemorates C.L. Ledermann (1875-1958) a Swiss botanist and traveller who collected plants during the Sepik Expedition of 1912-13.

Lycianthes ledermannii (Bitter) Bitter, Abh. Naturwiss. Vereine Bremen 24 (1920) 504.

A large *liane* to 35 m tall, glabrous or with indumentum of minute, brown, crisped, simple hairs on young tips only, soon lost on mature leaves and stems. *Leaves* paired, major leaf lamina (24-) 16 (-9.5) x (10.5-) 7 (-4.0) cm, broad elliptic, coriaceous, entire, with 6-7 principal lateral veins, base rounded to broadly cuneate, rarely oblique, apex acute to shortly acuminate; petiole c. 2 (-3) cm long; minor leaf relatively large and well developed (12-) 7.5 (-4) x (8-) 5 (-1.5) cm, broad ovate to broad elliptic, with 4-5 principal lateral veins, base rounded, apex rounded to obtuse, petiole 0.5-1 cm. *Inflorescence* a cluster of up to 50 flowers from a pulvinous between major and minor leaves which may develop into a vermiform axis with up to 4 short arms with congested buds; pedicel c. 10 mm long, slender. *Calyx* cupular c. 2 mm deep and 2 mm diam., entire, purple at flowering stage. *Corolla* c. 8 mm diam., stellate, the lobes 4 x 1.15 mm, deeply divided to calyx rim, elliptic, thick and firm, minute inflection at the tip, strongly reflexed, white or shaded to purple. *Stamens*: filaments c. 2 mm long, attached low in corolla tube, anthers held erect in a loose cone above the rim formed by the reflexed petals, 3-4 mm long, stout, oblong, pores apical. *Ovary* c. 1 mm long, style 2-4 mm long, erect, straight, short styles may represent male flowers (see note below); stigma minutely bilobed. Fruit cluster of (1-) 9-12 (-14) berries, pedicel c. 1.5 cm long, slightly enlarged upwards, straight, lenticels conspicuous; calyx 6-13 mm diam., saucer-like, coriaceous, margin entire;*berry* 6-9 mm diam. globular to ovoid, blue to blue-black when ripe (3 records). (Fig. 17; Map 3).

Notes

This large growing species is essentially from the lowlands and has been collected from sea level to 2360 m with a mean from 37 collections of 460 m alt. The species may be found in forest, swamp woodland, lower mountain forest, rainforest, dense tall secondary forest, fringing forest, old primary forest, frequently in river and creekside sites. A great many of the flowers examined appear to be male and in these the ovary, style and stigma may be vestigial. Clear cut female flowers have not been recognised. *van Royen & Sleumer 7621 & Carr 11670* state that the anthers are yellow whilst *Millar 23858* states that they are purple.

Selected specimens (49 collections seen)

CERAM: *Eyma 2131*, 10.xi.1937, Maraina Biv. 1, (BO); *Kornassi 649*, 4.xii.1917, Hatoemete ±3° 50′, 129° 00′, sea level, (BO, K).

IRIAN JAYA: Vogelkop: *Koster BW 11054*, 25.ii.1961, Masmi plain Manokwari 0° 53′, 134° 05′, 8 m alt., (ADW, L, LAE); *Kosterman 2704*, 18.viii.1948, Momi, S of Manokwari 0° 53′, 134° 05′, (A, BO, K, L); *Pleyte 623, 633*, 20.viii.1948, Sorong near Klamono 1° 08′, 131° 28′, (A, BO, K, L); *van Royen & Sleumer 7621*, 2.xi.1961, Bamfot village, 850 m alt., (A, BO, CANB, L, LAE, RSA); *Schram BW 10620*, 13.v.1961, Forest Res. Stn. Tafelberg 0° 50′, 134° 05′, 130 m alt., (ADW, BO, L, LAE). Geelvink Bay: *Gjellerup 613*, 21.viii.1911, Sawia 1° 50′, 137° 10′, 100 m alt., (BO, K, L); *Kanehira & Hatusima 12359*, 4.iv.1940, Patema 40 km inland of Nabire, 3° 13′, 135° 28′, 300 m alt.,

Fig. 17. *S. oliverianum* Lauterb & Schum. Drawn from herbarium specimen, *Schram BW 10620* (ADW), fruits from *Pullen 1846* (CANB).

(A, BO); *Lam 706*, 23.vii.1920, Pioniersbivak, 2° 15′, 136° 58′, 10 m alt., (K, L). Jayapura: *Leeuwen 9884*, viii.1926, Rouffaer, 3° 25′, 137° 30′, 175 m alt., (BO, K, L). Snow Mountains: *Kalkman 4386*, 5.vii.1959, Mt Antares E of junction of Bon & Minam rivers, 3° 24′, 142° 04′, 1500 m alt., (A, CANB, L, LAE). Mimika: *Aet 395*, 1.vii.1941, near Oeta 4° 30′, 135° 58′, (A, BO, K, L).

PAPUA NEW GUINEA: West Sepik: *Vink 17628*, 17.ix.1966, Mt Amdutakin, Hindenberg Rnge, 5° 15′, 141° 40′, 2360 m alt., (L). East Sepik: *Hollrung 776, 1876*, Augustafluss (Sepik River) near Malu, 4° 13′, 142° 51′, (BO, K, L, MEL, P); *Pullen 1846*, 3.x.1959, 3 mile N of Angoram, 4° 05′, 144° 05′, 30 m alt., (A, CANB, L, LAE). Madang: *Hoogland 4907*, 18.vi.1955, Boak near Silaul 5° 15′, 145° 35′, 60 m alt., (CANB, LAE); *Schlechter 18319, 18427*, 3.x.1908, Kenejia Base, 5° 42′, 145° 34′, (P, UC). Morobe: *Hartley 10065*, 26.iii.1962, Bewapi creek, 6° 40′, 146° 55′, 60 m alt., (A, CANB, L, LAE, RSA); *Hartley 10136*, 30.iv.1962, Burep river, 6° 40′, 147° 05′, 30 m alt., (A, CANB, L, LAE, RSA); *Hartley 11428*, 18.iii.1963, Tymne-Wagau track, 6° 50′, 146° 42′, 457 m alt., (A, BRI, CANB, L, LAE); *Holdsworth s.n.*, s.d., Finschhafen, 6° 36′, 147° 51′, (UPNG); *Hoogland & Pullen 8805*, 21.v.1956, Lae Bot. Gard. 6° 45′, 147° 00′, (A, LAE); *Millar NGF 23260*, 3.iii.1964, Bupu village, 6° 51′, 146° 36′, 762 m alt., (A, BISH, K, L, LAE); *Millar NGF 23858*, 22.ii.1965, Oomsis ridge, 6° 40′, 146° 45′, 609 m alt., (A, BISH, BRI, CANB, L, LAE, NSW); *Symon 10659, 10666*, 16.vi.1977, Sankwep logging area, 6° 30′, 147° 00, (ADW). Southern Highlands: *Gebo 1866*, 27.vi.1972, Mt Iru, 5° 52′, 142° 46′ 2134 m alt., (BISH, CANB, UPNG); *Womersley et al NGF 37289*, 2.xi.1978, 4 miles from Kopiago, 5° 23′, 142° 31′, 1466 m alt., (A, K, LAE). Gulf: *Craven & Schodde 848*, 18.2.1966, near Ravikivau 7° 46′, 145° 10′ 15m alt., (A, BRI, CANB, K, L, LAE). Central: *Carr 11670*, 12.iii.1935, Veiya 9° 03′, 147° 01′ sea level, (A, BM, CANB, K, L, NY); *Goldie s.n.*, s.d.(?1876-77) Pt Moresby, (MEL). Northern: *Carr 16195*, 22.iii.1936, Kokoda, 8° 55′, 147° 40′, 365 m alt., (BM, CANB, K, L).

16. **Solanum peranomalum** Wernham, Trans. Linn. Soc. Lond., Bot. 9 (1916) 119; Wernham ex Ridley in Hooker's Icon. Pl. 31 (1916) t. 3062.

Type citation: "Canoe camp, 150 ft" and "New Guinea: Mt. Carstensz, 45 m., C.B. Kloss".

Type material: Holotype BM! and photo ADW.

Derivation: the name refers to the very unusual or divergent nature of this species relative to most species of *Solanum*.

No other collections of this species have been recognised and the original description is repeated here.

"*Shrub*, flowering stems robust, terete, flattened in one plane when young, glabrous. *Leaves* glabrous, papery, entire, close together in pairs, opposite, strongly unequal, the larger oblong, shortly acuminate to acute, base often oblique, 11-13 x 4.5-5.3 cm; petiole woody 1 cm long, veins prominent below, 8-9 secondaries, smaller leaves sub-orbicular, 9 mm diam. base cordate, subsessile. *Flowers* numerous [7, 9, 7, illustrated] arising from a pulvinous at the base of the leaf, pedicel slender and with the *calyx* sparsely rufous hairy, approximately 8 mm long. Calyx cupula, limb entire 2.5 mm long. *Corolla* scarcely 4 mm long, divided nearly to the base in oblong-lanceolate teeth, glabrous." (Fig. 18; Map 6).

Notes

Solanum peranomalum appears closely related to *S. wollastonii* and *S. rostellatum*. It differs from the first in having more flowers per node, in being sparsely rufous pubescent and in having an entire calyx margin (cf. 5 short teeth). It differs from the second in pubescence (long simple antrorse) and in the number of flowers per node. Unfortunately there are no indications of the fruits of either *S. peranomalum* or *S. wollastonii*.

17. **Solanum pustulatum** Symon, sp. nov.

Frutex effusus aut scandens. Inermis, pilis minutis simplicibus antrorsis ex basi pustulari praecipue in juvenalibus ramis. *Folia* geminata inaequalissima interdum sine folio minore;maius ad 7 x 3 cm ellipticum coriaceum acuminatum, petiolo 5-10 mm longo; minus ovatum ad 5 x 3 mm subsessile. *Flos* solitarius axillaris (rarim duo) fortasse dioecius; pedicellus ad 2.5 cm longus; *calyx* 3-3.5 mm longus, cupulatus integer; *corolla* stellata lobis 9-10 mm longis purpurea; filamenta circa 1mm longa; antherae 6-7 mm longae linearlanceolatae; *ovarium* 3-4 mm longum ovatum; stylus 7 mm longus erectus; stigma 1 mm longum bilobum; flos masculinus ovario, stylo, stigmate vestigialibus. *Bacca* circa 7-8 mm diam. globularis, in maturitate non visa.

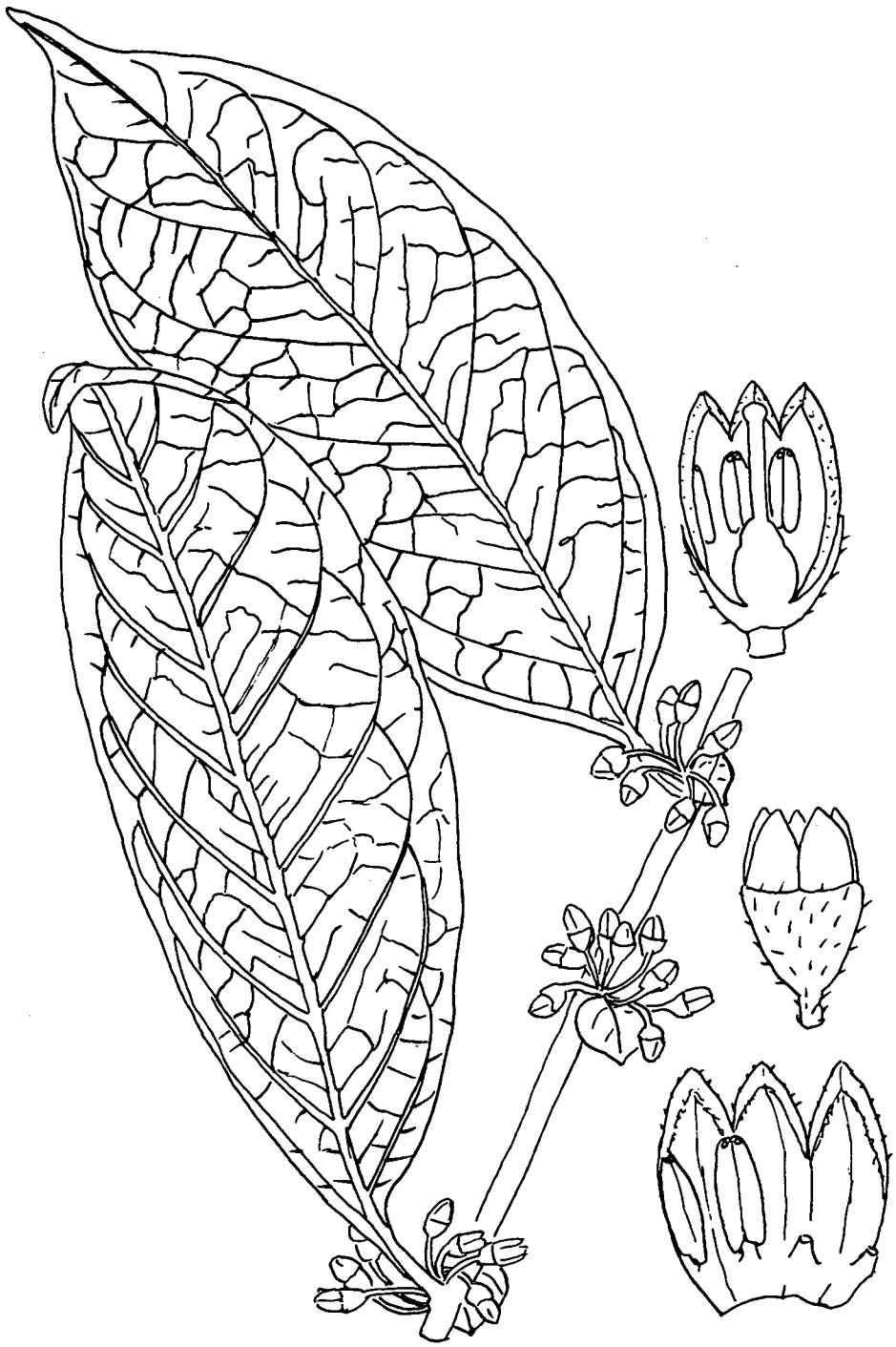

Fig. 18. *S. peranomalum* Wernham. Redrawn from original figure, Hook. Icon. Pl. t. 3062 (1916).

Type citation: *P. van Royen NGF 18229*, 5.ix.1963. Confluence of Warapuri and Warrangga Rivers, Wahgi-Jimi Divide north of Nondugl, Minj sub-dist., Eastern Highlands Dist. Lat. 6° 10′ S, Long. 144° 50′ E, Alt. 7000′ (2134 m). In shrubbery along river, shrub with lax branches 10 ft (3 m) high, leaves dark green above light green below, flowers purple with darker stripes, anthers yellow.

Type material: Holotype BRI, isotypes K, L, LAE.

Derivation: The name is derived from the prominent pustular bases of the hairs.

A sprawling *shrub* or *climber*, indumentum of minute simple, pale antrorse hairs on a pustular base (simple, uniseriate, multicellular) and minute glandular (simple glandular) hairs, abundant on young twigs, occasional on petiole, main veins below, leaves glabrous above and hairs lost on older surfaces. *Leaves* usually paired, very unequal, smaller leaf sometimes lacking; major leaf lamina (14-) 5-7 (-2.5) x (4.2-) 1.5-3 (-1) cm, elliptic, coriaceous, 5-7 principal lateral veins, impressed above, conspicuous below, base rounded to broadly cuneate, apex acute to long acuminate; petiole 5-10 mm long; minor leaf 3-5 mm x 2-3 mm greatly reduced, sometimes absent, ovate, base rounded, apex acute, virtually sessile. *Inflorescence* a solitary flower (rarely two) from leaf axil, possibly dioecious, pedicel to 2.5 cm long, sparsely pubescent. *Calyx* 3-3.5 mm long, cupular, margin entire. *Corolla* stellate, lobes 9-10 mm long, 2-3 mm wide, deeply divided to calyx rim, linear-lanceolate, purple. *Stamens*: filaments c. 1 mm long; anthers 6-7 mm long, linear lanceolate, pores apical, extrorse. *Ovary* 3-4 mm long, ovate; style c. 7 mm long erect; stigma 1 mm long, bilobed and just exceeding anther tips; in male flower ovary, style and stigma vestigial. *Fruits* solitary, pedicel c. 15 mm long, straight; calyx 5 mm diam., saucer-like, entire; *berry* c. 7-8 mm diam., globular to slightly ovoid, final size, colour and texture unknown, a single collection (*Carr 13737*) states "fruit green". (Fig. 19 & 20; Map 9).

Notes

Essentially a species from moderate to high altitudes, nine collections have come from 1524 m to 2744 m with a mean of 2296 m. Ecological notes are not extensive but the plants have been collected from forest, partly felled *Nothofagus* forest, open scrub on limestone, lower montane rainforest, shrubbery by river, forest edges, *Nothofagus* forest and among regrowth on old garden site.

The reproductive biology is inadequately known. Unfortunately the specimens have few flowers available for analysis and whether the plants are dioecious or monoecious is not clear.

Selected specimens (27 collections seen)

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: Western Highlands: *Vandenberg et al NGF 39883*, 30.ix.1968, Wabag road, 1.5 miles from turnoff, 5° 50′, 143° 50′, 2469 m alt., (A, BO, BRI, K, L, LAE); *Symon 13876 & Kerenga*, 13.vi.1984, Tomba Pass, near Mur Mur pass, (ADW, CANB, K, L, LAE, MO); *Symon 10687*, 23.vi.1977, between Mt Hagen and Wabag, 2520 m alt., (ADW, CANB, K, L, LAE, MO); *van Royen NGF 18229*, 5.ix.1963, Confluence of the Warapuri and Warrangga rivers, Wahgi-Jimi divide, 6° 10′, 144° 50′, 2134 m alt., (BRI, K, L, LAE). Chimbu: *Paijmans 1331*, 19.iv.1983, 15 km SW of Keglsugl, 5° 50′, 145° 06′, 2700 m alt., (CANB). *Womersley NGF 4883*, 7.iv.1953, Al river valley near Nondugl, 5° 52′, 144° 45′, 2134 m alt., (A, BM, BO, BRI, CANB, K, L, LAE, NSW); Eastern Highlands: *Symon 10681*, 22.vi.1977, E slope of Daulo, 5° 59′, 145° 30′, (ADW, L, LAE). Southern Highlands: *Croft et al LAE 60818*, 28.xii.1973, north Onim hill SE slope Mt Giluwe, 6° 10′, 143° 59′, 2100 m alt., (ADW, L, LAE); *van Royen 11511*, 19.vii.1976, Mt Giluwe, track from Onim, 6° 04′, 143° 53′, 2290 m alt., (UPNG). Northern: *Carr 13611*, 4.xii.1935, Alola, 8° 59′, 147° 43′, 1829 m alt., (A, BM, CANB, K, L, NY); *Carr 13737-8*, 11.xii.1935, Alola, 8° 59′, 147° 43′, 1981 m alt., (BM, CANB, K, L, NY).

Fig. 19. *S. pustulatum* Symon. Drawn from herbarium specimen, *Womersley 4883* (CANB), fruit from *Carr 13738* (CANB).

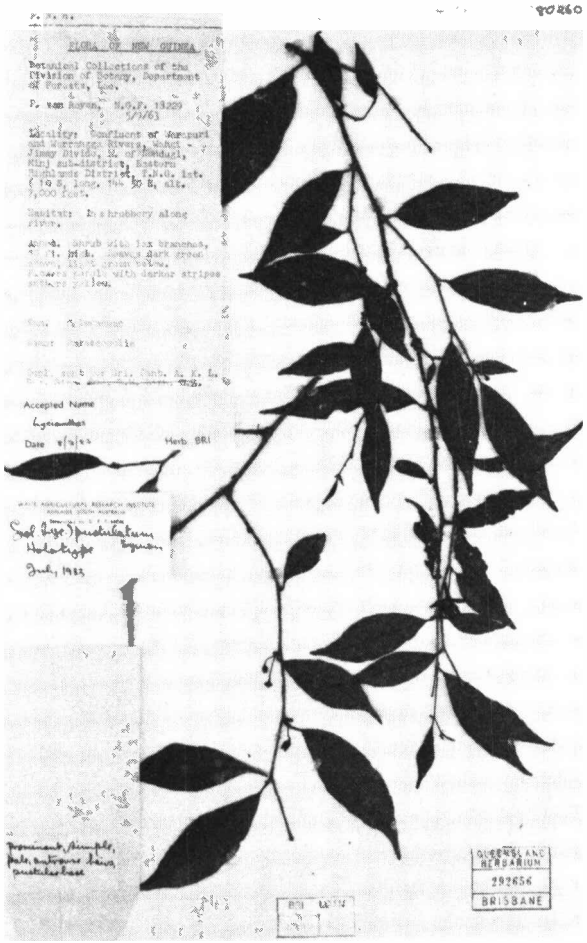

Fig. 20. Holotype of *S. pustulatum* Symon (*van Royen NGF 18229*, BRI).

Fig. 21. Holotype of *S. umbonatum* Symon (*Hartley 11756*, CANB).

18. **Solanum rostellatum** Merrill and Perry, J. Arnold Arb. 30 (1949) 51-52.

Type citation: "British New Guinea: Central Division, East Mt. Tafa, *Brass 4135* (type) May 1933, Alt. 2100 m, common on roadside in tall foothill forest (weak shrub about 1 m high, leaves dull green on purple petioles; corolla purple, anthers bright yellow)."

Type material: Holotype A!, isotypes BRI!, L!, NY! and photos ADW.

Derivation: the name refers to the somewhat beaked nature of the flower buds.

A weak *shrub* or *climber* to 3 m occasionally epiphytic on tree boles, indumentum of simple hairs (simple, uniseriate multicellular) curvedly erect, antrorse or appressed, sometimes on a swollen pustular base, brownish, abundant on young twigs and on main veins below, sparse on most leaf surfaces, soon lost on older surfaces. *Leaves* paired, very unequal, minor leaf greatly reduced, generally present, sometimes lost from older stems; major leaf lamina (16.5-) 9 (-3.5) x (5.7-) 3 (-1) cm elliptic to broad-elliptic, dull green, 5-7 principal lateral veins, conspicuous below, base rounded to broadly cuneate, oblique, apex acuminate to long acuminate; petiole 3-10 mm long, relatively short, occasionally twisting about support, purple; minor leaf (2-) 0.8 (0.5) cm reniform, orbicular to broad ovate, base cordate, apex rounded, sessile. *Inflorescence* a cluster of (1-) 2-3 (-6) pedicellate bisexual flowers from the leaf axil; pedicel to 2.4 cm long, straight. *Calyx* 3-4 mm deep, cupulate, entire. *Corolla* stellate, lobes deeply divided to calyx rim. Tube c. 2 mm long, cylindrical, lobes 6-9 mm long, long elliptic, interacuminal membrane absent, apex minutely inflexed, purple-blue. *Stamens*: filaments c. 1 mm long, flattened; anthers 4.5-7.5 mm long, oblong-elliptic, pores apical. *Ovary* c. 2 mm long; style 5-7 mm long erect straight; stigma c. 2 mm long, decurrent on style, apex shortly bifid. *Fruit* a cluster 1-5 berries; pedicel 2 (-2.5) cm, straight; calyx 4-5 mm diam., saucer-like; *berry* 6-8 mm diam., globular to apiculate in some collections, dark green ? immature, final colour and texture unknown. (Fig. 22; Map 2).

Notes

The species has been collected from 1677 m altitude to 2800 m, with a mean of nine collections being 1929 m. They have come from submontane rainforest, roadside regrowth, primary montane forest and secondary forest. The few flowers available for inspection have all been bisexual.

Selected specimens (14 collections seen)

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: West Sepik: *Henty et al. NGF 41640*, 19.x.1968, Bulinup W of Oksapmin, 5° 20′, 142° 15′, 1981 m alt., (A, BISH, BO, BRI, CANB, K, L, LAE, NSW). Chimbu: *Millar NGF 38438*, 28.ii.1970, Ekuam Gumini, 8° 00′, 147° 55′, 2591 m alt., (L, LAE). Eastern Highlands: *Grubb & Edwards 240*, 24.v.1971, W of Fatima river Marafunga, 6° 00′, 145° 11′, 2600 m alt., (L, LAE); *Roemer 1063*, xi.1909, Mt Hellwig, 5° 56′, 145° 36′, (BO, L); *Symon 10677-8*, 22.vi.1977, Daulo Pass, 5° 59′, 145° 30′, (ADW, F, K, L, LAE, MO, US); *Symon 10690 & Katik*, 24.vi.1977, between Nol and Mendi, near crest, 6° 08′, 143° 39′, (ADW, CANB, K, L, LAE, MO). Central: *Brass 4135*, 29.v.1933, E Mt Tafa, 8° 35′, 147° 10′, 2100 m alt., (A, BRI, L, NY); *Croft & Lelean NGF 34800*, 17.ix.1973, E slope of Lake Myola, 9° 09′, 147° 43′, (A, BISH, BO, BRI, K, L, LAE, MO); *Frodin 661*, 20.vi.1971, Goilala, 8° 22′, 146° 59′ 2200 m alt., (L, LAE); *Schodde 5705*, 14.ix.1970, Efogi, 9° 09′, 147° 40′, 1830 m alt., (BRI, CANB, K, L, LAE).

19. **Solanum umbonatum** Symon, sp. nov.

Frutex effuse scandens, inermis, paucis pilis minutis ferrugineis papillatis praecipue in juvenalibus ramis, glabrescentibus. *Folia* geminata inaequilissima interdum sine folio minore; maius 9 x 2.7 cm, ellipticum acutum ad acuminatum, petiolo 5-7 mm longo; minor ad 1 x 0.4 cm trullatum, petiolo 1-1.5 mm. *Inflorescentia* fasciculata 5-10 floribus. *Flos* masculinus: pedicellus circa 5 mm longus, *calycis* tubus 2-2.5 mm longus, cupulatus, 4-5 umbonibus ad 0.5 mm longis sub margine; *corolla* stellata lobis circa 5 mm longis ellipticis crassis; filamenta circa 1 mm; antherae 3.5-4 mm longae oblongae; *ovarium* stylus stigma vestigialia. *Flos* hermaphroditus non visus. Fructus fasciculatus 1-3 baccis. *Bacca* circa 5 mm diam. globularis, in maturitate non visa.

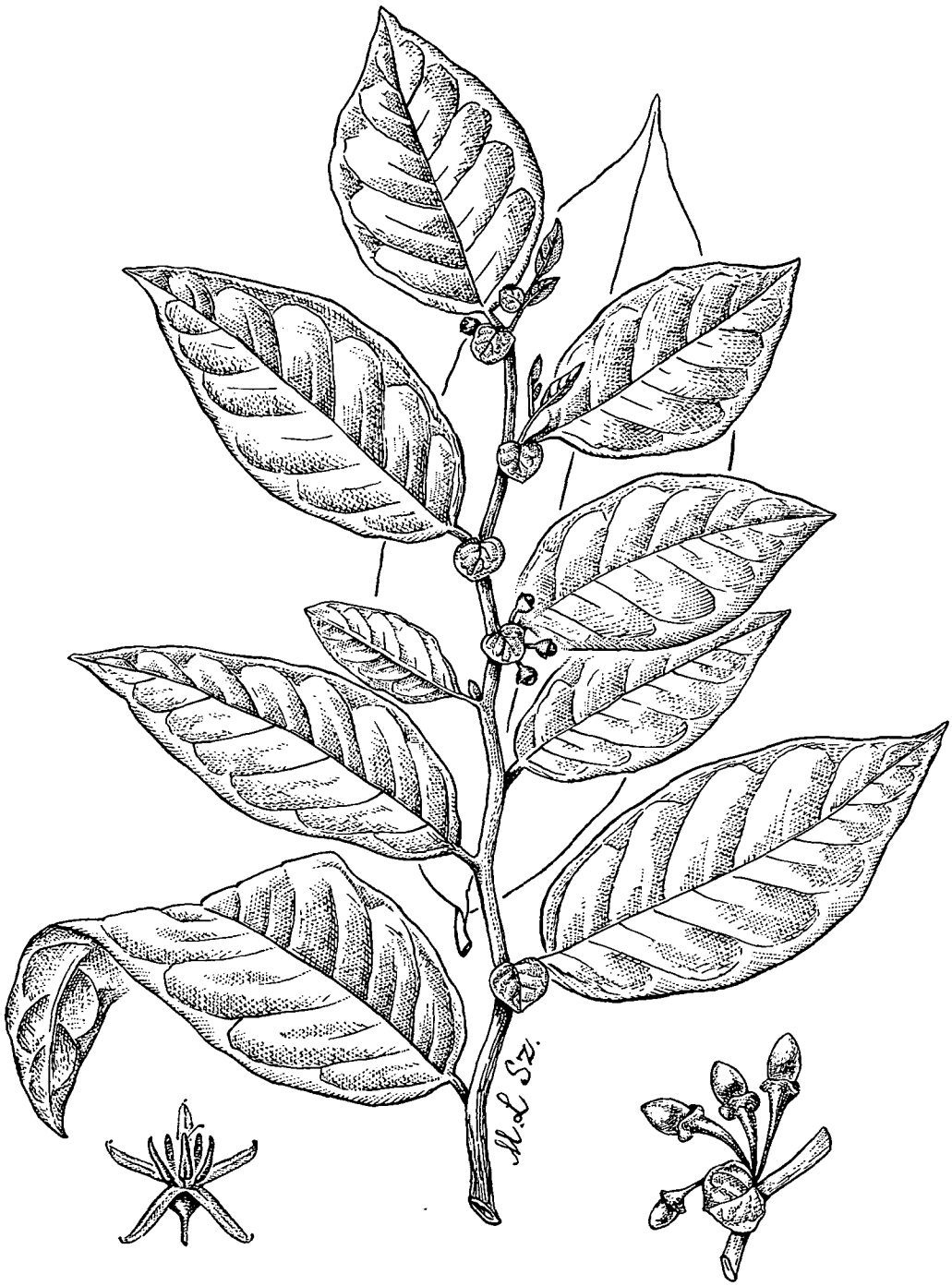

Fig. 22. *S. rostellatum* Merrill & Perry. Drawn from herbarium specimen, *Symon 10677* (ADW).

Type citation: *Hartley 11756*, 26.iv.1963, Edie Creek, about 4 miles (6.4 km) SW of Wau, Morobe Dist. 1829 m alt. Liane in oak forest on slope, flowers purple, leaves dark green above, pale below.

Type material: Holotype CANB, isotypes BRI, L, LAE.

Derivation: the name refers to the 4-5 short blunt lobes (umbos) just below the calyx rim.

A *shrub*, sprawling *climber* or *liane* (epiphyte according to *Streimann & Kairo NGF 35988*) size not reported, stems to 2 cm diam., glabrous or indumentum of sparse, minute, brown, papillose hairs (lens essential) on young tips, buds, soon lost. *Leaves* paired, minor leaf greatly reduced often absent, young leaves flushed purple; major leaf lamina (16-) 9 (-4.5) x (6.5-) 2.7 (-1.2) cm, elliptic, with 5-8 principal lateral veins, base cuneate, apex acute to acuminate; petiole 5-7 mm long, purple; minor leaf (1.3-) 1.0 (-0.3) x 0.3-0.4 cm, trowel-shaped, base cuneate, apex acute; petiole 1-1.5 mm long. *Inflorescence* clusters of 5-10 pedicellate flowers. *Male flower*: pedicel c. 5 mm long, slender; calyx 2-2.5 mm long, cupulate, with 4-5 umbos to 0.5 mm long, slightly deflexed, below calyx rim, pedicel and calyx purple at anthesis; corolla stellate, deeply divided, lobes c. 5 mm long, elliptic, thick, interacuminal membrane absent. *Stamens*: filaments c. 1 mm long, flattened;*anthers* 3.5-4 mm long, oblong, waxy yellow, pores apical; ovary, style and stigma vestigial. *Bisexual flower* not seen. *Fruits* in clusters of 1-3 (*Anon NGF 3104*) pedicel c. 7-15 mm long, calyx 4-5 mm diam., saucer-shaped, umbos less obvious, ribs visible, *berry* c. 5 mm diam., globular, deep green, ? immature, final colour and texture unknown. (Fig. 21 & 23; Map 16).

Notes

This species has been collected from 457 m altitude, to 2286 m, with a mean of 1600 m from 8 collections. These have come from lower montane forest, rainforest, epiphytic on *Pandanus*, secondary swampy area, and the floor of submontane forest. All but two of the collections appear to be male and bisexual flowers have not been seen.

The species is distinguished from *S. pustulatum* by the short pedicels, umbonate buds, minute papillose hairs rather than long simple antrorse hairs. *S. umbonatum* appears related to *S. wollastonii* which has similar minute, brown indumentum and shortly lobed buds described as "5 teeth 3 mm long". *S. wollastonii* has larger suborbicular minor leaves and fewer flowers per node.

Selected specimens (17 collections seen)

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: Morobe: *Conn 142 & Kairo*, 27.iv.1977, near Blue Point Mt Kaindi 7° 10′, 146° 40′, 800 m alt., (ADW, BFC, L); *Craven & Schodde 1258*, 11.iv.1966, near Wengomanga via Oiwa, 7° 18′, 146° 13′, 1951 m alt., (BRI, K, L, LAE); *Hartley 11434*, 18.iii.1963, Tymne-Wago track, 146° 42′, 6° 50′, 457 m alt., (A, BRI, CANB, L, LAE, RSA); *Hartley 11756*, 26.iv.1963, Edie Creek, 7° 21′, 146° 39′, 1829 m alt., (BRI, CANB, L, LAE); *Streimann 9635*, 17.x.1982, Ekuti Divide, 7° 19′, 146° 23′, (CBG, L); *Streimann & Stevens LAE 53892*, 7.i.1972, Angabena ridge, 7° 20′, 146° 10′, 1675 m alt., (A, BRI, CANB, K, L, LAE); *Symon 10632*, 29.v.1977, Aseki road, 7° 11′, 146° 39′, (ADW, CANB, K, L, LAE, MO). Gulf: *Stevens LAE 54766*, 8.i.1972, Aseki-Spreader divide, 7° 20′, 146° 10′, 1800 m alt., (BO, BRI, K, L, LAE, NSW, US); *Streimann & Kairo NGF 35988*, 14.v.1958, above Hambio village 7° 22′, 146° 03′, 1859 m alt., (BFC, LAE). Milne Bay: *Katik et al. s.n.*, 18.iii.1979, Mt Rossel, Rossel Island, 11° 20′, 154° 10′, (LAE).

20. **Solanum vitiense** Seem., J. Bot. 1 (1863) 206 and Fl. Vitiense (1866) 176, tab. 36.

Type citation: "Fiji Islands, Seemann 340 ex parte (by some mishap specimens of an *Ardisia* were mixed with my n. 340)."

Type collection: K!, a sheet at K labelled "type specimen" bears a fruiting and a flowering shoot and two labels, the larger of which reads "No. 340/*Solanum viride* R. Brown? / Viti or Fiji Islands / collected by / Dr. B. Seemann 1860," and a smaller label states "Port Kinmairo /

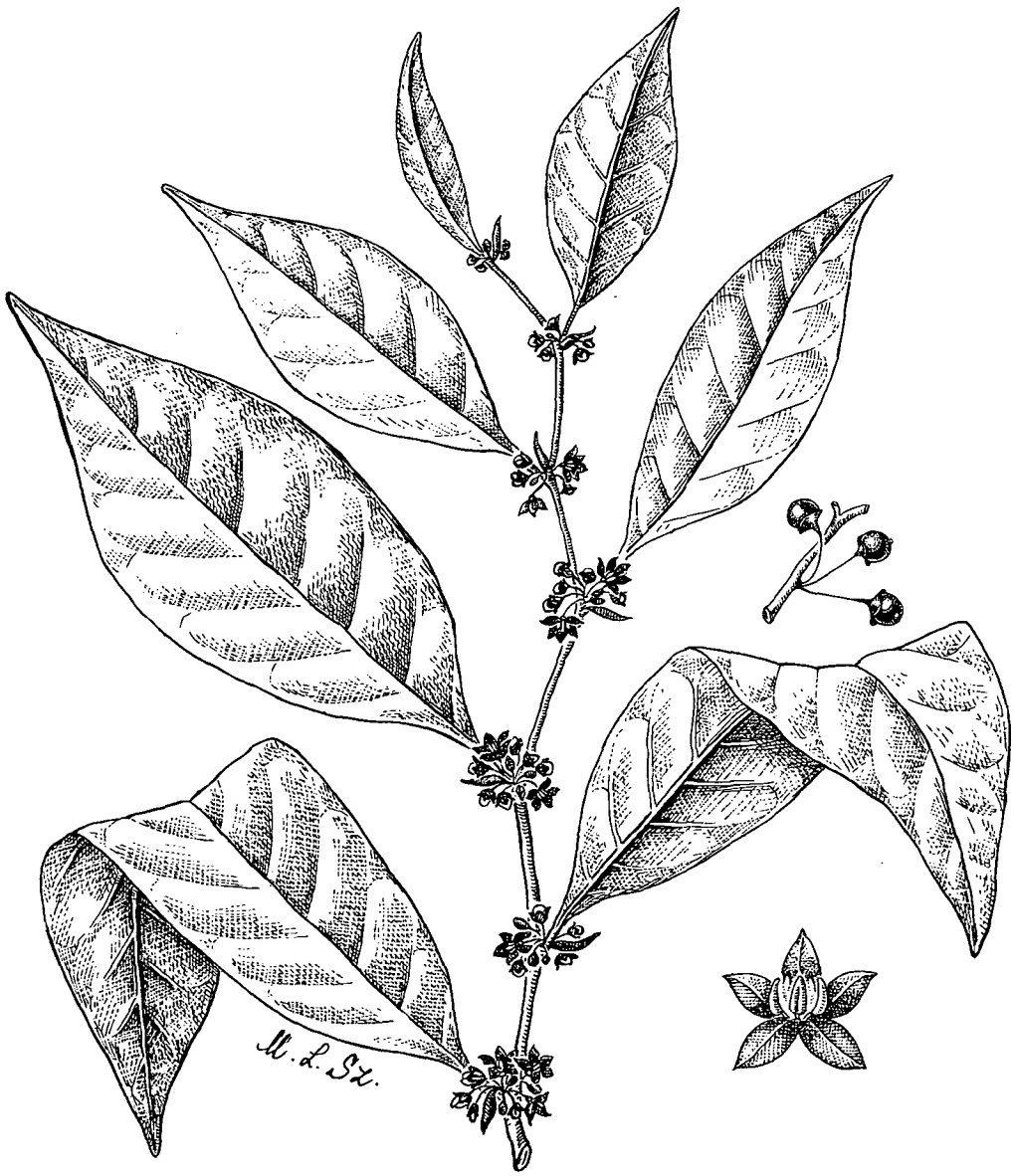

Fig. 23. *S. umbonatum* Symon. Drawn from herbarium specimen, *Hartley 11756* (CANB).

July 1860". A second sheet at K bears one fruiting and one flowering shoot and has the label "Viti Levu / tree to 24' / Ovalau October 1860". Pinned to this sheet is a sketch of a floral dissection, part of which was used in the tab. 36 referred to above. Isotypes:BM!, GH!, MEL!, NSW!, OXF! and photos ADW.

Derivation: the name refers to the island where the species was first collected, Viti a term originally used for Fiji.

Brachistus feddei Reinecke, Bot. Jahrb. Syst. 25 (1898) 674-675.

Type citation: "Savaii : Ueber Aopo, Sept. 1894 (n. 58 a ♂). Upolu : Wald am Samea-Berg, Sept. 1893 (no. 58 ♂); Mulifanua-Ur-Wald, Oct. 1893 (no. 78 ♀)."

Type material: Holotype ?B (destroyed), isotypes at K two sheets, one with the label "Flora Samoënsis / No. 58 / *Brachistus pacificus* Reinecke / Upsolu Sameaberg / October 1893 Dr. Reinecke". The second has the label "Flora Samoënsis / No. 58a / *Brachistus Feddei* (*pacificus* struck through) Reinecke / Savaii uber Aopa / September 1894 Dr. Reinecke." Photos ADW.

Derivation: The name commemorates F.K.G. Fedde (1873-1942) eminent German botanist, editor and publisher.

Solanum rechingeri Witasek, Fedde Repert. 5 (1908) 165.

Type citation: "Insula Poperang (Gruppe der Shortlands-Inseln). Octobri 1905 (*Rechinger, No. 4398*)."

Type material: Holotype W (n.v.), photo ADW.

Derivation: the name commemorates K. Rechinger (1867-1952) Austrian botanist who visited and collected in the Pacific and New Guinea.

Small to medium *tree* to (2-) 5.8 (-15) m tall, trunk to 30 cm diam. often crooked, bark smooth, light brown, twigs with abundant lenticels, unarmed; indumentum of minute, brownish, crisped hairs on young tips only (lens necessary) soon glabrous. *Leaves* paired, smaller about half the size of the larger, major leaf lamina (19.5-) 13 (-7) x (10-) 5.8 (-2.5) cm, elliptic to broad elliptic, 8-10 principal lateral veins, entire, base broadly cuneate to rounded, oblique, apex acute to acuminate; petiole (3-) 1.8 (-1) cm; minor leaf (8-) 5.5 (-2) x (6.5-) 3.8 (-1) cm, broad elliptic to ovate to orbicular, 5-7 main lateral veins, base rounded, apex rounded, acute to acuminate, petiole (1-) 0.7 (-0.5)cm. *Inflorescence* a cluster of 4-9 (-20) pedicellate flowers from between two leaf bases—a short vermiform axis 5-8 mm may develop in some cases; pedicel c. 1.5 cm long. *Calyx* c. 3 mm long, cupulate, margin entire or with very shallow rounded lobes scarcely distinguished, sometimes almost ciliate or with minute acumens. *Corolla* tube 2-3 mm long, cylindrical in male flowers, swollen about ovary in bisexual flowers, lobes 5-8 mm long, lanceolate-elliptic, deeply divided to the rim of the calyx, apex minutely inflexed, lobes reflexed at maturity, white, lavender to purple. *Stamens*: filaments c. 2 mm long inserted on tube about summit of ovary, anthers c. 4 mm long, oblong-lanceolate, pores apical, or split down side of anther developing in some cases. *Ovary* 1.5-2 mm long, oblong-conical; *style* c. 6 mm long, erect, stigma capitate or shortly bilobed. In male flowers ovary, style and stigma all vestigial, together only 1-2 mm long. *Fruit* clusters of 1-6 pedicellate berries; pedicel 2-3.5 cm long, swollen towards apex, abundant lenticels in upper part; calyx 6-9 mm diam., saucer-like, coriaceous, entire; *berry* 1-1.5 cm diam., globular, smooth, bright red at maturity. *Seeds* 3-3.5 mm across, somewhat irregularly twisted, minutely reticulate with a thicker corky margin, 79 and 103 counted in two fruits. (Fig. 24; Map 15).

Notes

S. vitiense has been collected frequently from the Solomon, Fiji and Western Samoan islands and once from Vavau in the Tonga group. Surprisingly it has not been collected from Vanuatu or the New Caledonian Islands. This species is mostly found at low altitudes; from sea level to 1350 m, the highest, on Savaii (Samoa). It must be one of the largest species of *Solanum* as it commonly reaches 6 m, and has been recorded as 15 m tall. All but one collector record the fruit as red, but *Kajewski 1863* from Bougainville describes them as blue—this may be in error. There are regional differences in flower colour. In the Solomon Islands the ratio of white to coloured is 13/10, in Fiji 21/3 and in the Samoan islands 8/13.

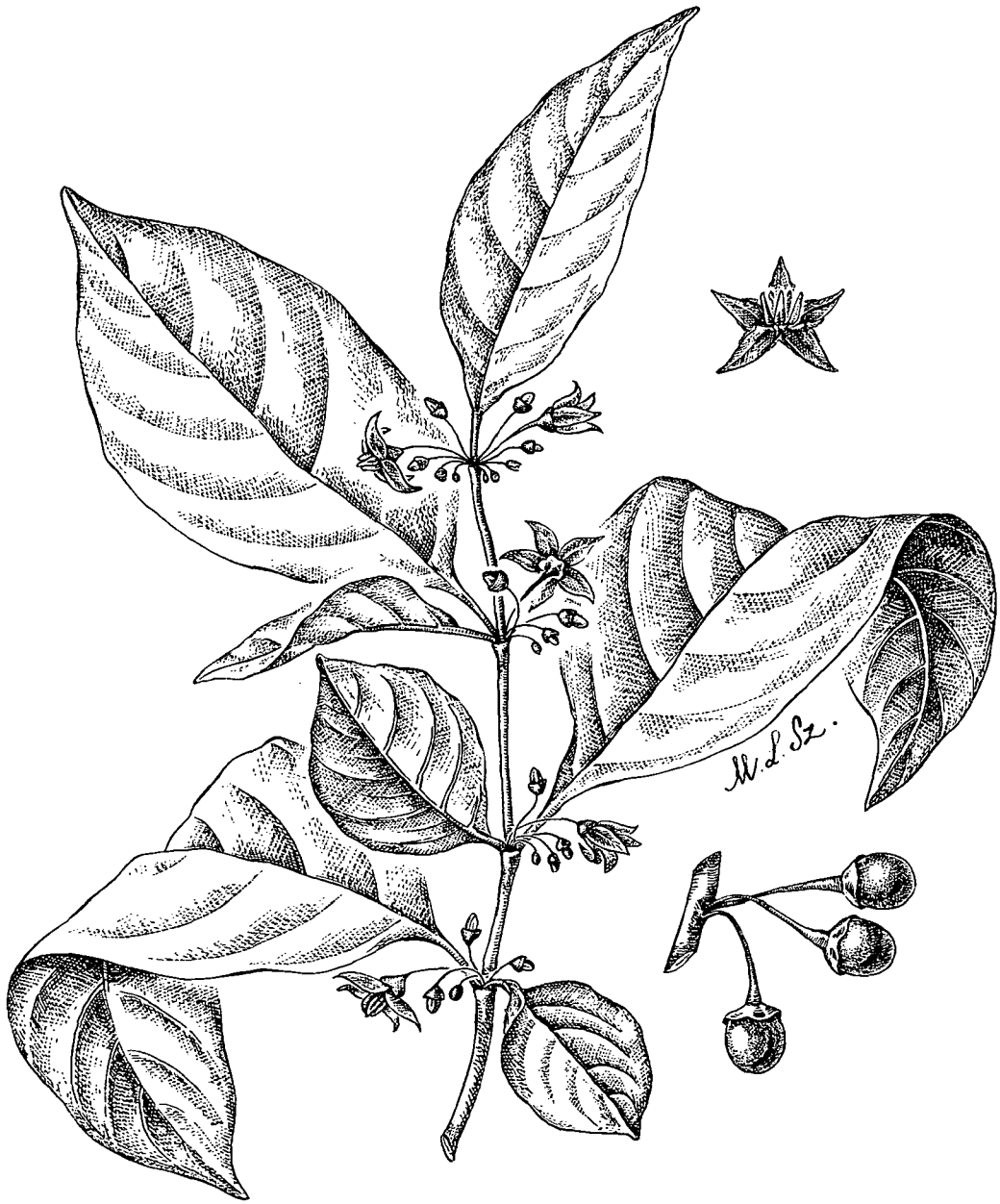

Fig. 24. *S. vitiense* Seemann. Drawn from herbarium specimen, *Kajewski 1800* (BRI), fruit from *Kajewski 1863* (BRI).

The reasons for this are not indicated but as a number of records in each locality describe flowers as "white and lavender", lilac to white" or "white-purple", the change may be related to the age of the flower or to environmental conditions. They are also often described as scented which is not common in *Solanum*. In the Solomon Islands plants have been collected in flower in all months except July and October, ripe fruits mostly late in the year from October to January. In Fiji flowering is again widespread with most between July and November: in the Samoan Islands flowering specimens have been noted between May to December with most collected in August. The species has a number of characters intermediate between subgenus *Lycianthes* and *Solanum*. The calyx often has shallow rounded lobes in the bud stage and minute acumens also occur in some specimens. At fruit maturity the calyx is entire and shows no sign of lobes. The inflorescences may also develop short axes (cf. *S. bitterianum*). The dehiscence of the anthers seems to vary from apical pores to longitudinal slits. In a detailed description of the flower *Powell 365* states "anthers 2 celled bursting lengthwise". Like other species of the subgenus *Lycianthes* the petioles, pedicels and calyx may be coloured purplish. The species is also monoecious with both male and hermaphrodite flowers.

Selected specimens (30 collections seen)

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: Bougainville: *Foreman NGF 45698*, 25.viii.1969, 22 miles NW of Tonelei Harbour, 6° 46′, 155° 54′, 91 m alt., (A, CANB, L, LAE); *Kajeswki 1800*, 2.vi.1930, Neketigo, Kugimaru, Buin, 6° 52′, 155° 42′, 150 m alt., (A, ADW, BM, BRI); *Kajewski 1863*, 12.vi.1930, as above, (A, BM, BRI, L, NSW); *Schodde & Craven 4094*, 21.ix.1964, vicinity of Aku village, 6° 45′ 155° 35′, (A, BISH, BO, BRI, CANB, K, L, LAE); *Waterhouse 66*, ix. 1932, Siwai, 6° 33′, 155° 25′, (A, BISH, K, NY, US).

SOLOMON ISLANDS: Santa Ysabel: *Brass 3314*, 8.xii.1932, Tiratona, 8° 00′, 151° 00′, 600 m alt., (ADW, BRI, L); *Teona BSIP 6362*, 5.iv.1966, Kolokofa hillside, 200 m alt., (K, LAE, US); *Whitmore BSIP 2437*, 27.x.1963, near Maringe Mission, (K, LAE). Mono Island: *Mauriasi et al. BSIP 14154, 11.v.1969, Palusua, 7°* 23′, 155° 32′, 23 m alt., (K, L, LAE). Fauro Island: *Mauriasi et al. BSIP 13952*, s.d., Haluena river area, 6° 55′, 156° 05′, 114 m alt., (A, LAE). Shortland Island: *Guppy 160*, V. 1884, in plantation, 7° 05′, 155° 45′, (K, MEL). New Georgia: *Mauriasi et al. BSIP 8491*, 20.xii.1967, SE Kolombangara W of Vila river, 8° 00′, 157° 10′, 30 m alt., (K, LAE); *Whitmore et al. BSIP 3081*, 26.1.1964, Baga Island, 7° 50′, 156° 34′, (K, L, LAE); *Whitmore et al. BSIP 5483*, s.d., Wagina Island, 7° 25′, 157° 44′, (LAE). West Choiseul: *Gafui et al. BSIP 18862*, s.d., East Mbirambira, 7° 00′, 157° 00′, 15 m alt., (K, LAE). Florida Island: *Comins 235*, ±1890, Popinisura, 9° 00′, 160° 05′, (K). Big Nggela: *Gafui et al. BSIP 16787*, s.d., Rove area, 9° 00′, 160° 05′, 91 m alt., (K, LAE). Guadalcanal: *Kajewski 2388*, 31.xii.1930, Nari, Berande river, sea level, (ADW, BISH, BM, NSW); *Kere BSIP 4936*, 27.xi.1964, Mt Austin, 305 m alt., (K, LAE); *Riley 45*, 20.ix.1945, Tenam river, (A, NY, US). Malatia: *Gafui et al. BSIP 16450*, 5.ix.1969, N of Anihonota village, 9° 00′, 161° 00′, 76 m alt., (K).

21. **Solanum wollastonii** Wernham, Trans. Linn. Soc. Lond., Bot. 9 (1916) 120.

Type citation: "Camp VIII? to IX, 4900 to 5500 ft".

Type material: Holotype BM! and photo ADW. The label on the sheet has the information: "Solanum s Camp VIII-IX 4900-5500 ft. collected by C. Boden Kloss."

Derivation: the name refers to A.F.R. Wollaston (1875-1930) British physician and explorer who made two expeditions to Mt. Carstensz in New Guinea.

Epiphytic *shrub* wholly glabrous, young stems graceful. *Leaves* papery, alternate or close together in pairs, the larger one oblong or elliptic 9-11 cm by 2.5-3.8 cm, with acuminate point, apex obtuse, base often oblique; petiole 5 mm long; the lesser leaf sub-orbicular to 1.8 x 1.5 cm, shortly petiolate. *Flowers* 1 or 2 arising between the leaves, pedicels slender at base, slightly thickened upwards, about 2 cm long. *Calyx* campanulate with 5 teeth, 3 mm long. *Corolla* glabrous, divided to near the base into 5 narrow oblong teeth 10 x 2 mm long. *Staminal* filaments short, anthers oblong 8 mm long. *Ovary* globose, style thick, stigma clavate. Fruit not seen.

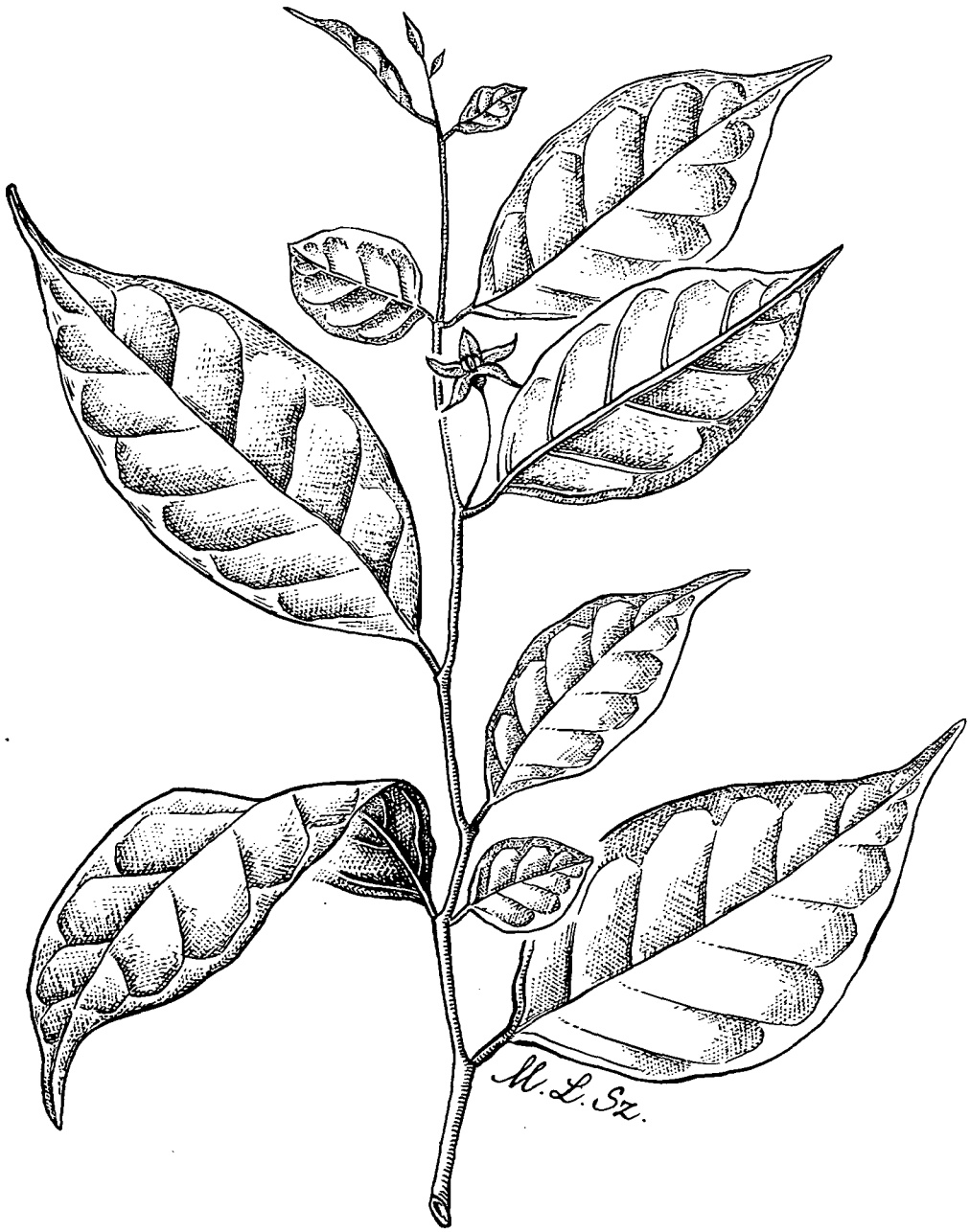

Fig. 25. *S. wollastonii* Wernham. Drawn from photo of type specimens, *Boden-Kloss* (BM).

Notes

The original description has been repeated above. No other collections have been recognised. It appears related to *S. umbonatum* which has similar minute indumentum, but more numerous flowers per node and very much smaller minor leaves. From *S. moszkowskii* it differs in having distinct umbos on the calyx. (Fig. 25; Map 5).

Sect. 5. (subgen. *Archaesolanum* Bitter ex Marzell) **Archaesolanum** (Bitter ex Marzell) Danert, Kulturpflanze 18 (1970) 267, 268.

Type species: *S. aviculare* Forst. f.

Short lived, soft-wooded *shrubs*, 0.5-2 (-4) m tall, lasting a few years, straggly with age, not reproducing vegetatively, glabrous except for minute simple or glandular hairs, all species unarmed. *Leaves* very variable, juvenile leaves deeply lobed, often large, 15-30 cm long, adult leaves usually lanceolate, entire, smaller. *Flowers* in large or small scorpioid cymes, often in fork of branches, rarely solitary. *Corolla* 1.5-5 cm diam. rotate or rotate-stellate, purple or bluish-violet. Filaments 2-5 mm long; anthers free, oblong, loosely erect. *Fruit* globular, ovoid or ellipsoidal, at maturity green suffused purple, yellow, orange to scarlet, succulent, sometimes aromatic; stone cell masses often conspicuous and numerous. *Seeds* 1.5-3 mm long.

Species of this section are strictly Australasian with a slight concentration of species in south eastern Australia. The section is unique in the genus in having the base chromosome number of n = 23 (cf. n = 12).

Two species occur in New Guinea, one of which occurs in Australia and New Zealand; the second is endemic and is described here.

22. **Solanum aviculare** Forst. f., Pl. Esc. (1786) 42, No. 12

Type citation: "Nova Zeelandia", the specimen was collected from New Zealand during Cook's second voyage.

Type material: Lectotype BM, "107 *Solanum aviculare*—G. Forster's Herbarium" Queen Charlotte Sound, New Zealand, proposed by Baylis (1954).

Derivation: Sometimes called 'bird nightshade' the origin of its application is not clear.

An erect, soft-wooded *shrub*, (1-) 2 (-4) m tall, lasting several years, becoming woody towards base, straggly with age, not clonal, stem angular with raised lines; all parts glabrous except for minute simple and glandular hairs on young growing points and corolla tips, unarmed, general aspect green. Lobed leaf lamina 15-30 cm x 10-15 cm, broadly elliptic to obovate, with 3-11 lobes, sinuses rounded, cut to within 1 cm of midvein; lobes 1-10 x 1-2 cm, lanceolate or long triangular, leaf and lobe apex acute to acuminate; entire leaves (8-) 10 (-25) x (1-) 2 (-3.5) cm, lanceolate-elliptic, apex mostly acute to acuminate, base cuneate, oblique; petiole 1-1.5 cm long, usually distinct and unwinged to base. *Inflorescence* a scorpioid cyme of few to 10 flowers, from stem fork or leaf axil, often forked at base with a pedicellate flower in fork, cyme rarely forked a second time; common peduncle usually lacking, floral rhachis to 15 cm long; pedicel 1.5-2 cm long. *Calyx* campanulate, 3-4 mm long, lobes bluntly triangular, acumens short, blunt. *Corolla* 3-4 cm diam., rotate-stellate, lobes broad, interacuminal tissue slightly exceeding acumen, shallowly campanulate and often facing downwards, bluish-violet (close to RHS Lavender Violet 637/1 & 2) with a deeper violet star. *Stamens*: filaments 3 mm long, thick; anthers 4 mm long, oblong, firmly erect. *Ovary* glabrous; style 7-8 mm long, slightly sigmoid, pale, erect, glabrous; stigma terminal, pale or green. *Fruits* 2 x 1-1.5 cm, obovoid to ellipsoid, at maturity bright orange-red to scarlet, succulent. *Seeds* 1.5 mm long, finely

Fig. 26. *S. aviculare* Forst. f. Drawn from live plant, *Symon s.n.* (ADW 40818).

reticulate, light or reddish-brown. Stone cell masses 1-1.5 mm long, rarely more, rounded, rarely facetted, not conspicuous. Seed counts on 10 berries yielded (388-) 690 (-845) seeds, with (29-) 40 (-53) stone cell masses. *Cotyledons* 8-10 x 3-5 mm, ovate, acute, almost glabrous, hypocotyl and petiole with simple hairs, first true leaf 15 x 12 mm with a few sparse hairs. (Fig. 26; Map 2).

Notes

S. aviculare is found at moderate to high altitudes in New Guinea, the heights given in twelve collections ranging from 1326 m to 2590 m with a mean of 1970 m. It occurs in secondary forest, on road edges and particularly in garden sites. Although several collectors state it is deliberately grown, there is no mention of any uses for the plant, e.g. *Balgooy 986*, Keglsugl Airstrip, "the locals seem not to make use of it".

S. aviculare is one of the few *Solanum* species in New Guinea that also occurs in Australia. It is possible that it is an early introduction, the oldest collection I have seen is *Giulianetti*, 1896, from Neneba, near Mt Scratchley. However, the fact that an endemic species of subgen. *Archaesolanum*, *S. multivenosum* also occurs here would support the idea that it is a native plant of longer standing. The species was not described in Bitter (1917), but plants from the higher altitudinal regions of New Guinea were much less well known at that time.

The only closely related species in New Guinea is *S. multivenosum* from which it differs in leaf venation, in having vermilion berries about 2 cm long in contrast to the very much larger drab green berries to 4 cm long, and in being less pubescent.

Specimens seen

IRIAN JAYA: Vogelkop: *Gjellerup 1190*, 30.iv.1912, Mt Arfak, 1° 14′, 134° 01′, (L); *Kanehira & Hatusima 13888*, 8.iv.1940, Angi, Arfak mountains, 1° 14′, 134° 01′, 1900 m alt., (A, BO). Snow Mountains: *BodenKloss s.n.*, i.1913, Camp VIII-IX, Mt Carstensz, 4° 05′, 137° 09′, (BM). Mimika: *Eyma 4505*, 28.i.1939, Wissel Lakes, 4° 05′, 136° 10′, 1750 m alt., (BO); *Eyma 4553*, ii.1939, Wissel Lakes region, 4° 05′, 136° 10′, (BO, K, L).

PAPUA NEW GUINEA: West Sepik: *Henty et al. NGF 41641*, 19.x.1968, Bulindup W of Oksapmin, 5° 17′, 142° 15′, (A, BISH, BO, BRI, K, L, LAE). Madang: *Clemens 7054*, 10.ix.1937, Sambanga, 4° 40′, 145° 04′, 1676 m alt., (A, L). Morobe: *Kairo 762*, 13.viii.1980, Gumi divide, 7° 13′, 146° 27′, (CBG); *Lane-Poole 544*, s.d., Nomi river Wasim Wasim, 6° 15′, 147° 00′, (BRI); *Streimann & Kairo NGF 27798*, 10.vi.1966, Wau, 7° 20′, 146° 45′, 1372 m alt., (A, BRI, CANB, FCB, K, L, LAE); *Symon 10629*, 29.v.1977, Aseki road from Bulolo, 7° 20′, 146° 10′, (ADW, LAE); *Symon 13852*, 3.vi.1984, Gumi area, 7° 12′, 146° 25′, (ADW, L, LAE). Western Highlands: *Green s.n.*, 24.vii.1962, Mt Hagen, 5° 45′, 144° 02′, (LAE); *Wheeler ANU 6194*, s.d., Weyek village 10 miles NW of Mt Hagen 5° 45′, 144° 02′, 1829 m alt., (L, LAE). Chimbu: *Balgooy 986*, 3.vii.1965, Keglsugl airstrip, 5° 50′, 145° 06′, 2500 m alt., (A, L, LAE); *Borgmann 303*, s.d. Keglsugl 5° 50′, 145° 06′, 2600 m alt., (L, LAE); *Eichler 18243*, 28.iv.1965, near Keglsugl, E slope Mt Wilhelm, 5° 50′, 145° 06′, 2500 m alt., (LAE); *Millar NGF 23144*, 2.ii.1964, Keglsugl, 6° 00, 145° 00′, 2622 m alt., (A, BISH, BO, BRI, K, L, LAE, NSW); *Robbins 666-667*, s.d., Keglsugl 5° 50′, 145° 06, 2439 m alt., (CANB, L, LAE). Eastern Highlands: *Hay 246*, 21.iii.1972, 10 miles SE of Obura, 6° 40′, 14° 600, 1920 m alt., (LAE); *Hoogland & Pullen 5318*, 12.vi.1956, near Yontegi village, 6° 13′, 145° 36′, 1900 m alt., (CANB, LAE). Gulf: *Brown 256*, 9.ix.1952, vicinity of Ueli,? Mt. Yule, 8° 12′, 146° 48′, 1219 m alt., (A). Central: *Carr 14366*, 3.x.1935, Boridi, 9° 05′, 147° 38′, 1371 m alt., (BM, CANB, K, L); *Giulianetti s.n.*, 1896, Neneba, Mt Scratchley, 8° 43′, 147° 27′, 1220 m alt., (K). Northern: *Carr 14091*, 30.xii.1935, Alola, 8° 59′, 147° 43′, 1372 m alt., (A, BM, K, L, NY); *Stevens & Veldkamp LAE 54158*, 20.vi.1972, Pumpunion, Mt Suckling, 9° 47′, 149° 01, 2035 m alt., (A, BRI, CANB, K, L, LAE).

23. **Solanum multivenosum** Symon, sp. nov.

Frutex ad 2-3 m altus, inermis, pilis minutis simplicibus. *Folia* varia—alia 15 x 9 cm lobis lateralibus duobus, alia 10-14 x 1.5-2.5 cm lanceolata acuminata, petiolo 1.5-2.5 cm longo. *Inflorescentia* cymosa brevis, interdum flos solitarius; pedunculus circa 1.5 cm; pedicellus 1.5-3 cm; *calycis* tubus c. 3 mm longus lobis 2 mm rotundatis, acumine brevi; *corolla* ad 4 cm diam. late stellata violacea; filamenta 3-5 mm longa glabra, antherae 5 mm longae crassae; *ovarium* conicum, 4-7 mm longum, glabrum; stylus 7-10 mm glabrus. *Fructus* fasciculatus 1-3 baccis 2-3 cm diam. globosis aut 5 x 3 cm ellipticis, in maturitate viridibus. *Semina* 2-2.5 mm longa plurima haematitica. Granula sclerotica conspicua ad 3 mm longa.

Type citation: Papua New Guinea, lower slopes of Mt Giluwe, 2280 m, *Nothofagus pullei* forest, logged area, sprawling shrub to 1 m long, fallen flower pale mauve, fruits all green. *Symon 10697 & Katik*, 26.vi.1977.

Type material: Holotype ADW, isotypes BH, CANB, K, L, LAE, MO, US.

Derivation: The name refers to the numerous lateral veins in the leaf.

A *shrub* (1.5-) 2 (-3) m tall, apparently with sombre or dark green aspect, unarmed, indumentum of minute, simple (3-4 celled) hairs on twigs and young shoots, above and below on leaves but concentrated on the network of veins. *Leaves* variable, deeply pinnatisect with 2-3 lateral lobes or entire, lobed lamina about 15 x 9 cm (to 25 x 20 cm) with 2 lateral lobes c. 5-8 x 1 cm, lanceolate, acute, sinuses rounded and cut to within 1-2 cm of midrib, simple lamina (7-) 10-14 (-17) x 1.5-2.5 (-3) cm lanceolate, acuminate, base long cuneate, tapering into petiole, 1.5-2.5 cm long. *Inflorescence* a short, few flowered cyme from a stem fork, or extra-axillary, solitary flowers may also occur. Peduncle 0-1.5 cm long; pedicel 1.5-3 cm long. *Calyx* tube c. 3 mm long, lobes 2 mm long rounded with a short acumen. *Corolla* to 4 cm diam. broadly stellate, purple-blue (one record as white). *Stamens*: filaments 3-5 mm long, glabrous, stout; anthers 5 mm long, stout, pores apical or developing short lateral slits, introrse. *Ovary* conical 4-7 mm long, glabrous; style 7-10 mm long glabrous; stigma subglobular. Fruiting peduncle 2-5 cm long maturing 1-3 fruits (in herb. specimens seen); pedicels to 5 cm long, gradually swollen apically to 5 mm diam, deflexed, calyx only moderately enlarged to about 1.5 cm diam.; *berry* 2-3 cm in diam. mostly globular, in two cases elliptic and then 5 x 3 cm described as mottled green and striped green (no suggestion in 6 fruiting collections of any colour developing). Stone cell masses conspicuous, to 3 mm long, rounded. *Seeds* 2-2.5 mm long, reddish, minutely reticulate. Three fruits counted from *Symon 13889* gave the following numbers of seeds and granules 1132/138, 1196/186 and 1003/163. *Cotyledons* 5 x 3 mm, ovate, acute; petiole 3 mm long; first leaf c. 7 mm diam. orbicular, slightly decurrent on upper petiole, sparingly pubescent with simple erect hairs, later leaves ovate-elliptic; hypocotyl and epicotyl pilose with erect, simple hairs to 2 mm long. (Fig. 27 & 28; Map 11).

Chromosome number: n = 46 counted by P. Sharp from *Symon 10697*.

Note

This new species belonging to subgenus *Archaesolanum* is of considerable interest. It is essentially a high altitude species and has been collected between 2200-2800 m (mean 2596 m) from roadsides in logged rain forest, edge of grassland and forest, regrowth in logging clearing, streamside vegetation and a landslide site. It differs from all other species in the subgenus in the considerable degree of pubescence (most others are glabrous but for a few papillose hairs on the corolla and young tips), the numerous lateral veins on the leaves and in having relatively few large fruits. It is closely related to *S. vescum* F. Muell. from south-east Victoria and eastern New South Wales which has smaller fruits, a rotate corolla, larger seeds and linear somewhat decurrent leaves. It may be separated from *S. aviculare* in Papua New Guinea by its larger, green, rather than vermilion fruits, smaller and simpler inflorescence, abundant tomentum, large and abundant stone cell masses and the lateral veins of the leaf being more numerous. The last character enables vegetative material to be identified. Collectors have described the flowers as white (1), skyblue (1), the rest as purple, and the fruits as green with purple stripes, green mottled olive green, green striped light and dark green, and once as yellowish dark green.

Specimens seen

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: West Sepik: *Vinas & Wiakabu LAE 59502*, s.d., Bielga river W of Folongonom, 5° 00′, 141° 05′, 2200 m alt., (BRI, LAE). Western Highland: *Flenley ANU 2621*, 17.iii.1965, headwaters Sui river NW of Sirunki, 5° 27′ 143° 32′, 2805 m alt., (A, BRI, CANB, K, L, LAE). Southern Highland: *Symon 10697*, 26.vi.1977,

Fig. 27. *S. multivenosum* Symon. Drawn from live plant ex *Symon 10697* (ADW).

Fig. 28. Holotype of *S. multivenosum* Symon (*Symon 10697 & Katik*, ADW).

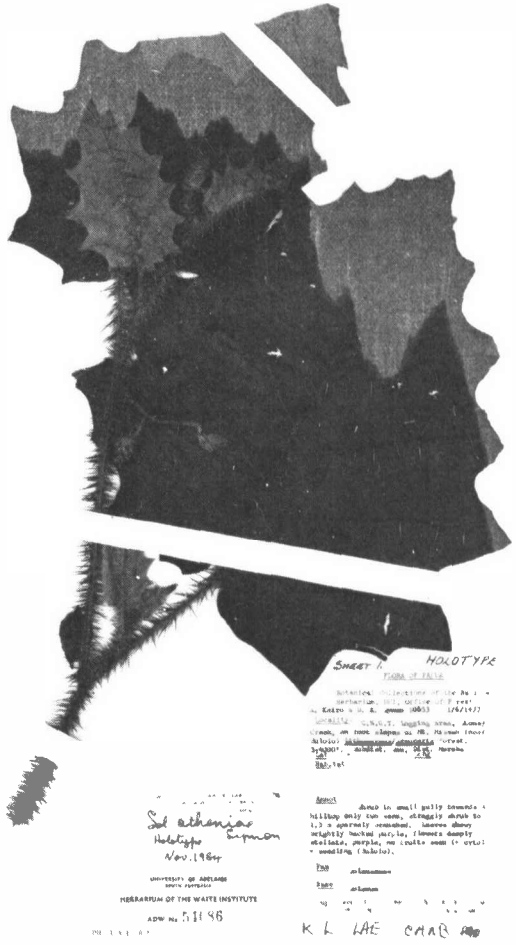

Fig. 29. Holotype of *S. atheniae* Symon (*Symon 10653 & Kairo*, ADW).

Mt Giluwe, 6° 04′, 143° 53′, 2280 m alt., (ADW); *Symon 13889*, 14.vi.1984, Mt Giluwe, 6° 04′ 143° 53′, 2450 m alt., (ADW, BH, CANB, K, L, LAE, MO). Eastern Highland: *Buderus NGF 23913*, 26.v.1965, Fatima river near Marafunga, 5° 50′, 145° 15′, (A, BISH, BO, BRI, CANB, K, L, LAE, NSW); *Millar NGF 40698*, 12.xi.1968, as above, (A, BISH, BO, BRI, CANB, K, L, LAE, NSW); *Streimann & Kairo NGF 45291*, 3.x.1970, Marafunga, 5° 50′, 145° 15′ 2652 m alt., (A, BISH, BO, BRI, CANB, FCB, K, LAE); *Womersley NGF 15368*, 27.ix.1962, Pengagl Creek, 5° 45′, 145° 05′, 2744 m alt., (BRI, CANB, K, L, LAE). Northern: *Foreman & Wardle NGF 45516*, s.d., Murray Pass, 8° 20′, 147° 28′, 2835 m alt., (A, CANB, K, L, LAE); *Ridsdale & Woods NGF 36896*, 11.viii.68, Murray Pass, 8° 20′, 147° 28′, 2591 m alt., (LAE).

Sect. 6. (subgen. *Potatoe* D'Arcy) **Petota** Dumort., Fl. Belg. (1827) 38.

Type species: *S. tuberosum* L.

Tuber-bearing *herbaceous perennials*, or soft wooded sprawling *vines*, unarmed and pubescent with simple or glandular hairs. *Leaves* often large, imparipinnate, interstitial leaflets often present. *Inflorescence* racemose or paniculate, pedicels articulate above their base; *corolla* rotate or stellate. *Anthers* elongate-oblong, scarcely tapered, opening by terminal pores and lateral slits. *Berry* succulent often greenish.

Species of this large and well known section are concentrated along the Andes of South America but extend to southern North America. The species described here is widely grown in temperate areas as a major world crop.

24. **Solanum tuberosum** L., Sp. Pl. (1753) 185.

Type citation: "Habitat in Peru".

Lectotype: Herb. LINN 248.12, (Hawkes (1956) 106), not seen, microfiche AD.

Derivation: The name refers to the tuberous underground stem outgrowths 'potatoes'.

A sprawling perennial *herb* to 50 cm., regenerating each year from underground tubers (the only species of *Solanum* in New Guinea that has underground tubers), vegetative parts somewhat succulent; indumentum, particularly on the young parts, of simple or glandular, never stellate, few-celled hairs, without prickles; underground stolons develop during the growth of the plant and bear tubers called potatoes. *Leaves* often large, ovate-oval in outline, pinnate with 5-9 leaflets; petiole and leaf rhachis angular in section, sometimes narrowly winged above; petiolules present, also winged; leaflets ovate, the lower ones rounded or acute, the upper ones acuminate, much smaller interstitial leaflets often present along the leaf rhachis. *Inflorescence* a leaf-opposed cymose panicle of few to 8 flowers; peduncle 5-10 cm long; pedicels 1-2 cm long, with an articulation shortly below the calyx. *Calyx* tube c. 5 mm long, lobes 5-8 mm long, lanceolate, acuminate. *Corolla* subrotate to rotate-pentagonal, white or pale violet. *Stamens*: *filaments* c. 2 mm long, short and thick; anthers 5-7 mm long, cordate below, oblong. *Style* 8-9 mm long. *Fruit* 1.5-2 cm diam., globular, greenish, often sparsely produced in cultivation. (Fig. 30).

Notes

Solanum tuberosum is a crop of major importance in the temperate areas of the world and in highlands in the tropics. The potato is widely cultivated but does not appear to be naturalised in New Guinea. It frequently persists for some time in old gardens and about refuse heaps.

Specimens seen

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: Western Highlands: *Symon 10683*, 23.vi.1977, Laiagam, 5° 30′, 143° 30′, (ADW). Eastern Highlands: *Hays 165*, 18.i.1972, SE of Obura, 6° 40′, 146° 00, 1951 m alt., (LAE).

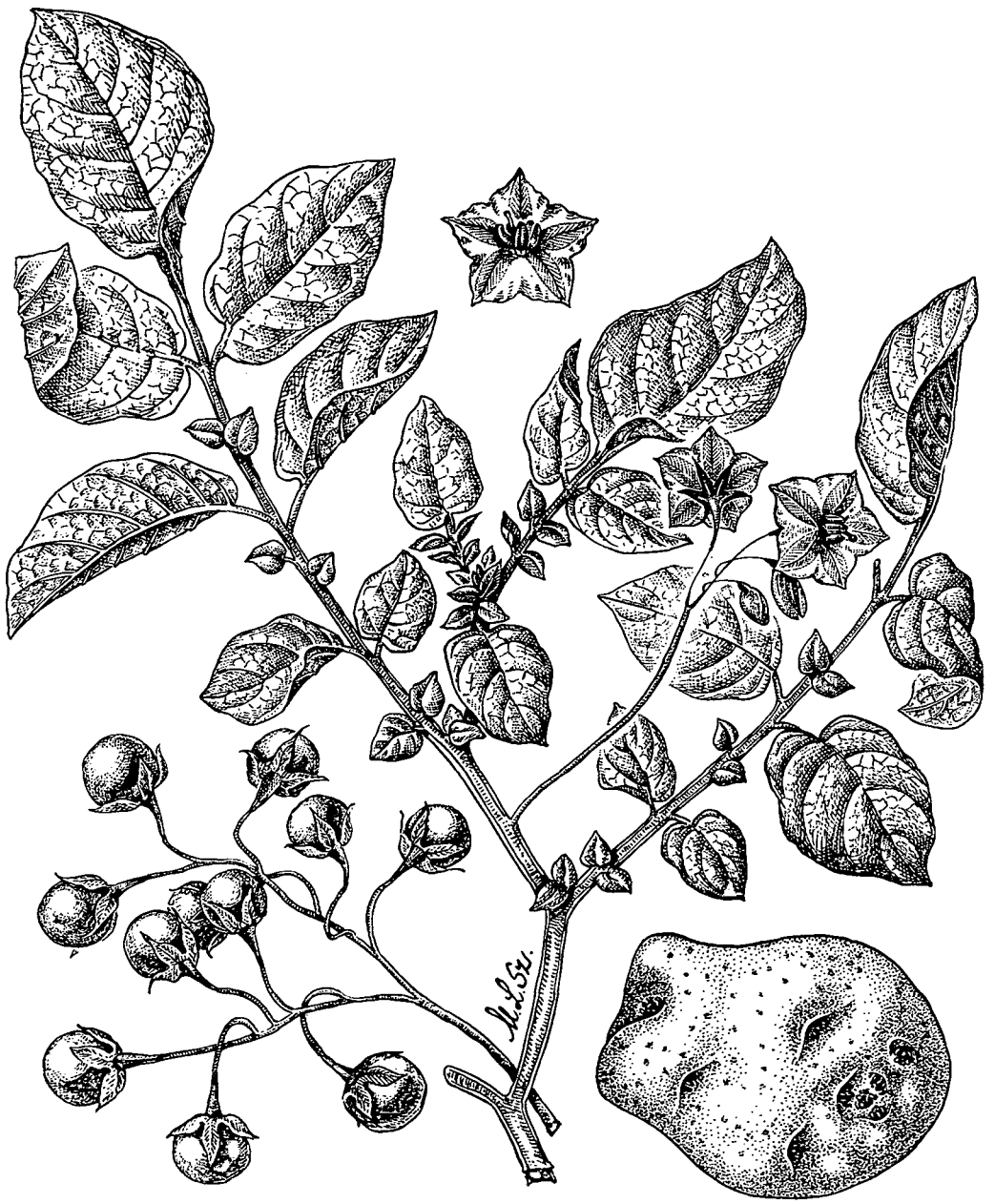

Fig. 30. *S. tuberosum* L. Drawn from herbarium specimen, *Symon 10683* (ADW).

Sect. 7 (subgen. *Potatoe* D'Arcy) **Jasminosolanum** Bitter ex Seithe, Bot. Jahrb. Syst. 81 (1962) 291.

Type species: *S. jasminoides* Paxt.

Climbers or *lianes*; unarmed; glabrate or pubescent with simple or branched hairs. *Leaves* entire or imparipinnate or pinnatisect on the same plants, minor leaves may be present and petioles twining. *Inflorescence* at first terminal becoming lateral, several to many flowered, paniculate. *Corolla* stellate to broadly stellate, showy; *anthers* stout, oblong, opening by terminal pores and lateral slits. *Berry* succulent, globose, bright red to purple-black.

The species of this section are mainly found in South America and several species have been widely grown as ornamentals. The single species described here is undoubtedly a garden escape.

*25. **Solanum seaforthianum** Andr., Bot. Repos. 8 (1808) t. 504

Type citation: Cultivated in Britain from material "introduced by Lord Seaforth from the West Indies . . . . The specimen which our figure represents was sent to us in fine bloom by Mr. J. Milne, botanic gardener".

Type material: No herbarium specimens of H.C. Andrews are known to exist. The plate indicated above is proposed as iconotype.

Derivation: The name commemorates Lord Seaforth who introduced seeds of the species to Britain.

A sprawling perennial *shrub* or *climber* with slender stems, unarmed, glabrous except for simple, few-celled hairs along leaf edges, on veins below and on corolla margins and tips, and few, short, glandular hairs on the peduncle and pedicels. *Leaves* to 13 x 11 cm, usually less, c. 5-8 cm long, ovate, partially or completely pinnately parted to midrib into 3-9 lobes, lowest lobe often smaller, other lobes 4 x 1.5 cm, oblanceolate, shortly petiolate or broadly attached, sinuses rounded or acute; petiole 2-4 cm long. *Inflorescence* a showy panicle to 10 cm long, few to 50 mauve-blue flowers, at first terminal, soon becoming lateral by growth of axillary bud; pedicel 1 cm long, slender, slightly thickened towards calyx, sparsely glandular-pubescent. *Calyx*: tube 1-2 mm long, almost entire, lobes very short and obtuse, tipped with a few hairs. *Corolla* 2-3 cm diam., stellate, deeply divided, tube 2-3 mm long; lobes 15 x 5 mm long, acute, margins and tips slightly pubescent. *Stamens*: filaments 2-4 mm long; anthers 4 mm long, oblong, stout, slight unequal. *Ovary* glabrous or with few glandular hairs; style 7-8 mm long. *Fruit* c. 1 cm diam., globular, bright shiny red, close to RHS Orient Red 819, finally pulpy. *Seeds* 2-3 mm across, reddish brown, shaggy hairy, (23-) 26 (-30) per berry. (Fig. 31; Map 1).

Chromosome number: n = 12 Fedorov (1969).

Note

This ornamental climber has been widely grown for its showy flowers and brilliant fruits. Originally from the West Indies it is now widely established in tropical areas. Henty (1980) lists it amongst the harmful plants in Papua New Guinea. To date it has only been found in the vicinity of Wau. Peekel (1948) states that it is widely planted in the Bismarck Archipelago.

Specimens seen

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: Morobe: *Symon 13831 & Vinas*, 1.vi.1984, Salamaua track, vicinity of Wau, 7° 03′, 147° 04′, (ADW, BH, L, LAE, MO).

Fig. 31. *S. seaforthianum* Andr. Drawn from live plant, *Symon s.n.* (ADW 32938).

Sect. 8 (subgen. *Brevantherum* (Seithe) D'Arcy) **Brevantherum** Seithe, Bot. Jahrb. Syst. 81 (1962) 297.

Type species: *S. verbascifolium* auct. non. L. = *S. erianthum* D. Don.

Large *shrubs* to small *trees*; unarmed; often densely pubescent with stellate to echinoid hairs. *Leaves* (often large) entire, pseudo stipules present in some species. *Inflorescence* a condensed panicle of cymes. *Corolla* stellate, medium-sized. *Anthers* oblong, opening by apical pores; *ovary* pubescent. *Berry* globose, succulent or mucilaginous, sometimes pubescent, often yellowish, the seeds numerous, and pale buff colour.

The centre of speciation of this section of 27 species is in tropical America; two species are now widely distributed in temperate and tropical areas. The species in New Guinea is one of the pan-tropical weeds.

26. **Solanum erianthum** D. Don, Prodr. fl. nepal (1825) 96.

Type citation: Not seen.

Type material: Lectotype K, "in Valle Nepalia prope Kalamanda, 1821, Wallich Herb. 2616C" proposed by Roe (1967) 359.

Solanum verbascifolium auct. pl. non L., Sp. Pl. (1753) 184. For discussion of nomenclature see Roe (1968), Nee (1982).

Derivation: The name refers to the woolly-pubescent buds and corolla.

A *shrub* or small *tree* to 4 (-8) m tall, often with a flattened spreading crown, trunk to 20 cm diam., without prickles, indumentum on all parts of dense, soft, pale stellate hairs (sessile or long multiseriate-stalked, porrect-stellate, with medium to long central ray on leaves; on stems, petioles, calyces, sessile or long multiseriate stalked, echinoid hairs abundant), general aspect green or grey-green. *Leaves* 10-20 x 5-15 cm, ovate-elliptic, entire, apex acute or acuminate, base rounded or obtuse; petiole 1-10 cm long; axillary leaflets (pseudo-stipules) absent. *Inflorescence* erect, pedunculate, compound cyme borne above leaves, at first terminal but soon lateral, peduncle to first forking 3-5 cm long, pedicels 5-10 mm long. *Calyx* c. 5 mm long including bluntly triangular lobes 2 mm long. *Corolla* about 1.5 cm diam., stellate; lobes about 4 mm broad, white, glabrous inside, pubescent outside. *Filaments* about 2 mm long; anther 2.5 mm long, oblong. *Ovary* densely pubescent; style 5-6 mm long, erect, glabrous; stigma terminal green. *Fruit* 1 cm diam., globular, pubescent, dull yellow, succulent when ripe. *Seeds* 1.5-2 mm long. (Fig. 32; Map 7).

Notes

S. erianthum is native to Mexico, Central America and the West Indies. It has become widespread and weedy throughout the tropics, and was named from specimens collected in Nepal. In New Guinea it occurs from sea level to 1230 m, and like *S. torvum* Sw. is found in disturbed sites. The earliest collection I have seen is at MEL and was collected by A. Goldie from Pt Moresby in 1876.

Selected specimens (55 collections seen)

IRIAN JAYA: Vogelkop: *Koster BW 13817*, 17.v.1962, Minjambau nr. 1° 05′, 133° 55′, 1230 m alt., LAE. Geelvink Bay: *Aet & Idjan 106*, 23.vii.1939, Biak Island, (BO); *Gjellerup 375*, 5.xii.1910, Bivali, (L, BO). Snow Mountains: *Eyma 4627*, 26.ii.1939, Wissel Lakes, 3° 50′, 136° 20′, (A, BO, K, L).

PAPUA NEW GUINEA: West Sepik: *Atastrip 108*, 1906, Nord New Guinea, (BO, L). East Sepik: *Saki & Waivikiak s.n.*, s.d., Wambak, 3° 37′, 143° 00′, 213 m alt., (UPNG). Madang: *Hoogland 5112*, 17.viii.1955, Bemli, 3° 09′, 141° 24′, 250 m alt., (CANB, L, LAE). Morobe: *Hartley 10002*, 14.iii.1962, Oomsis Creek, 6° 43′, 146° 47′, 121 m alt., (A, BRI, L, LAE, RSA); *Millar NGF 14496*, 6.vi.1962, Bulolo, 7° 10′, 146° 40′ 670 m alt., (A, BRI, CANB, L, LAE, NSW). Eastern Highlands: *Durand & Nelson 189*, 7.xi.1974, Daulo Pass, 5° 59′, 145° 30′, (F, UC); *Millar NGF 37683*, 9.vii.1968, Baptist Mission Hagen, 5° 35′, 144° 10′, 1340 m alt., (BO, BRI, CANB, K, L, LAE). Southern

Highlands: *Brass 1406*, 12.v.1926, Kurandi, 5° 39′, 142° 46, (A, BRI, K). Gulf: *Brass 581*, 6.xi.1925, Biriatabu, 7° 53′, 146° 11′, 365 m alt., (A, BRI, K). Central: *Carr 12846*, 20.vii.1935, Koitaki, 9° 24′, 147° 28′, 547 m alt., (BM, CANB, K, L, NY); *Schodde 2758*, 11.viii.1962, N of Rigo, 9° 48′, 147° 33′, 6 m alt., (A, BO, BRI, CANB, K, L, LAE). Northern: *Cheeseman 36*, 25.v.1933, Kokoda 8° 52′, 147° 45′, (A, K, L); *Hoogland 3928*, 18.ix.1953, Hadzodzo, 8° 51′, 147° 59′, 350 m alt., (BM, BO, BRI, K, L, LAE, MEL, US). Milne Bay: *Brass 21729*, s.d. Menapi, 9° 46′, 149° 55′, 10 m alt., (A, L, LAE). New Britain: *Croft & Katik NGF 14979*, 11.v.1973, Fulleborn Harbour, 6° 10′, 150° 40′, 10 m alt., (BRI, L, LAE); *Womersley NGF 8787*, 19.vi.1956, Keravat, 4° 35′, 152° 00, 60 m alt., (BRI, K, LAE). New Ireland: *Koie & Olsen 1483*, 4.ii.1962, Mussau, 1° 35′, 149° 40′, 20m alt., (LAE). Bougainville: *Kajewski 2276*, 1930, Karingu, Buin, 6° 46′, 155° 41′, 50 m alt., (A, BISH, BRI); *Nachman 161*, iv.1971, Nissan Island, 4° 30′, 154° 15′, (LAE).

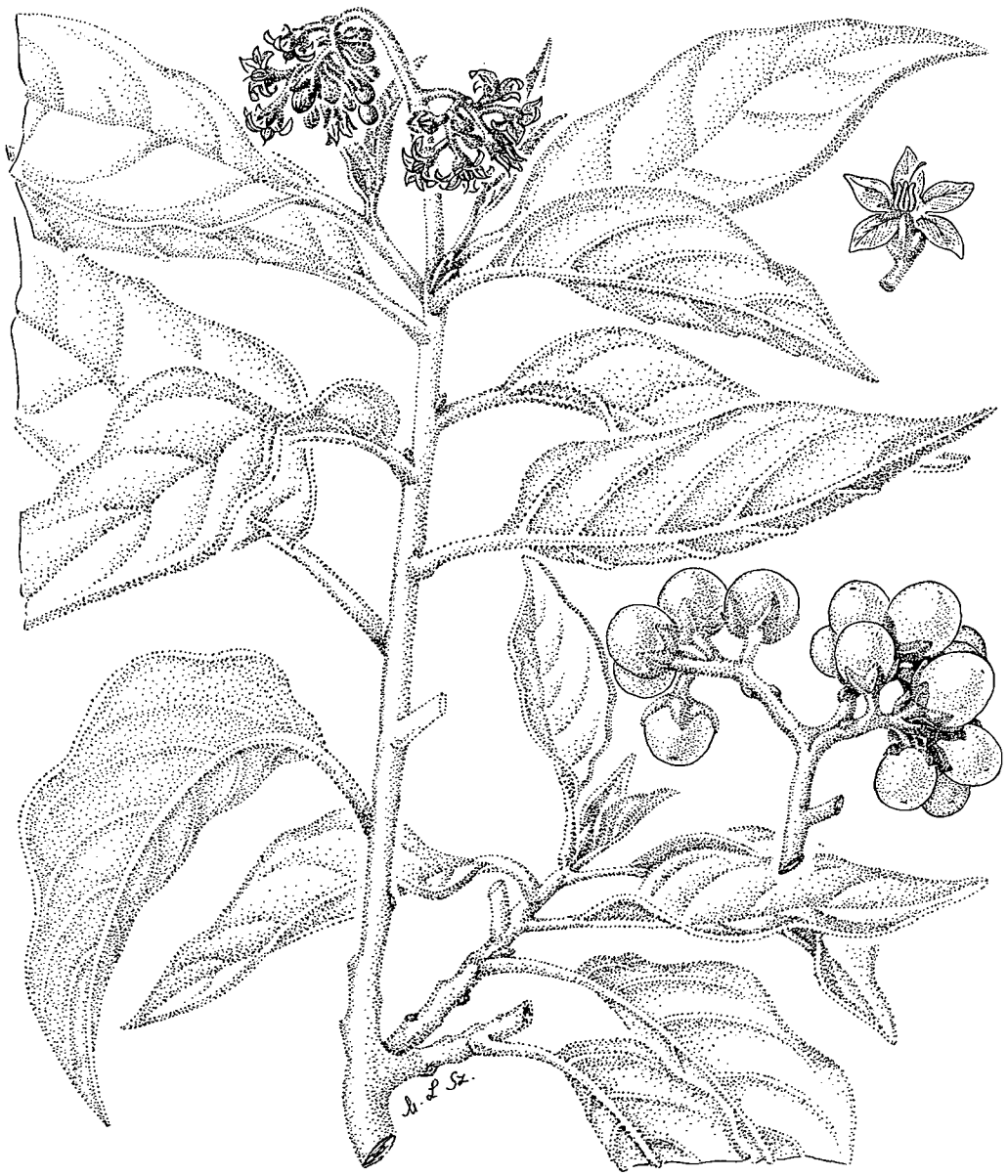

Fig. 32. *S. erianthum* D. Don. Drawn from live plant (ADW 42702).

Sect. 9 (subgen. *Leptostemonum* (Dunal) Bitter) **Acanthophora** Dunal, Hist. nat. *Solanum* (1813) 131, 218.

Type species: *S. mammosum* L. (D'Arcy, 1972:275)

Group *S. mammosum*, Whalen (1984).

Herbs or *shrubs*; copiously armed with acutely sharp prickles; indumentum of apparently simple hairs (reduced stellate hairs) or small stellate hairs. *Leaves*, ovate shapes, deeply or shallowly lobed. *Inflorescence* condensed, few-flowered, unbranched cyme. *Corolla* deeply stellate; *anthers* lanceolate, often pale yellow, opening by small terminal pores. *Berry* yellowish to vermilion, or blackish, firm-fleshed, dryish, sometimes with crisp, white mesocarp. *Seeds* variable, in some species flattened with narrow wing.

The centre of speciation of this section is in tropical Central and South America. Several species have escaped from cultivation as ornamentals and become weedy.

*27. **Solanum mammosum** L., Sp. Pl. (1753) 187.

Type citation: "Habitat in Virginia, Barbados".

Type material: Herb. Linn. 248.32 (LINN), microfiche AD!.

Derivation: The name refers to the nipple-like apex and shape of the fruit.

An annual or short-lived *shrub*, 1-2 m tall, hirsute indumentum of simple or occasionally stellate hairs; prickles sparse, 1-1.5 cm long, on leaves and stems, straw-coloured, mostly straight. *Leaves*: lamina 12-15 x 12-15 cm, orbicular or broad-ovate, with 5-7 main lobes each of which may be slightly lobed, main lobes broadly triangular, apices acute, sinuses rounded, not deeply cut; petioles 6-10 cm long. *Inflorescence* a 1-4 flowered almost sessile cyme; pedicels 8-10 mm long. *Calyx*: tube 2 mm long; lobes subulate-acuminate 3-4 mm long. *Corolla* 3-4 cm diam., deeply stellate, pale purple-blue, tube very short; lobes 2 x 0.4 cm, linear-lanceolate, hirsute outside, glabrous within. *Stamens*: filaments 1 mm long; anthers 7-8 mm long, attenuate. *Ovary*, style and stigma not seen. *Fruits* large, 3-6 cm long, yellow or orange, with nipple-like apex and basal outgrowths, pulp white. *Seeds* purple-red, punctate. (Fig. 33; Map 11).

Chromosome number: n = 11, 12 Heiser (1971).

Note

S. mammosum is occasionally cultivated as an ornamental for its bizarre fruit. In New Guinea it has become naturalised at a few sites.

Specimens seen

IRIAN JAYA: Geelvink Bay: *Bruyn 415*, 10.x.1915, Biak Island, (BO).

PAPUA NEW GUINEA: West Sepik: *Morren 56*, 22.vii.1969, Telefomin subdist. 4° 55′, 141° 38′, (LAE). East Sepik: *Wiakabu LAE 73484*, s.d. Apangi No. 2 village, 3° 38′, 143° 1′, 260 m alt., (LAE). Madang: *Symon 13816*, 25.v.1984, Silaul village, 5° 11′, 145° 34′, (ADW, L, LAE). Morobe: *Katik LAE 62167*, 23.vii.1974, Mumeng near Zenag River, 6° 58′, 146° 37′, (BRI, K, L, LAE); *Vinas 321*, 18.vii.1984, "Mrs Booth" village between Wau and Bulolo, 2397 m alt., (ADW, BFC (A, K, L, LAE); *Wiakabu & Hevi, LAE 73343*, 12.xii.1977, Mumeng near Zenag 6° 57′, 146° 35, 1050 m alt., (LAE). Southern Highlands: *Schodde 2330a*, s.d. Wasemi Island, Lake Kutubu, 6° 24′, 143° 19′, 762 m alt., (A, CANB, L, LAE). Bougainville: *Kajewski 1881*, 28.vi.1930, Kugumaru Buin, 150 m alt, 6° 45′, 155° 40′, (A, BISH, BRI).

SOLOMON ISLANDS: Guadalcanal: *Hansell s.n.*, 4.iv.1968, Mangupahu hillside, 9° 30′, 160° 00′, 701 m alt., (K).

Fig. 33. *S. mammosum* L. Drawn from live plant *Kelly s.n.* (ADW 44578).

Sect. 10 (subgen. *Leptostemonum* (Dunal) Bitter) **Lasiocarpa** (Dunal) D'Arcy, Ann. Missouri Bot. Gard. 59 (1972) 270.

Basionym: *Lasiocarpa* grad. ambig., Dunal, in DC., Prodr. 13 (1852) 30, 252.

Type species: *S. lasiocarpum* Dunal

Group *S. quitoense*. Whalen (1984).

Small to large *shrubs* or small *trees*, armed, indumentum of stellate or reduced-stellate hairs sometimes glandular. *Leaves* (often large) deeply or shallowly lobed, sometimes suffused purple. *Inflorescence* short, congested, unbranched cyme with several hermaphrodite flowers below, few males above. *Corolla* stellate (often white). *Anthers* lanceolate, opening by terminal pores. *Ovary* densely pubescent. *Calyx* somewhat enlarged in fruit. *Berry* succulent, usually yellow to orange, pubescent. *Seeds* pale buff.

Species of this section are concentrated in northern South America, but two extend across the Pacific, one of which occurs in New Guinea and South-East Asia. The second species described here is tentatively placed in this section, but more material is needed for critical examination.

28. **Solanum atheniae** Symon, sp.nov.

Frutex ad 2 m sparsim ramosus. *Aculei* in ramis et petiolis densi, utrinque et copiose, in foliis inaequales ad 12 mm longi recti brunnei. Pili stellati praecipue in foliis infra copiosi supra cellulis longissimis centralibus rariores. *Folia* circa 20 x 16 cm late ovata lobis late triangularibus, apice acuto, basi subcordato obliquo, infra purpurea; petiolus 5-6 cm longus. *Inflorescentia* cymosa floribus hermaphroditus infra et floribus masculis supra (usque 6-8 flores). Flos hermaphroditus:pedicellus 5-6 mm, *calycis* tubus brevis aculeatissimus acumine 20 mm longo; *corolla* stellata lobis 20 x 4 mm extra hirsuta; filamenta 0.5 mm; antherae 7-7.5 mm angustatae supra, subsaggitatae infra; *ovarium* 3 mm longum supra pubescens; stylus 7 mm longus. *Bacca* non visa. Flos masculinus: pedicellus 2-3 mm, calycis tubus circa 3 mm lobis late triangularibus acumine lineari 4 mm. *Corolla* stellata lobis 11 x 2.5 mm extra hirsuta purpurea, filamenta circa 1 mm, antherae 7 mm attenuatae; ovarium stylus stigma vestigialia.

Type citation: *Symon 10653 & Kairo*, 1.vi.1977. "C.N.G.T. logging area, Stoney Creek, foot of Mt Missim, 7° 10′, 146° 50′, *Lithocarpus/Araucaria* forest, 1000 m alt. Subdist Wau, Dist Morobe, shrub in small gully towards a hilltop, only two plants seen, straggly shrub to 1.5 m sparsely branched, leaves showy, brightly backed purple, flowers deeply stellate, purple, no fruits seen".

Type material: Holotype ADW 54086 (3 sheets), isotypes CANB, K, L, LAE.

Derivation: Named after the greek goddess Pallas Athena who sprang fully armed from the brow of Zeus and who later carried his arms. The name is an oblique reference to the very strongly armed nature of the species.

A straggly androdioecious *shrub* to 2 m, sparsely branched in the few plants seen, internodes 8-13 cm long; *prickles* dense on stems and petioles, abundant on upper and lower leaf surface, mainly along veins, distinctly retrorse on main vein below, unequal, to 12 mm long, straight, polished, brownish, some of smaller prickles tipped by a stellate hair with a long central ray, the transition from stellate hairs on long stipe to sharp prickles is notable, indumentum of stellate hairs abundant (porrect stellate with long or short stipe and long to very long central cell) dense on leaf below, scattered above then with very long central cell and reduced lateral cells. *Leaves*: lamina to 30 x 30 cm, more often 20 x 16 cm, broad ovate in outline, with c. 6 main lobes on each side, lobes broadly triangular (themselves with shallow minor lobes or repand margin) sinuses rounded and cut 1/5-1/4 of way to midrib, apex acute, base subcordate, very oblique, fresh leaves pale bright purple below; petiole (3-) 5-6 (-8) cm long. *Inflorescence* a cyme distant from the leaf axil, with hermaphrodite flower below and male flowers above; peduncle to lower bisexual flower about 2 cm long, rhachis 3-5 cm long (forked in one case) bearing c. 6 male flowers; pedicel of male flower 2-3 mm long, calyx tube c. 3 mm long with broadly triangular lobes and linear acumen of 4 mm. *Corolla*: lobes

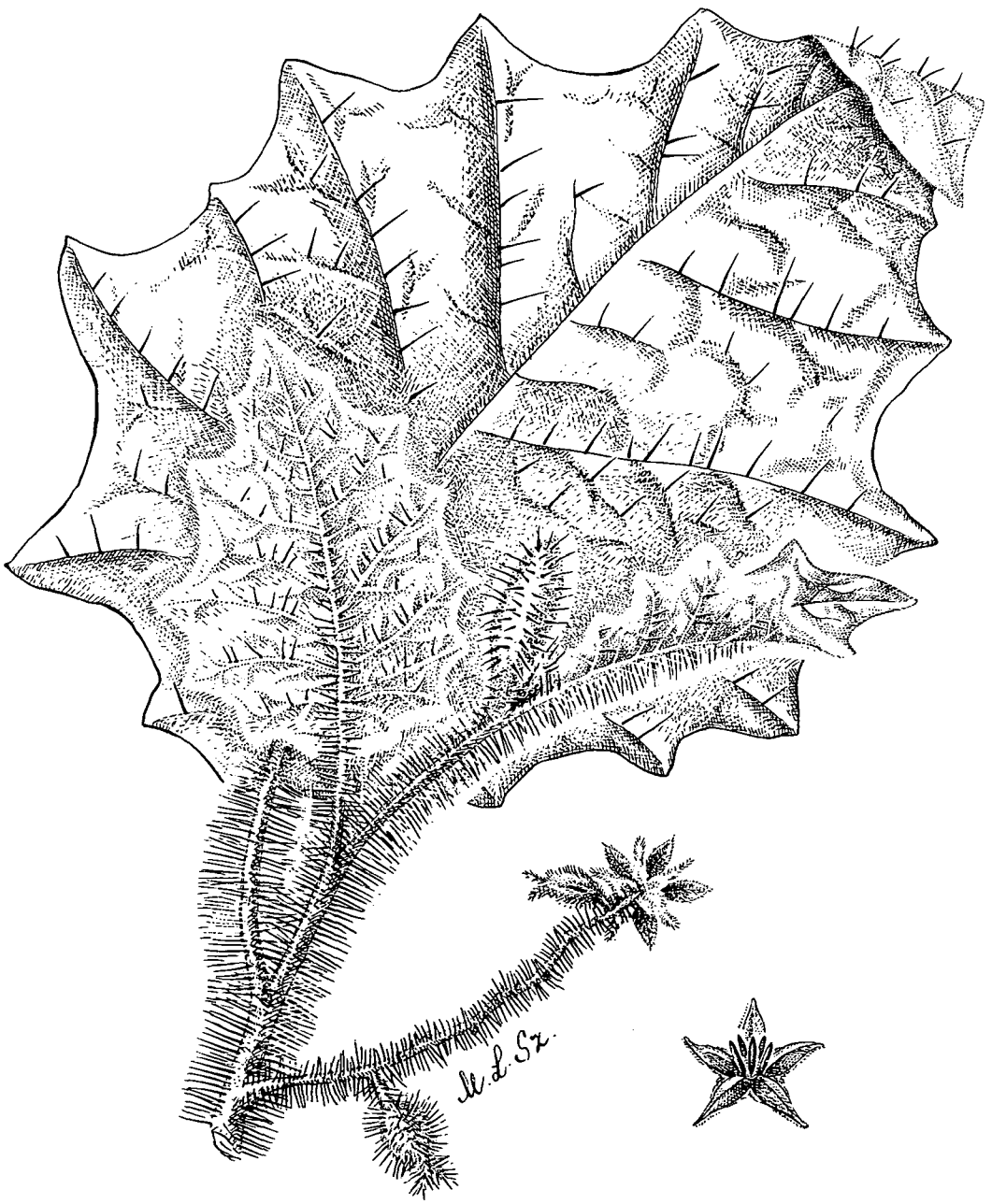

Fig. 34. *S. atheniae* Symon. Drawn from herbarium specimen, *Symon 10653* (ADW).

c. 11 x 2.5 mm, stellate, densely pubescent outside purple. *Stamens*: filaments c. 1 mm long; anther 7 mm long distinctly tapered to narrow apex, pores apical. Ovary, style and stigma vestigial. Female flower: pedicel 5-6 mm long; calyx tube short, ending with linear acumen 20 mm long, all very prickly, corolla stellate, lobes 20 mm long x c. 4 mm wide, densely pubescent outside, filaments 0.5 mm long, broad below; anthers 7-7.5 mm, tapered above, subsaggitate below; *ovary* 3 mm long, pubescent above, style 7 mm long, stout. *Fruits* not seen. (Figs. 29 & 34; Map 3).

Chromosome number: n = 12, counted by Randell from *Symon 10653*.

Notes

This striking species appears to belong to sect. *Lasiocarpa* comprising 13 species recently monographed by Whalen *et al.* (1981). The section is centred in northern South America with two outlying species, *S. repandum* Forst.f. in the Central Pacific and *S. lasiocarpum* Dunal in S.E. Asia extending from southern and eastern India to New Guinea. Phytogeographically this is an intriguing distribution.

The new species is very close to *S. felinum*. *S. atheniae* differs in having a long linear apex to calyx lobes, [deltoid or lanceolate], deeply stellate purple corolla [stelliform, white], prickle base c. 1 mm wide [to 4 mm]. The new species is based upon a single collection.

29. **Solanum lasiocarpum** Dunal, Hist. nat. *Solanum* (1813) 223.

Type citation: "Hab. in Malabariae arenosis; Hort. Mal. in insula Batavia. Moris."

Type material: Lectotype: Rheede, Hortus Indicus Malabaricus 2 (1680) tab. 35., cited by Whalen, Gentes Herbarum 12 (1981) 100.

Synonym: *S. ferox*, auct. plur. non L.

Derivation: The name refers to pubescent nature of the fruit.

A *shrub* 2 (-3)m tall, stems relatively thick, woody below, unarmed or armed with prickles to 6 mm long, straight or slightly recurved, abundant on stem, petiole, upper and lower leaf surface, (Bitter (1919) reports forms without prickles); all parts with dense indumentum of hirsute-villous stellate hairs (long or short multiseriate-stalked, porrect-stellate, with long to very long central ray, often glandular); general aspect yellowish or rusty-green. *Leaves* markedly discolorous, often paired at nodes, when paired smaller leaf c. 2/3 the size of the large; juvenile leaf lamina to 30 x 30 cm, broadly ovate, c. 6 major lobes on each side, sinuses shallow, rounded and barely cut 1/5 of way to midrib, lobe apices acute; adult leaves to 18 x 15 cm, ovate to ovate-elliptic, with 4-6 short, broadly triangular lobes on each side, with smaller secondary lobes or teeth, sinuses shallow and rounded, rarely cut 1/5 of way to midrib, leaf and lobe apices acute, base truncate, rounded to cordate; petiole 5-8 cm long; *Inflorescence* of (1) 2-6 flowered, densely hairy cymes; peduncle very short; floral rhachis short; pedicel 5-10 mm long. *Calyx* 6-8 mm long, broadly campanulate; lobes short, broadly triangular, apex acute. *Corolla* to 4 cm diam., stellate, white, densely hairy outside. *Stamens*: filaments very short or absent; anthers to 8 mm long, broadly lanceolate, erect but the group slightly deflexed. *Ovary* to 4 mm long, somewhat conical, densely pubescent; style 5-7 mm long, erect, pale, glabrous; stigma capitate, small. *Fruit* 1.5-3.0 cm diam., solitary or in clusters of 2-3, globose, densely pubescent with stellate hairs having a long central ray, yellowish; calyx slightly enlarged to cover base of fruit. *Seeds* 2-2.5 mm long, flat, slightly notched, pale yellow. *Cotyledons* lanceolate, 10-15 x 5 mm; first leaf broad-ovate, 1-1.5 x 1 cm. (Fig. 35; Map 9).

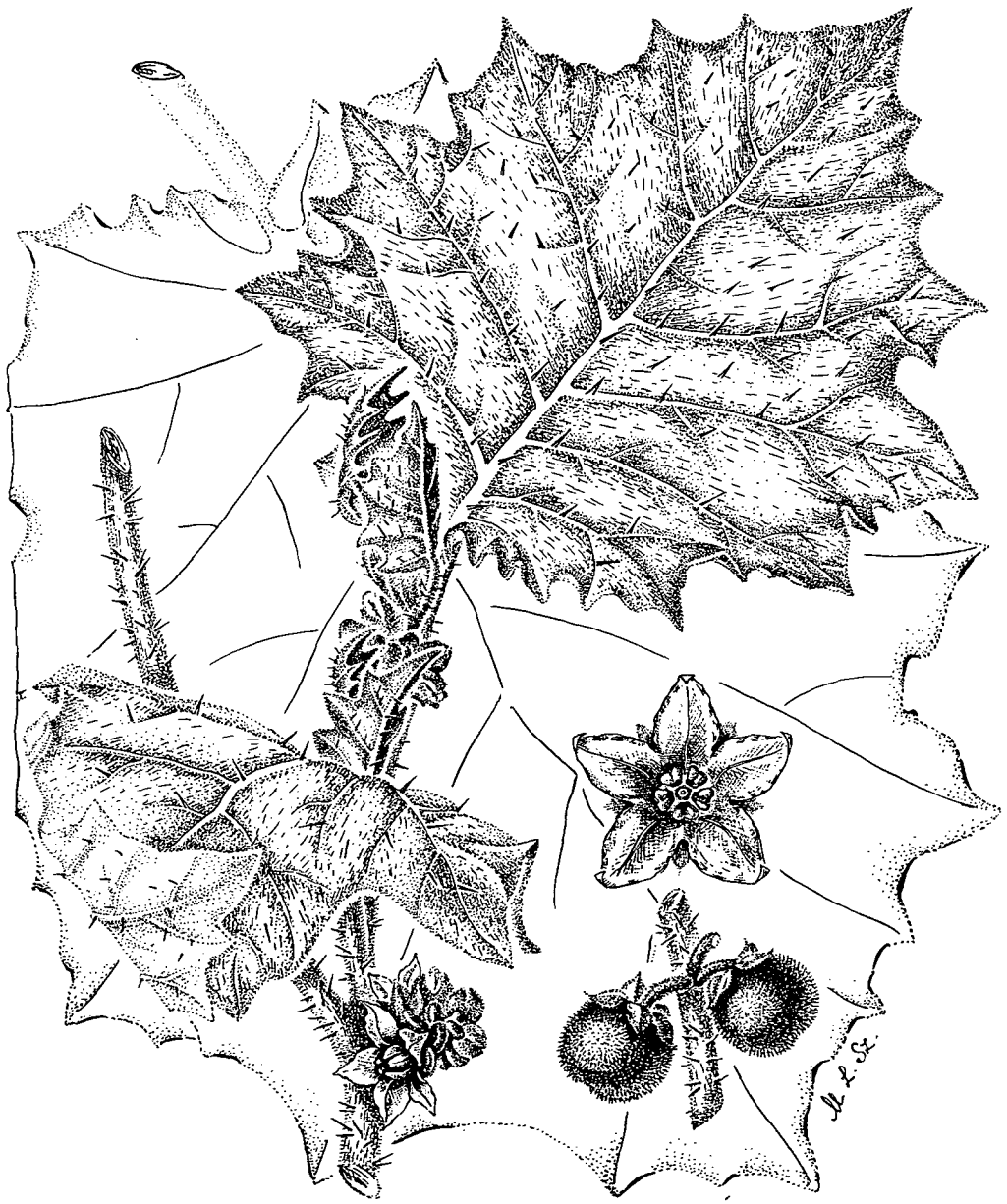

Fig. 35. *S. lasiocarpum* Dunal. Drawn from live plant, *Webb & Tracey 10974* (ADW).

Notes

S. lasiocarpum is now widespread in New Guinea. It is mostly found at low altitudes and is rare above 1000 m. It occurs in disturbed sites, roadsides, forest margins, logging areas, old gardens, secondary regrowth and about house clearings. The species is apparently occasionally cultivated and eaten, e.g. *Brass 22020* Menapi, Cape Vogel, "eaten by natives"; *Morren 58*, UKR subdistrict Telefomin "cultivated and planted from seed"; *Townsend 55* Ambunti, Sepik, "edible". The earliest collection I have seen is J. Chalmers, 1878, Orangerie Bay, S.E. New Guinea.

The relatives of this species are found mainly in tropical Central America. Whalen (1981) could find no exact match with the Central American species and considered *S. candidum* Lindl. to be the most closely related. It is highly likely that *S. lasiocarpum* is an early European introduction from Central America to south-east Asia and that some differentiation has occurred. A similar history applies to *S. repandum* Forst. f.

The name *S. stramoniifolium* Jacq. was used by Schumann & Lauterbach (1901) for the collections *Lauterbach 38 & 1281*, and by Foreman (1971) for *Rechinger 4366*. Whalen *et al.* (1981) consider this species strictly confined to South America and the name misapplied to material of *S. lasiocarpum*.

Specimens (55 collections seen)

IRIAN JAYA: Vogelkop: *Koster BW 13976*, 21.vi.1962, Warmere Valley 20 km W of Manokwari 0° 53′, 134° 05′, 250 m alt., (BISH, BO, BRI, L, LAE); *Pleyte 671*, 21.viii.1948, Klamono, 1° 10′, 131° 45′, (A, BO, K, L). Geelvink Bay: *Britton 6*, 24.ix.1944, Biak, 1° 10′, 136° 05′, 10 m alt., (F); *Versteegh & Vink BW 8330*, s.d. Biak 1° 10′, 136° 05′, (CANB, L, LAE). Jayapura: *Gjellerup 651*, 30.viii.1911, Arsoo 2° 40′, 139° 33′, (BO, L); *Lam 636*, 16.vii.1920, Mamberamo, 1° 32′, 137° 53′, (A, BO, L). Snow Mountains: *Leuwen 10586*, x.1926, Nassau mountains, 4° 30′, 138° , (BO, L); *Kloss s.n.*, i.1913, Camp iiiiv, Otakwa river to Sukarno (Mt Carstensz) mountain 4° 05′, 137° 09′, (BM). Mimika: *Aet 581*, 27.vii.1941, Tarera near Oeta 4° 33′, 136° 03′, (BO, K, L).

PAPUA NEW GUINEA: West Sepik: *Ledermann 6898*, s.d. Sepik 5° 09′, 141° 23′, (K); *Morren 58*, 22.vii.1959, Telefomin, 4° 55′, 141° 38′, 868 m alt., (LAE). East Sepik: *Herre 252*, 11.v.1929, Marienburg 3° 57′, 144° 14′, (F, NY); *Kerenga & Lelean LAE 73982*, s.d. Frieda river airstrip 4° 35′, 142° 00 30-40 m alt., (LAE). Madang: *Clunie et al. LAE 63523*, 4.ii.1978, Sapi catchment 5° 13′, 145° 30′, 60 m alt., (LAE, UPNG). Morobe: *Kairo & Streimann NGF 30692*, 21.vi.1967, Hump logging area Bulolo, 7° 10′, 146° 40′, 915 m alt., (A, BFC, BO, BRI, CANB, K, L, LAE, NSW); *Millar & Henty NGF 15605*, s.d. Oomsis Creek 6° 40′, 146° 45′, (A, BRI, CANB, L, LAE). Western Highlands: *Street 165*, 12.xi.1964, Kainambe, Jimi Valley, 5° 20′, 144° 30′, 1006 m alt., (LAE). Western: *Brass 7467*, viii.1936, Lake Daviumbu, Middle Fly River 7° 35′, 141° 17′, (A, BM, BO, BRI, L, LAE); *Geno 70*, 19.ix.1979, Balamuk nr Bensbach 9° 06′, 141° 09′, 10 m alt., (UPNG). Central: *Carr 12747*, 21.i.1935, Koitaki 9° 24′, 147° 28′ 457 m alt., (BM, CANB, K, L, LAE, NY); *Gillison NGF 22120*, 22.xii.1964, Brown River, Joramo creek, 9° 15′, 147° 20′, 60 m alt., (A, BRI, CANB, K, LAE). Northern: *Brass 23962*, 11.viii.1953, Biniguni camp Gwariu river 9° 39′, 149° 18′, (A, LAE). Milne Bay: *Brass 28809*, 19.xi.1956, Woodlark island, 9° 14′, 152° 57′, 5 m alt., (A, K, L, LAE); *Lelean & Streimann LAE 52534*, 21.x.1971, Sewa Bay, Normanby Isl. 10° 00′, 150° 58′, (A, BRI, CANB, K, L). New Britain: *Bateson 146*, s.d., between Toma & Baining Mntn 4° 22′, 152° 10′, (K); *Stevens & Lelean LAE 58631*, 8.vi.1973, edge of Mengen massif, 5° 04′, 151° 48′, 885 m alt., (A, BRI, K, L, LAE). Bougainville: *Nachman 327*, x.1971, Nissan Isl. 4° 30′, 154° 15′, (LAE).

SOLOMON ISLANDS: Santa Ysabel: *Beers et al. BSIP 7305*, s.d., Korigole Bay, 8° 00′, 159° 00′, 50 m alt., (K, L, LAE).

30. **Solanum repandum** Forst. f., Fl. ins. aust. (1786) 18.

Type citation: "Marchionis et Societatis insulae".

Type material: There is at K a specimen from the Forster herbarium that may be part of the type collection, photo ADW.

S. ferox var. *repandum* (Forst.f.) Bitter, Bot. Jahrb. Syst. 55 (1917) 84.

A woody *shrub* to 2 (-3) m with a stem girth of 10 cm (*Brown BSIP 19217*), unarmed, indumentum varied, dense stellate hairs on leaf below (short multiseriate-stalked or sessile porrect stellate hairs with well developed central cell) upper leaf surface with long simple hairs

Fig. 36. *S. reparidum* Forst. f. Photo of original drawing by S. Parkinson of *S. latifolium* nom. nud. from Tahiti.

Fig. 37. Holotype of *S. abortivum* Symon (*Symon 13840*, ADW).

with or without reduced stellate hairs with long central cell and small or obsolete laterals, long glandular hairs usually abundant, buds and young tips densely pubescent. *Leaves* often large, especially in juvenile phases, largest lamina seen by me 25 x 18 cm, others c. 16 x 11 cm, broad-ovate to broad elliptic, margins repand with several shallow broadly triangular lobes, sinuses shallow and broad, lobe apex obtuse, leaf apex acute, base rounded, oblique; petiole 3-10 cm long. *Inflorescence* strongly andromonoecious, the lower flowers fruitful, upper flowers male, a condensed cyme of 5-12 flowers, the axis obsolete or to 1.5 cm long; pedicel 5-15 mm long. *Calyx*: tube broadly campanulate, densely pubescent, the lobes ovate or broadly triangular c. 8 mm long, apex acute. *Corolla* c. 2.5 cm diam. deeply divided, stellate, lobes ovate-lanceolate, white. *Stamens*: filaments very short (not available); anthers 6-9 mm long, virtually sessile, attenuate, closely erect in a cone. *Berry* to 4-5 cm diam. (a sub-cultivar) few per inflorescence, globose or ovoid sometimes apiculate, pubescent when young less so when mature, multilocular, yellow when ripe. *Seeds* 2.5-3 mm long, obovate, flattened reticulate, pale brown, numerous. (Fig. 36; Map 16).

Notes

Material available has been inadequate and this interesting species deserves better collecting and documentation. The description draws heavily on Whalen (1981). The species is cultivated and spontaneous on the central Pacific islands. In Papua New Guinea it has been collected mainly from the Solomon Islands, the most westerly record being a single collection from Pomio, East New Britain. *Solanum repandum* is closely related to *S. sessiliflorum* Dunal, from the western Amazon basin in South America, Whalen (1981). Its extension with *S. lasiocarpum*, with which it is also readily confused, through the Pacific to South-East Asia is of great phytogeographical interest. The species is well illustrated in Seemann, Flora Vitiensis, (1866) tab. 38 and an early plate by Parkinson of Tahitian material, now at BM, has recently been published. The collection by *D'Albertis 1876*, from the Fly River, reported by Mueller (1877) to be *S. repandum*, is at MEL and is *S. lasiocarpum*. The collection by *Dahl 1897*, from the Gazelle Peninsula reported by Schumann (1898) 148 to be *S. repandum* has not been seen. Unfortunately seeds are not readily available for cultivation. It is possible that *S. repandum* is a cultivar derived from *S. lasiocarpum* being selected for spinelessness and large fruits. Biological studies on the relationships and variation in these taxa are needed.

Specimens seen

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: None seen.

SOLOMON ISLANDS: Shortland Island: *Guppy 109*, v.1884, Shortland Isl., 7° 05′, 155° 45′, (K); *Guppy 314*, viii.1884, Shortland Isl., 7° 05′, 155° 45′, (K). Wana Wana Island: *Barrau s.n.*, xi.1954, Wana Wana, 8° 15′, 157° 05′, (BRI). New Georgia Island: *Waterhouse 61*, 5.vi.1929, New Georgia, 8° 20′, 157° 30′, (A, K, LAE). Guadalcanal Island: *Brown BSIP 19217*, 28.xii.1970, Honiara, 9° 28′, 159° 52′, (K, LAE). Malaita Island: *Anon BSIP 112*, 29.viii.1945, Auki, 9° 00′, 160° 00′, (BRI); *Kennan s.n.*, i.1970, Yandina, 9° 05′, 159° 20′, (LAE).

Sect. 11 (subgen. *Leptostemonum* (Dunal) Bitter) **Gracilliflora** sensu Symon (1981).

Group *S. ferocissimum*, Whalen, Gentes Herbarum 12 (1984) 233.

Shrubs, armed with acicular prickles; indumentum of stellate hairs (often sparse in New Guinea examples). *Leaves* tend to be small, entire or only shallowly lobed. *Inflorescence* a simple cyme rarely branched, often reduced, with few flowers. *Corolla* stellate, often pale lavender or near white in colour. *Anthers* lanceolate opening by terminal pores. *Berry* red but may darken to almost black when over ripe.

This group is also developed in eastern Australia, but its limits elsewhere have not yet been defined. Closely related species also occur in Central America e.g. "*Solanum bahamense* group", and possibly in New Caledonia, series *Vaccinioides*.

Fig. 38. *S. abortivum* Symon. Drawn from herbarium specimen, *Symon 13840* (ADW).

I had earlier included the related Australian species in sect. *Gracilliflorum* (Dunal) Seithe, but Whalen persuades me that the typification of that section is obscure and in any case seems likely to apply to Central American species.

31. **Solanum abortivum** Symon sp. nov.

Frutex ad 1 m altus sparsim ramosus. *Aculei* copiosi ad 2-2.5 mm longi in ramis, sed in foliis infra et supra ad 5 mm longi. In ramis juvenalibus pili minuti stellati glabrescentes. *Folia* geminata inaequalia circa 10 x 4 cm late elliptica, margine minime repando; petiolus 1-2 cm longus. *Inflorescentia* flos solitarius subaxillaris et pedicellaris; pedicellus 1.5-2 cm tenuis, erectus; *calycis* lobi 2 mm longi, triangulares acumine 1-2 mm longo. *Corolla* stellata lobis 1.1 cm longis lanceolatis purpurea; filamenta 1 mm longa glabra; antherae 5-6 mm longae lanceolatae; *ovarium* stylum stigma non visa. *Bacca* 7-8 mm diam. globularis rubiginosa.

Type Collection: *Symon 13840 & Kairo*, 2.vi.1984, Papua New Guinea, middle slopes of Mt Missim, c. 7° 13′, 146° 49′, 1500-1600 m alt. End of logging track and beginning of foot track, opening in *Castanopsis* forest. Erect prickly shrub, flowers purple, berry dull red.

Type material: Holotype ADW, isotype CANB, LAE.

Derivation: the name refers to the apparently abortive rhachis above the solitary flower.

An erect sparsely branched *shrub* to 1 m high, *prickles* 2-2.5 mm long, with a flattened base, pale straw colour, slightly retrorse, slightly hooked, abundant on principal stems, scattered prickles to 5 mm long on upper and lower leaf surface mainly on mid vein; indumentum of minute stellate hairs (sessile, porrect-stellate with central cell equal to lateral cells) and minute, sessile, glandular hairs on young tips, older stems and mature leaves glabrous. *Leaves* frequently paired the smaller about 3/4 the size of larger, in juvenile phase lamina to 14 x 6 cm, later leaves c. 10 x 4 cm, broad elliptic, margin shallowly repand, apex shortly acuminate, base broadly cuneate, oblique; petiole 1-2 cm long, mostly unarmed. *Inflorescence* a solitary (or few?) pedicellate flower from a sub-axillary position. In specimen to hand several have an abortive rhachis 4-5 mm long above the single flower, pedicel 1.5-2.2 cm long, slender, more or less erect, *calyx* lobes 2 mm long, triangular with acumen of 1-2 mm long. *Corolla* stellate, deeply divided, lobes c. 1.1 cm long, lanceolate, apex sub-acuminate, minutely pubescent with stellate hairs towards apex outside, purple. *Stamens*: filaments 1 mm long, glabrous; anthers 5-6 mm long, lanceolate, narrowed above, pores apical. *Ovary*, style and stigma not seen. *Fruiting* pedicel 2.5-3 cm long, calyx lobes scarcely enlarged, *berry* 7-8 mm diam. globular, dull red. (Fig. 37 & 38; Map 13).

Notes

This new species may be most closely related to *S. saruwagedensis*, but the material available of both is limited. *S. abortivum* differs from *S. saruwagedensis* in its paired leaves, reduced prickles especially on the leaves, reduced inflorescence and slightly more abundant stellate hairs. Despite the pedicellate flower apparently from the leaf axil it is readily separated from any species of subgen. *Lycianthes* by the presence of stellate hairs, prickles and clearly developed calyx lobes.

32. **Solanum anfractum** Symon, sp. nov.

Frutex circa 1-2 m altus ramis minime anfractis. *Aculei* ad 1 cm longi recti in ramis sparsi, rari in foliis. Pili minuti stellati in ramis juvenalibus densi, in foliis supra sparsi, infra densiores. *Folia* geminata aut ternata inaequalia, (primum folium circa 8 x 3 cm, secundum circa 3/4 magnitudinis huius, tertium circa 2.5 x 1 cm) elliptica integra acuta aut breviter acuminata; petiolus circa 1 cm. *Inflorescentia* conferta cymosa 1-3 floribus; pedunculus absens aut brevissimus; pedicellus circa 1.5-2 cm longus; *calycis* tubus circa 1.5-2 mm, lobis linear-lanceolatis circa 4 mm longis; *corolla* 2 cm diam. stellata subalbida aut lilacina;filamenta 1.5 mm longa; antherae 5-7.5 mm longae attenuatae; *ovarium* 1.5 mm diam. glabrum; stylus 7-9 mm erectus glabrus infra glandulosus. Pedicellus 3-3.5 cm longus. *Bacca* 1-1.5 cm diam. globosa tandem rubiginosa. *Semina* 5 x 4 mm depressa cum ala angusta.

Fig. 39. *S. anfractum* Symon. Drawn from herbarium specimen, *Pullen 8043* (CANB).

Type citation: *Kanis 1416*, 13.ix.1970, Trail ENE of Efogi village near 9° 09′, 147° 39′, 1800 m alt. In primary forest on ridge, shrub 2.5 m high, corolla violet.

Type material: Holotype CANB, isotypes A, BRI, K, L, LAE.

Derivation: the name refers to the slightly zigzag nature of the leading shoots.

Shrub (0.5-) 1-2 (-2.5) m tall, stems of the leading shoots slightly zigzag; prickles to 1 cm long, straight, sparse on stem (6/11 cases) rare on the leaves (1/11), about half available herbarium specimens have no prickles; indumentum of minute, stellate hairs (sessile, porrect-stellate with short central cell) often with four lateral rays, dense on young twigs, sparse on leaves above, denser below. *Leaves* alternate, paired or ternate, larger leaf lamina about 8 x 3 cm (exceptionally 14 x 6 cm), minor leaf about 3/4 the size of the larger, third leaf smaller 2-3 x 1-1.5 cm, elliptic, entire, acute or shortly acuminate, base cuneate, often oblique; *petiole* 0.75-1 cm long, (of the largest leaves to 2 cm long), of small ternate leaves 3-11 mm long. *Inflorescence* a condensed cyme of 1-3 flowers; peduncle 0 or very short, scarcely 10 mm long; pedicel 1.5-2 cm long at anthesis, slender, slightly enlarged towards summit. *Calyx*: tube about 1.5-2 mm long, deeply divided into linear-lanceolate lobes about 4 mm long. *Corolla* 2 cm diam., deeply stellate, white/cream, violet/purple, minutely pubescent outside. *Stamens*: filaments 1.5 mm long, anthers 5-7.5 mm long, attenuate, pores small, apical, extrorse. *Ovary* 1.5 mm, glabrous, style 7-9 mm long erect, just exceeding anther tips, glabrous or glandular pubescent below, stigma globose. *Fruiting* pedicel 3-3.5 cm long, slender below, slightly thickened towards summit, calyx not much enlarged; *berry* 1-1.5 cm diam. globose, finally red, (8 collections) usually solitary, rarely more. *Seeds* 5 x 4 mm, strongly flattened, including distinct wing .75-1 mm wide round margin of the seed. (Fig. 39 & 40; Map 4).

Notes

Twentysix collections have come from altitudes which range from 122 m to 2730 m, with a mean of 1684 m. The species has been collected from primary forest, montane rainforest, submontane forest, and secondary forest along streams. It appears to be one of the species of less disturbed sites in contrast to most species of *Solanum*. Flower colour has been described as white, cream, blue, violet, pale mauve, purple and magenta pink. The fruits have been described as red (eight collections) without exception.

Specimens seen

IRIAN JAYA: Vogelkop: *van Royen & Sleumer 7256*, 7-8.xi.1961, Tohkiri Mnts 0° 50′, 132° 45′ 1550 m alt., (BO, K, L). Snow Mountains: *Leeuwen 10574*, x.1926, Nassau Gebirge, Explor. biv. ±4° 15′, 137° 00′, (BO, K, L).

PAPUA NEW GUINEA: Madang: *Sayers NGF 19832*, 10.viii.1964, Sewe, 5° 51′, 146° 08′, 2300 m, (L, LAE); Morobe: *Hartley 10033*, 20.iii.1962, Oomsis Creek, 6° 43′ 146° 47′, 122 m alt., (A, BRI, CANB, L, LAE); *Jacobs 9558*, 11.xi.1973, SE of Lae on coast opposite Lasanga Isl. 7° 25′, 147° 10′, 500-600 m alt., (L); *Stone 10162*, 10.v.1971, Garaina area, 7° 54′, 147° 07′, 1067-m alt., (A, BISH, BRI, K, L, LAE); *Streimann & Foreman NGF 24441*, 26.iv.1972, Mt Kawea, Buso, 7° 25′, 147° 10′, 800 m alt., (A, BRI, K, L, LAE). *Streimann & Kairo NGF 42460*, 21.xi.1960, Spreader divide between Aseki & Menyamya, 7° 18′, 146° 07′, 1920 m alt., (A, L, LAE); *Streimann & Stevens LAE 53987*, 10.i.1972, Aseki, slope of Angabena ridge, 7° 20′, 146° 10′, 1500 m alt., (BRI, CANB, L, LAE); *Vinas LAE 59876*, 6.x.1977, Tibuheneneng Creek near Kurunkurungnu, 6° 29′, 147° 32′, 2200 m alt., (L, NSW, UPNG). Western Highland: *Street & Manner 351*, 12.xii.1967, Jimi Valley, 5° 21′, 144° 20′, 1707 m alt., (L, LAE); *Manner 7*, 13.xii.1972, Koinambe, Jimi Valley, 5° 30′, 144° 37′, 1829 m alt., (LAE); *Manner s.n.*, 12.iii.1972, Kompiam, 5° 20′, 143° 55′, 1829 m alt., (UPNG). Chimbu: *Hide 700*, 27.v.1981, 5 km S of Karimui Stn, 6° 32′, 144° 50′, 1290 m alt., (UPNG). Eastern Highlands: *Brass 31807*, 29.ix.1959, Purosa, Okapa area 6° 41′, 145° 32′, 1950 m alt., (L, LAE, US); *Henty & Coode NGF 29195*, 9.i.1968, Kassam Pass, 6° 12′, 146° 02′, 1280 m alt., (A, BRI, CANB, L, LAE); *Wheeler ANU 5682*, s.d., Noreikora swamp, 6° 30′, 145° 75′, 1890 m alt., (A, CANB, L, LAE); *Womersley NGF 6014*, 8.vii.1954, Aiyura, 6° 19′, 145° 54′, 1768 m alt., (A, BRI, L, LAE). Southern Highlands: *Conn & Kairo 483*, 27.vii.1977, Mt Kemenagi, 6° 28′, 143° 23′, (BFC, L); *Kalkman 5217*, 27.viii.1966, North foot of Mt Ne, 5° 58′, 143° 20′, 2730 m alt., (CANB, L, LAE). Central: *Croft & Lelean NGF 34552*, 13.ix.1973, E slope of Lake Myola, 9° 09′, 147° 43′, 1800 m alt., (A, BRI, K, L, LAE); *Croft et al. LAE 65003*, 23.vii.1974, E side of Lake Myola, 9° 10′, 147° 54′, 2100 m alt., (BISH, BRI, CANB, K, L, LAE, NSW, US); *Gillison 361*, 5.xi.1964, near Lake Myola, 9° 08′, 147° 43′, 1646 m alt., (L, LAE); *Kanis 1416*, 13.ix.1970, trail ENE of Efogi village, 9° 09′, 147° 39′, 1800 m alt., (A, BRI, CANB, K, L, LAE). Milne Bay: *Pullen 8043*, 16.viii.1969, Mt. Mon E of Bonenau village, 9° 53′, 149° 20′, (A, CANB, L, LAE).

Fig. 40. Holotype of *S. anfractum* Symon (*Kanis 1416*, CANB).

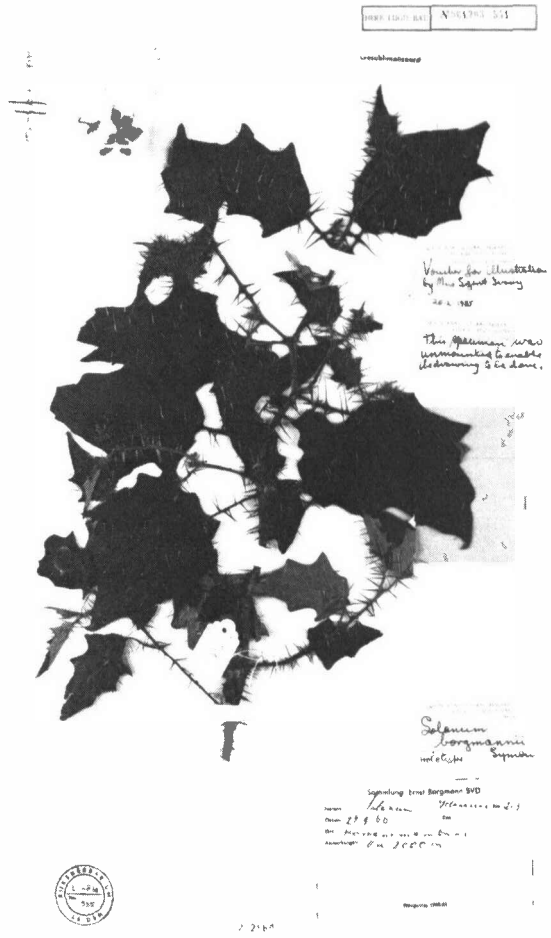

Fig. 41. Holotype of *S. borgmannii* Symon (*Borgman 213*, L.).

33. **Solanum borgmannii** Symon, sp. nov.

Frutex, natura ignota. Valde armatus multis aculeis ad 1.5 cm longis, rectis, basim complanatis, in caule et petiolo et lamina copiosis. Omnes partes pilis stellatis minutis brevibus, adspectu generali discolori. *Folia* alterna, petiolata; lamina ad 10 x 7cm, ovata-acuminata, in utroque margine duobus lobis triangularibus acutis; apex folii acuminatus; petiolus circa 3 cm longus. *Inflorescentia* cymosa conferta 3-4 floribus, ex internodio superiore oriens; pedunculus 0-2 mm longus; pedicellus 10-12 mm longus, inermis; *calycis* tubus 1.5 mm longus lobis 1 mm longis rotundis, acumine 1 mm longo; *corolla* 3 cm diam. late stellata lobis late ellipticis, extrinsecus in alabastro pubescens; filamenta 2 mm longa; antherae 3.5 mm longae, late lanceolatae; *ovarium* 1.5 mm longum, ovatum, paucis glandulosis pilis; stylus circa 1-2 mm longus, erectus; stigma capitatum. *Bacca* non visa.

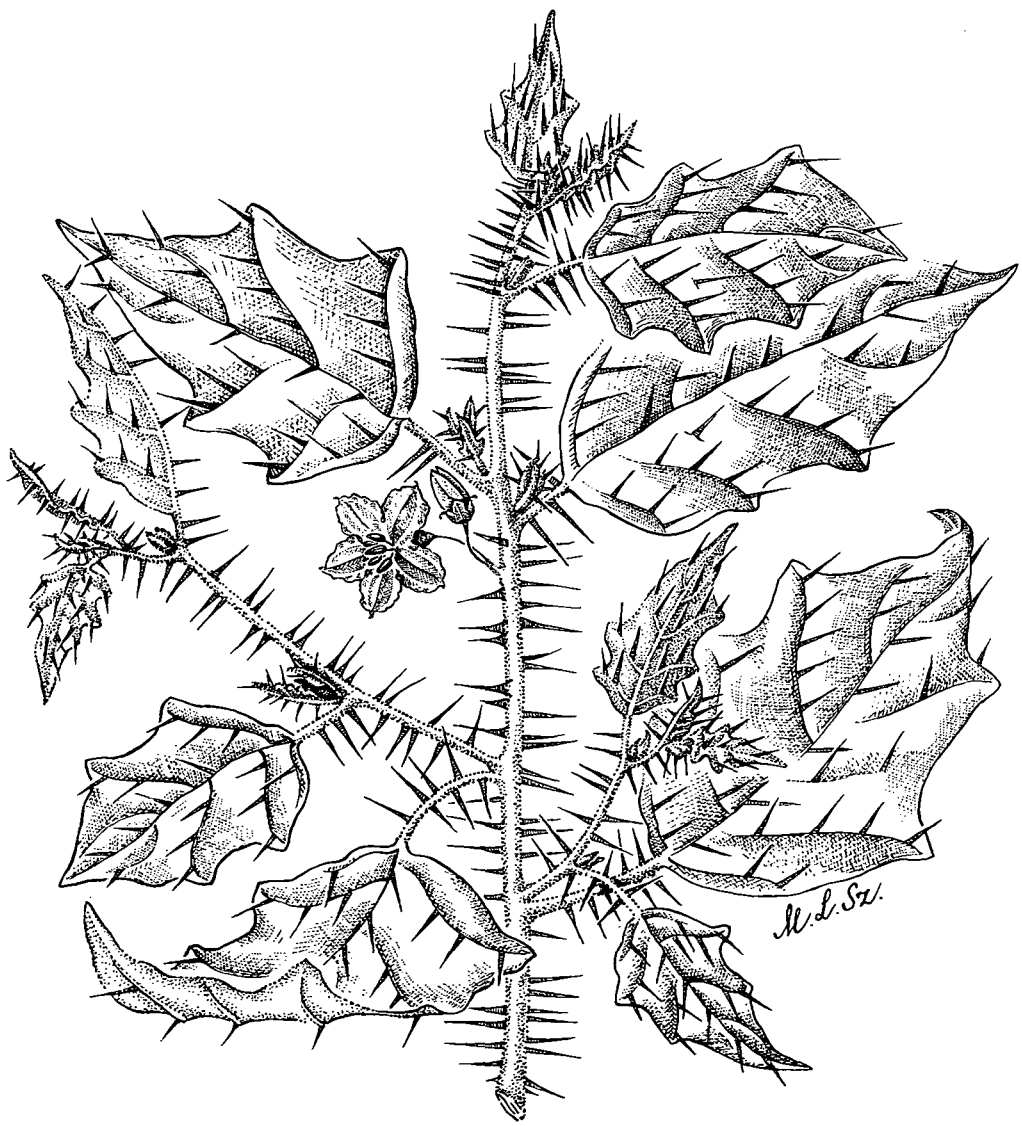

Fig. 42. *S. borgmannii* Symon. Drawn from holotype specimen, *Borgmann 213* (L).

Type Citation: *Borgmann 213*, 29.ix.1960, Komanemambino, ca. 3000 m [=Komanimambulo, slopes of Mt Wilhelm, 5° 48′, 145° 05′, Chimbu Dist. Papua New Guinea].

Type material: Holotype L, isotype LAE.

Derivation: Named after Ernst Borgmann SVD who made the first collections of this species.

Shrub height and nature unknown; *prickles* to 1.5 cm long, straight, reddish-brown, flattened towards base, abundant on stem, petiole and lamina; *indumentum* of minute, stellate hairs (sessile, porrect-stellate with central cell equal to lateral ray) dense on young tips and on lamina below sparser above. *Leaves* alternate, petiolate, lamina to 10 x 7 cm, commonly a little less, ovate-acuminate with c. 2 lobes on each margin, sinus shallow and rounded, lobes c. 1 cm long, triangular, acute, leaf apex acuminate; *petiole* c. 3 cm long, with up to 6 prominent prickles. *Inflorescence* a condensed cyme of 3-4 flowers from an upper internodal position; peduncle 0 or very short scarcely 1-2 mm long; pedicel 10-12 mm at anthesis, unarmed; calyx tube 1.5 mm long; lobes 1 mm long, rounded, acumen 1 mm long; corolla 3 cm diam., broadly stellate divided halfway into broadly elliptic lobes, interacuminal tissue well developed, densely pubescent outside where exposed in bud. *Stamens*: filaments 2 mm long, anthers 3.5 mm long, broadly lanceolate. *Ovary* 1.5 mm long, ovate, with a few glandular hairs; style 1-2 mm long, erect; stigma capitate. *Fruit* not seen. (Figs. 41 & 42; Map 13).

Notes

This species is based on the type collections only which lack ecological data and fruits. It has been collected at one of the highest altitudes recorded for *Solanum* in New Guinea. In the absence of more details, especially its fruits it affinities remain unsure, but would seem to have distant affinities with *S. cinereum* R. Br. from eastern Australia. Therefore its placement in this section must be considered tentative.

34. **Solanum dallmannianum** Warb., Bot. Jahrb. Syst. 13 (1891) 415.

Type citation: "In deutsch New-Guinea am Sattelburg im secundären Wald."

Type collection: Holotype; B? (destroyed), no duplicates traced.

Derivation: not traced.

Solanum cremastocarpum Lauterb. & Schum., Fl. Schutzgeb. Südsee (1901) 534-535.

Type citation: "Kaiser Wilhelmsland: Sattelberg, bei 800 m *Lauterbach n. 557*, am 24 Juli 1880, *Bamler n. 34*, am 12 Januar 1899, faboa kapoa der Eingeborenen".

Type material: Syntypes; ?B (destroyed), ? *Bamler s.n.*, WRSL! and photo ADW.

Derivation: the name refers to the hung or hanging fruits which are borne at the end of relatively long peduncles.

Solanum dolichopodum Bitter, Bot. Jahrb. Syst. 55 (1917) 68.

Type citation: "Nordöstl. Neu-Guinea: KaiserWilhelmsland; in den Wäldern des Finisterre-Gebirges, etwa 1000 m ü.M. (*R. Schlechter n. 18165*—blühend im September)."

Type material: Holotype ?B (destroyed), duplicates not traced.

Derivation: the name means long stalked or long footed, a reference to the long slender pedicels.

A loose open *shrub* 2-3 m long or small *tree*, bark smooth, greenish-brown (*Hartley 11362*), stem armed with sparse, scattered prickles c. 2 mm long, slightly hooked, none seen on leaves; *indumentum* of very sparse, minute, stellate hairs on leaves, young twigs and tips, lens needed. *Leaf* lamina 11-17 x 5-8 cm, ovate-lanceolate, entire, base rounded, oblique, apex acuminate, with 9-10 principal veins on each side of midrib, drying brown above, paler below. *Inflorescence* a lax simple or once forked cyme from a sub-axillary position; peduncle to first flower or fork 2-3.5 cm long, unarmed; rhachis 2-3 cm, pedicel slender 1.5 cm glabrous. *Calyx* 2.5-3 mm long, almost truncate, lobes shallow and rounded, scarcely developed, glabrous. *Corolla* deeply stellate, lobes c. 10 mm long, triangular. *Stamens*: filament 1 mm long; anthers

c. 5.5 mm long. *Ovary* 1.5 mm long, broadly conical; style 7 mm long, erect, stigma capitate. *Fruiting* pedicel lengthening to 3-3.5 cm long, slender at base, thickening slightly above; calyx scarcely enlarged; *berry* 1-1.5 cm diam., globular orange-red (*Brown 65*), red (*Carr 14955*) crimson (*Hartley 11362*). *Seeds* 3-4 mm long, flattened, reticulate. (Fig. 43; Map 5).

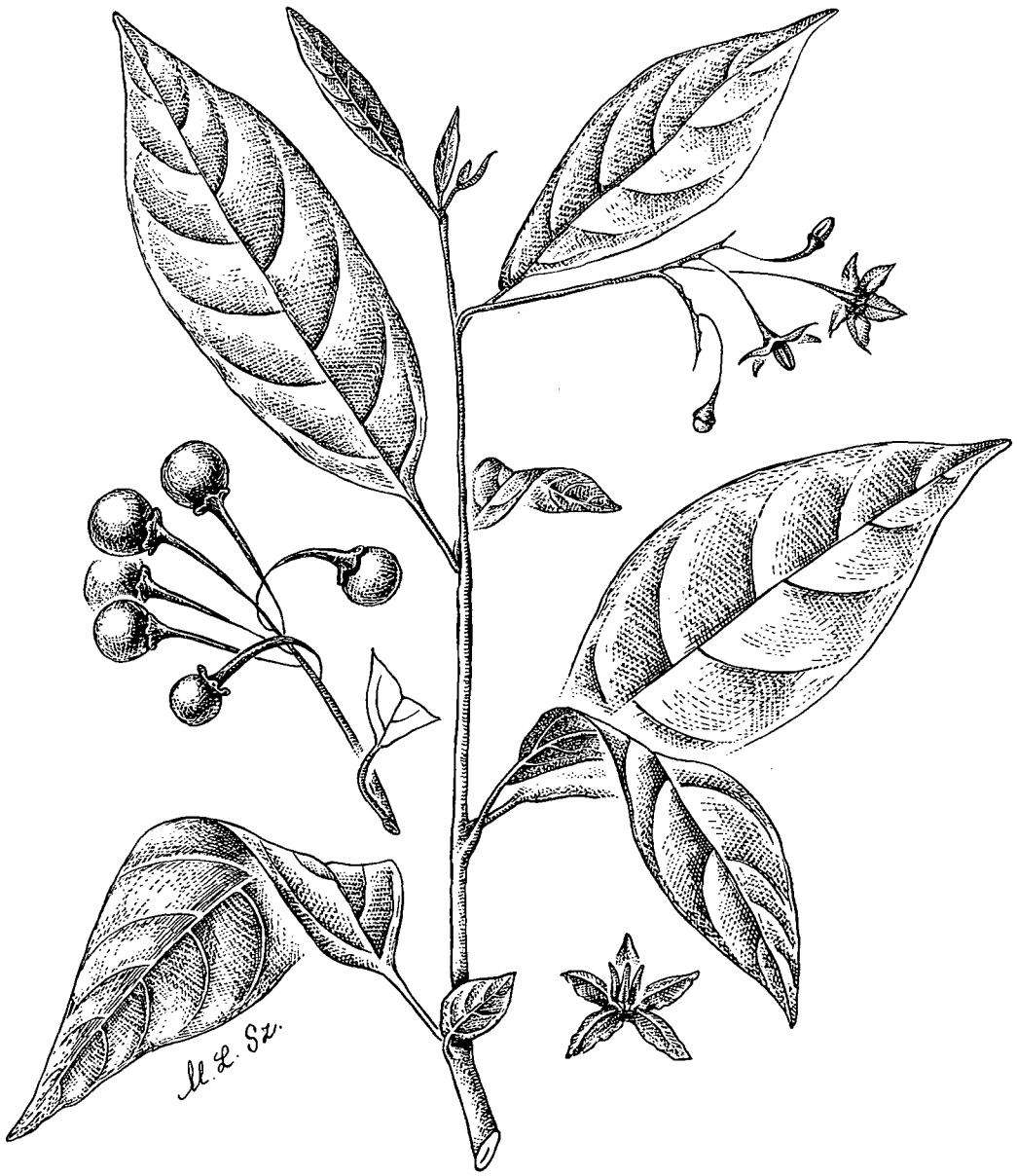

Fig. 43. *S. dallmannianum* Warburg. Drawn from herbarium specimens, *Hartley 11362* (CANB); fruits from *Carr 14955* (CANB).

Notes

This species has been collected between 91 m and 1219 m altitude with a mean of five collections of 682 m. It has been found in abandoned garden sites, secondary forest, roadside banks and as a vine on river banks. The absence of type material for both the species name and one of the synonyms has made recognition of the few collections difficult. *S. cremastocarpum* was recognised as a synonym by Bitter, but he then proceeded to name *S. dolichopodum* which seems to differ in little more than the shorter peduncle and absence of pubescence. However, a number of New Guinea species are sparsely pubescent only on young tips and are glabrescent with age. It is possible that *S. dolichopodum* applies to my own new species *S. incano-alabastrum*, but the few flowers, slender elongate pedicels and broader leaves seem distinct characters.

Specimens seen

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: Morobe: *Hartley 11362*, 7.iii.1963, between Busu & Butibum, 6° 41′, 147° 01′, 90 m alt., (A, BRI, CANB, L, LAE, RSA); *Millar NGF 13880*, 13.xii.1961, Patep river, 7° 00′, 146° 40′ 490 m alt., (BRI, LAE); *van Royen 11183*, 16.vi.1976, Watut river to Mt Amungwiwa, 1770 m alt., (L); *Symon 10662*, 16.vi.1977, Sankwep logging area, near Gawam, 6° 36′, 147° 02′, (ADW, L, LAE, MO). Southern Highlands: *Conn 487 & Kairo*, 27.vii.1977, Mt Kemenage, Lake Kutubu, 6° 24′, 143° 19′, (BFC); *Katik s.n.*, 23.v.1977, Lake Kutubu, 6° 25′, 143° 20′, 305 m alt., (LAE, UPNG). Central: *Brown 65*, s.d., near Orisa, Mt Yule area, 8° 15′, 146° 45′, 610 m alt., (A); *Carr 14955*, 15.xi.1935, Boridi, 9° 05′, 147° 38′, 1000 m alt., (BM, K, L, NY); *Guilianetti s.n.*, 1896, Neneba, Mt Scratchley, 8° 43′, 147° 27′, 1219 m alt., (K).

35. **Solanum denseaculeatum** Symon, sp. nov.

Frutex ad 3.5 m altus. *Aculei* ad 7 mm longi erect in ramis densi, in petioli foliis inflorescentia sparsi. Pili stellati in foliis infra et ramis juvenalibus et inflorescentia densi, in foliis senioribus supra sparsi. *Folia* saepe geminata rarim ternata inaequalia (primum folium circa 8 x 4.5 cm secundum circa 1/2 magnitudinis huius tertium circa 1-1.5 cm longum) ovata-elliptica integra aut repanda. *Inflorescentia* cymosa sub axillaris 12-30 floribus; pedicellus 7-9 mm longus; *calycis* tubus circa 4 mm longus lobis breviter triangularibus acumine 0.75 mm longo. *Corolla* stellata circa 1 cm longa extus dense pubescens; filamenta circa 1 mm; antherae circa 6 mm longae lanceolatae; *ovarium* circa 2 mm longum globulare; stylus 7 mm longus erectus. Fructus fasciculatus 1-6 baccis distaliter latis; pedicellus 2-2.5 cm longus supra turgidus. *Bacca* circa 1 cm diam. globulosa, in maturitate non visa. *Semina* 2.5-3 mm longa depressa reticulata.

Type citation: *Streimann & Kairo NGF 21198*, 20.x.1965. Papua New Guinea, Golden Pines Logging area, Watut, Morobe District, 7° 15′S, 146° 30′E. Alt. 3800′. Alongside road, shrub with needles, height 10 feet, d.b.h. 2 ins. Bark light grey, middle green, inner cream. Leaves rough surface, dull green above lighter below and hairy on both sides. Flowers blue and yellow. Fruit green.

Type material: Holotype BRI 134624, isotypes A!, BFC, BRI 1346223!, CANB, K!, L!, LAE!, NSW!, [BOG, SING, UH, PNH, US, BISH not seen].

Derivation: the name refers to the dense array of prickles along the stem.

A *shrub* to 3.5 m high, armed with erect, straight prickles to 7 mm long, dense on stem, sparse to absent on petiole, leaves and inflorescence, *indumentum* of stellate hairs (sessile or stipitate porrect-stellate with long central ray) dense on leaves below, on young tips and inflorescence, sparse on older leaves above. *Leaves* often paired occasionally ternate, larger leaf c. 8 x 4.5 cm, ovate-elliptic, entire or repand with 1-2 very broad, shallow lobes, leaf base rounded, oblique, apex acute to acuminate, second leaf about 1/2 size of first; third when present further reduced to 1-1.5 cm long; petiole 1.2 cm long on the largest leaves, veins impressed above. *Inflorescence* a raceme-like cyme from a sub-axillary position bearing 12-30 flowers over a period of time; floral rhachis extending 3-6 cm, rhachis with a few prickles towards base; pedicel 7-9 mm long. *Calyx* c. 4 mm long, lobes shortly triangular with an acumen 0.75 mm. *Corolla* stellate, deeply divided, c. 1 cm long, densely pubescent outside, *Stamens*: filaments c. 1 mm, flattened below; anther 6 mm long lanceolate, narrowed towards

apex. *Ovary* c.2 mm long, globular, with a few stellate and glandular hairs towards apex; style 8 mm long, erect, with a few stellate and glandular hairs towards base; stigma terminal subconical. *Fruiting* cluster of 1-6 berries, mostly borne distally in collection to hand; pedicel 2-2.5 cm long, swollen above; calyx not much enlarged; *berry* c. 1 cm diam. perhaps not fully developed, globular, colour of ripe berry not known. *Seeds* 2.5-3 mm long, flattened, reticulate. (Figs. 44 & 45; Map. 4).

Fig. 44. *S. denseaculeatum* Symon. Drawn from herbarium specimen, *Streimann & Kairo NGF 21198* (BRI).

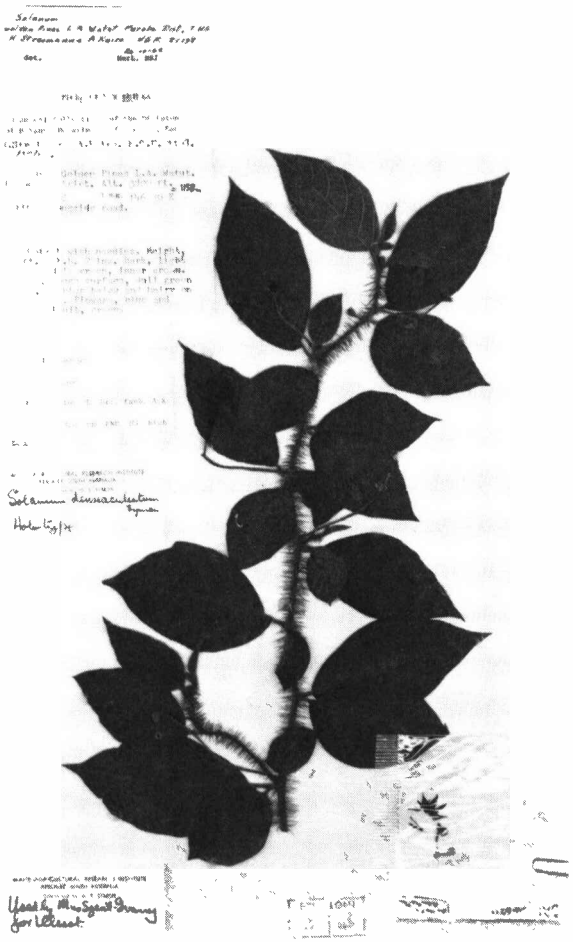

Fig. 45. Holotype of *S. denseaculeatum* Symon (*Streimann & Kairo NGF 21198*, BRI).

Fig. 46. Holotype of *S. expedunculatum* Symon (*Symon 10675 & Katik*, ADW)

Notes

Two collections have been recognised. The species is related to *S. turraeaefolium* S. Moore and is similar in the sub-axillary origin of the inflorescence, the shallow lobing of the leaves (scarcely developed in the new species) and the leaves finally glabrescent above. The new species differs in leaf shape, the densely prickly stems, and it has only been found at a higher altitude.

Specimens seen

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: Morobe: *Streimann & Kairo, NGF 21198*, 20.x.1965, Golden Pines logging area, 7° 15′, 146° 30′, 1158 m alt., (A, BFC, BRI, CANB, CBG, K, L, LAE, NSW); *Kairo 766*, 14.xi.1980, Gumi divide 25 km W of Bulolo, 7° 13′, 146° 25′, 1700 m alt., (BFC, CBG).

36. **Solanum expedunculatum** Symon, sp. nov.

Frutex 12 m altus. Aculei breves erecti ferruginei in ramis et in foliis utrinque 2-3 mm longi, sed interdum absentes in ramis distalibus et foliis. Pili stellati densi in partibus omnibus interdum maxime ferruginei. *Folia* juvenia ad 12 x 6 cm, vetustiora ad 3 x 2 cm elliptica ad ovato-lanceolata. *Inflorescentia* cymosa 2-6 floribus, ex internodio superiore exoriens; pedunculus plerumque absens rhachidi valde deminuta; pedicellus 1.7-2 cm longus; *calycis* tubus 2 mm longus lobis circa 3 mm longis triangularibus cum acumine lineari 2-3 mm longo; *corolla* stellata partita 4-5 lobis circa 8mm longis albidis aut violaceis aut lilacinis; filamenta circa 1.5 mm; antherae 5-6 mm longae; *ovarium* circa 1 mm diam.; stylus 7-8.5 mm longus erectus paucis pilis glandularibus ad basim; stigma capitatum. Fructus fasciculatus plerumque solitaria bacca, raro 3-4 baccis; pedicellus 2-2.5 cm longus tenuis; *bacca* 8-10 mm diam. globosa in maturitate rubiginosa.

Type citation: *Symon 10675 & Katik*, 22.vi.1976. "Papua-New Guinea, top of Daulo Pass, 2320 m, sprawling shrub, slightly rusty aspect, flowers white to very pale mauve, no ripe fruits".

Type material: holotype ADW, isotypes CANB, K, LAE, MO.

Derivation: the name refers to the virtual absence of a peduncle to the reduced inflorescences.

A *shrub* 1-2 (-3) m armed with short, erect, reddish prickles 2-3 (-5) mm long on stems, upper and lower leaf surface, reduced or absent on pedicel and calyx sometimes absent from aged and distal twigs and leaves; all parts with dense indumentum of stellate hairs (shortly and stoutly stipitate, porrect stellate with short central ray or ray equal to lateral), sometimes sparser above, leaves paler below, drab or intensely rusty above. *Leaf* lamina in juvenile phase to 12 x 6 cm, usually much less and commonly 2.5-3.5 x 1.5-2.5 cm, elliptic to ovate-lanceolate, base cuneate to rounded, oblique, apex acuminate. *Inflorescence* a small cymose cluster of 2-6 flowers in an upper internodal position; peduncle generally absent, rhachis to 5 mm long often very reduced; pedicels 1.7-2 cm long. *Calyx*: tube 2 mm long, lobes c. 3 mm, triangular with linear acumen 2-3 mm long. *Corolla* stellate, 4-5 partite; tube 3-4 mm, lobes c. 8 mm long, triangular; flower colour reported to be white, pinky-red, lavender to purple. *Stamens*: filaments c. 1.5 mm long, anthers 5-6 mm long. *Ovary* c. 1 mm long; style 7-8.5 mm long, erect with a few glandular hairs towards the base; stigma capitate, shortly bilobed. *Fruit* mostly a single berry sometimes two, rarely 3 or 4 berries; pedicel 2-2.5 cm long, slender; *berry* 8-10 mm diam., globose, dark red when ripe. Five fruits counted yielded a mean of 48 seeds from *Symon 10700*. Seedling hypocotyl pubescent with long simple and several celled hairs, some glandular; cotyledons 10 x 4 mm, elliptic, acute, sparsely ciliate with slender glandular hairs; first leaf 9 x 6 mm, ovate, sparsely pubescent above with long (0.5-0.75 mm), simple, two celled hairs, some glandular mainly on margin. (Figs. 46 & 47; Map 5).

Chromosome number: n=12 counted by B. Randell from *Symon 10675*, *10702*, and n=24 counted by P. Sharp from *Symon 10700*.

Notes

This species is found at moderate to high altitudes. Of sixteen records the lowest was 1646 m, the highest 2850 m and the mean 2383 m. The plants have been collected from forest regrowth, old garden sites, less often in mixed forest, roadside banks, camp clearings and mossy forest. The shrubs may sprawl and root at the nodes where they touch ground.

Fig. 47. *S. expedunculatum* Symon. Drawn from herbarium specimen grown from *Symon 10700* (ADW).

Specimens seen

IRIAN JAYA: None seen

PAPUA NEW GUINEA: Morobe: *Streimann 8383*, 16.iv.1982, Ekuti divide, Bulolo-Aseki road 7° 19′, 146° 23′, 2200 m alt., (BFC, CBG, LAE); *Symon 13825 & Katik*, 31.v.1984, Aseki road near crest, 7° 22′, 146° 11′, (ADW, CANB, K, L, LAE, MO). Western Highlands: *Bowers 802*, 13.vii.1969, Alipe Ponya, Kepaka upper Kaugel, 5° 56′ 144° 01′, 2530 m alt., (K, LAE); *Gilliard s.n.*, vii. 1950, Mt Hagen, 5° 45′, 144° 02′, (LAE); *Hoogland & Pullen 6054*, 29.viii.1956, near Tomba village, 5° 50′, 144° 01′, 2600 m alt., (A, BM, BRI, CANB, K, L, LAE, MEL, US); *Streimann 8467*, 7.vii.1982, Waghi-Sepik divide, 5° 43′, 144° 38′, 2400 m alt., (BFC, CBG, L, UPNG); *Symon 10702*, 27.vi.1977, Wahgi-Sepik divide about crest, 5° 50′, 144° 35′, (ADW); *Symon 10706*, 29.vi.1977, as above, (ADW). Chimbu: *Hide 458*, 21.iii.1973, SW of Koge Mission, 6° 07′, 145° 00′, 2400 m alt., (LAE). Eastern Highlands: *Millar NGF 40708*, 12.xi.1968, Fatima river, Marafunga, 6° 05′, 145° 15′, 2439 m alt., (A, BRI, CANB, K, L, LAE); *Paijmans 1308*, 16.v.1971, SE of Mt. Kerigomna, 5° 58′, 145° 08′, 2500 m alt., (CANB); *Stevens LAE 51095*, 2.xi.1970, Fatima river, Marafunga, 6° 05′, 145° 15′, 2621 m alt., (A, BO, BRI, CANB, K, L); *Symon 10675*, 22.vi.1977, Daulo Pass top, 6° 05′, 145° 25′, 2320 m alt., (ADW); *Symon 10680*, 22.vi.1977, E slope of Daulo, 6° 05′, 145° 25′, (ADW). *Vandenberg & Womersley NGF 35007*, 7.v.1968, Marafunga logging area, 6° 00′, 145° 10′, 2492 m alt., (A, BO, BRI, CANB, K, L, LAE). Southern Highlands: *Frodin NGF 32059*, 27.viii.1966, vicinity Habono resthouse, W of Mt Ne, 5° 58′, 143° 20′, 2073 m alt., (BRI, CANB, L, LAE); *Symon 10700 & Katik*, 26.vi.1977, SE slopes of Mt Giluwe, 6° 04′, 143° 53′, (ADW). Central: *Frodin 671*, 21.vi.1971, Goilala, 8° 19′, 147° 07′, (K, L, LAE, UPNG).

37. **Solanum gibbsiae** J. Drumm. in Gibbs, Fl. Arfak mts (1917) 177.

Type citation: "Arfak Mts. Angi Lakes, edge of forest by ♀ lake, 7000′. Fl., Fr. Dec. 5974."

Type material: Holotype BM! and photo ADW.

Derivation: the name commemorates L.S. Gibbs (1870-1925), British botanist who collected in New Guinea and published on the Flora of the Arfak Mountains.

A slender *shrub* to 1.5 m, bark described as chestnut or black, armed with slender, acicular prickles to 1 cm long, abundant on stem, scattered on leaves above and below, chiefly on main veins; indumentum of minute stellate hairs (sessile, porrect-stellate with central ray equal to laterals) scattered on leaves above and below, dense on corolla bud outside. *Leaf* lamina 5-12 x 3-4 cm, elliptic with 2-6 broad shallow lobes on each side, lobes cut 1/5-1/3 way to midrib, their apex rounded to acute, sinus shallow and rounded, leaf apex acute to shortly acuminate, base truncate to broadly cuneate, oblique, dark green glossy above, pale green below; petiole 5-10 mm long, mostly armed. *Inflorescence* a simple cyme from an upper-internodal position just below leaf; peduncle to first flower 1-2 cm long, floral rhachis to 2 cm long; pedicel slender c. 5 mm long. *Calyx* 2 mm long, truncate, lobes scarcely developed, acumen 0.5 mm long. *Corolla* (not seen) reported (Drummond) "rose-purple, subrotate, lobes 5, c. 3.5 mm long, narrow triangular, gradually acuminate, sparsely stellate pilose outside, inside with anthers sub-connivent, unequal, glabrous, at length more or less reflexed". *Fruiting* pedicel to 2 cm long enlarged upwards; *berry* 1-3 per truss (not seen) reported "depressed globular 8-10 mm diam., shining, moderately succulent. *Seeds* (barely mature) about 12, yellowish, subreniform sometimes a little angular, laterally planoconvex, testa sub-translucent armed with small shining papilli beneath the lens". By comparison with its related species the berry is probably red. (Fig. 48; Map 3).

Notes

As pointed out by Drummond, *S. gibbsiae* (and *S. leptacanthum*) may be related to *S. retrorsum* Elmer, from the Philippines and to *S. ferocissimum* Lindl., from Australia.

38. **Solanum heteracanthum** Merrill & Perry, J. Arnold Arb. 30 (1949) 48-49.

Type citation: "Netherlands New Guinea: 9 km NE of Lake Habbema, *Brass 10764* (type) Oct. 1938, alt. 2700 m, rain forest or valley bottom (weak shrub 1.5 m high, in a native clearing; flowers purple; fruit unripe); Bele River, 18 km NE of Lake Habbema, *Brass 11505*, Nov. 1938, alt. 2200m, scrambling in an open landslip (flowers purple;fruit immature)."

Fig. 48. *S. gibbsiae* J. Drumm. Drawn from photo of type specimen, *Gibbs 5974* (BM).

Type material: Holotype A! and photo ADW, isotype BRI, L.

Derivation: the name refers to the varied prickles on the plant.

Plant *shrubby* to 1.5 m tall, prickles 5-7 mm long attaining 5 mm wide at base, laterally compressed, strongly recurved on stems and on leaves below, erect and straight on leaves above; *indumentum* of close, dense, minute stellate hairs on tips and leaves below (sessile porrect stellate with short central cell), along impressed veins above, upper leaf surface glabrescent, leaves strongly discolorous. *Leaves* alternate, often geminate, unequal, the larger lamina 5-12 x 1.3-5 cm, ovate-oblong, with 3-4 shallow, rounded lobes on each side, lobe apex round, sinuses shallow and rounded, leaf base rounded to broad cuneate, oblique, leaf apex acuminate; petiole 7-9 mm long. *Inflorescence* a congested cymose cluster of c. 20 flowers from a sub-axillary position; peduncle c. 5 mm long, furcate; floral rhachis 2-5 mm long; pedicels 7-10 mm long. *Calyx* c. 2 mm long, campanulate, lobes 3 mm long, abruptly obtuse at apex. *Corolla* c. 2 cm diam., deeply divided, lobes c. 11 mm long, lanceolate, densely pubescent outside. *Stamens*: filaments 1-2 mm long; anthers c. 6 mm long, narrow lanceolate, long attenuate, pores apical; *ovary* 1 mm long, ovoid, glabrous or with a few stellate hairs; style c. 8 mm long, also with a few stellate hairs below, stigma shortly bilobed. *Fruit* in clusters of up to six, pedicel swollen above; calyx not much enlarged, berry c. 1 cm diam., globose, nature and colour not stated. *Seeds* 4 x 3 mm, reniform, laterally compressed, minutely reticulate, about 16 in one fruit. (Fig. 49; Map 4)

Notes

Material to match the type collections is rare. The species appears to be closely related to the Australian *S. dimorphispinum* C.T. White and *S. hamulosum* C.T. White, but has smaller leaves, more congested inflorescences and smaller fruits. The few collections were all made in the 1930s.

Specimens seen

IRIAN JAYA: Snow Mountains: *Brass 10764*, x.1938, 9 km NE of Lake Habbema near 4° 05′ 138° 35′ 2700 m alt. (type), (A, BRI, L); *Brass 11505*, xi.1938, Bele river 18 km NE of Lake Habbema, near 4° 05′, 138° 35′, 2200 m alt., (A, BO, L).

PAPUA NEW GUINEA: Northern: *Carr 15672*, 20.ii.1936, Lala river, 8° 55′, 141° 40′, 1524 m alt., (A, BM, K, L, NY); *Carr 15675*, as above, (BM, K, L, NY). Central: *Cheeseman 209*, 2.ii.1934, Mt Tafa, 8° 37, 147° 10′, 2591 m alt., (K, L).

39. **Solanum infuscatum** Symon, sp. nov.

Frutex semi scandens. Aculei 5 mm longi undique, dispositi. Omnes partes pilis longis simplicibus glandulosis brunneis; in corollae lobis pauci pili minuti stellati. *Folia* circa 6 x 3.5 cm ovata 2-3 lobis late triangularibus, interdum geminata. *Inflorescentia* conferta cymosa circa 6 floribus ex internodio superiore exoriens; pedunculus circa 1 cm; pedicellus ad 12 mm longus; *calycis* lobi circa 3 mm longi triangulares apice acuminato; *corollae* lobi circa 1.5 cm longi angusti purpurei; antherae circa 8 mm longae. Fructus fasciculatus ad 3 baccas; pedicellus 2.5 cm longus, minime sursum turgidus; *bacca* 1-1.5 cm diam. globosa denim rubiginosa. *Semina* 3.5-4 mm longa depressa reticulata fere orbiculata.

Type citation: *Foreman NGF 48100*, 14.ii.1970, Papua New Guinea, Arigenang Village, Finschhafen sub-district, Morobe District, 6° 28′S, 147° 21′E. Ridge side at edge of forest; 4000′ altitude; semi-scandent shrub. Leaves light green covered with fine brown hairs and sharp spines. Flowers purple. Fruit green-red, globular.

Type material: Holotype LAE, isotype BRI! CANB!, L!

Derivation: the name refers to the brownish aspect of the hairs with their prominent glandular apex.

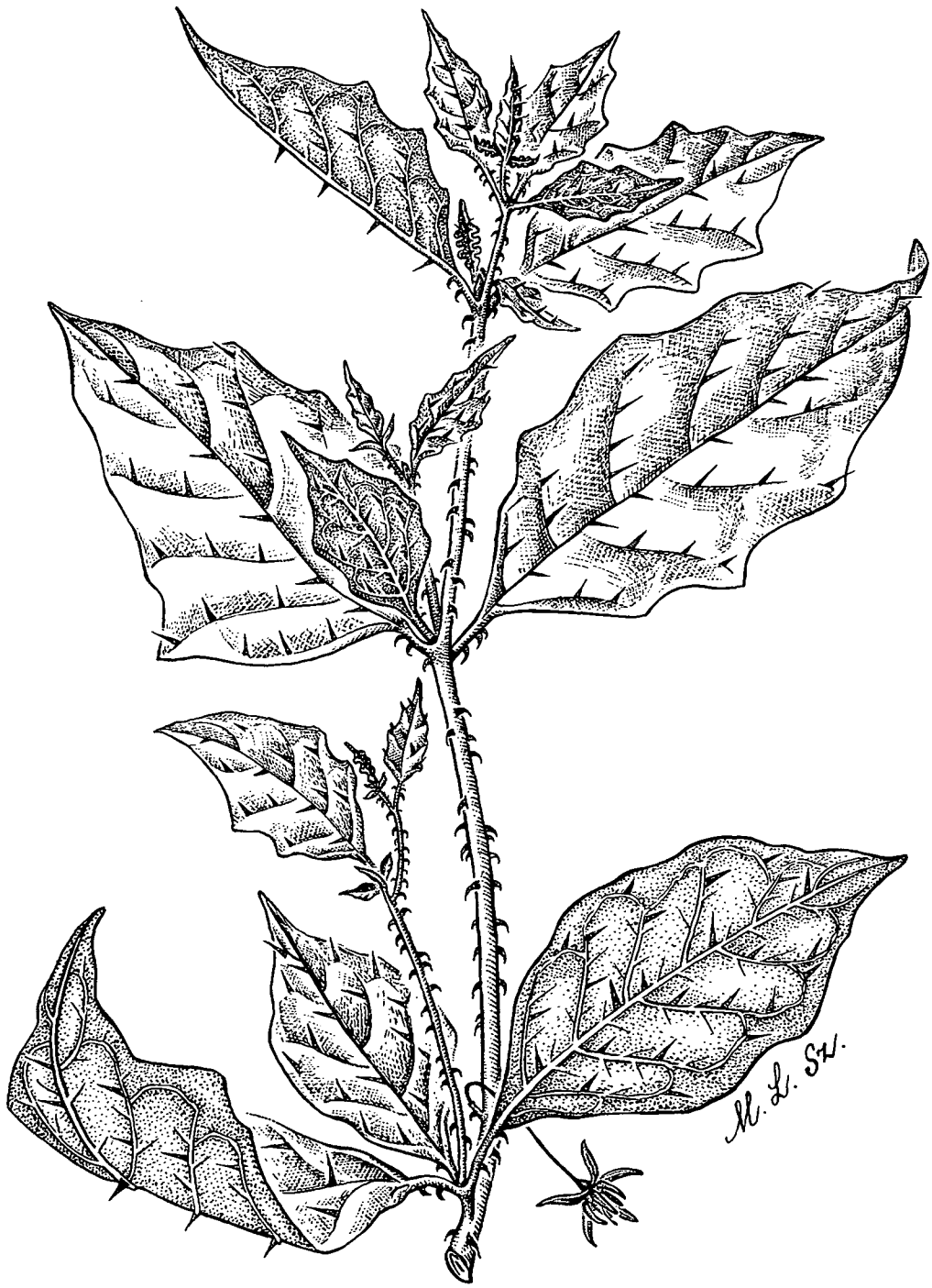

Fig. 49. *S. heteracanthum* Merrill & Perry. Drawn from herbarium specimen, *Carr 15672* (CANB).

A semi-scandent *shrub*, armed with acicular prickles to 5 mm long on stems, petioles, upper and lower leaf surfaces; all parts with indumentum of long, simple, several celled, mostly glandular hairs (simple, uniseriate, glandular) abundant on stems and common on leaves described as fine brown hairs (*Foreman NGF 48100*), minute, few rayed, stellate hairs (minute, sessile, porrect stellate) detected only on margins of corolla lobes. Leaf lamina to 8.5 x 5.5 cm, commonly about 6 x 3.5 cm, ovate in outline with 2-3 shallow, broadly triangular lobes on each side, lobe apex acute, sinus shallow and rounded, leaf apex acuminate, leaf base rounded to sub-cordate, oblique, leaves sometimes geminate, the second not much smaller than the first. *Inflorescence* a condensed cyme of about 6 flowers from an upper internodal position; peduncle and rhachis to about 1 cm long, pedicel to 12 mm long. *Calyx* lobes c. 3 mm long, triangular with an acuminate apex. *Corolla* lobes c. 1.5 cm long, narrow, deeply divided, purple. *Stamens*: filament not available; anther c. 8 mm long (no flower available for dissection). *Fruit* in clusters of up to 3 berries; pedicel 2.5 cm long, slightly swollen upwards, calyx lobes not much enlarged, *berry* 1-1.2 (?-1.5) cm diam., globular, finally red. *Seeds* 3.5-4 mm long, flattened, reticulate, irregularly orbicular. (Figs. 50 & 51; Map 4).

Note

This species is based on the type collection (see photo). The specimen has been stuck down and it has not been possible to dissect the flower without damage. The abundant glandular hairs are a conspicuous feature of the species. The intensely glandular tomentum of simple hairs is like that of *S. missimense*.

40. **Solanum leptacanthum** Merrill & Perry, J. Arnold Arb. 30 (1949) 45-46.

Type citation: "British New Guinea: Central Division, Ononge Road, Dieni, *Brass 3814* (type), April, 1933, alt. 500 m, in rain forest (one plant seen; shrub 1 m, with terminal flat spreading branches; flowers pink; fruit broadly ovoid, orange-yellow, 1.8 cm long, 1.5 cm diameter)".

Type material: Holotype A!, isotypes L!, NY! (photos ADW).

Derivation: the name refers to the rather thin, long (but sparse) prickles.

A *shrub* 1-2 m, sparsely armed with prickles 5-10 mm long on stem and both sides of leaves, mostly unarmed on distal shoots, more abundant on lower stems; indumentum of sparse, fine, spidery, stellate hairs (sessile, porrect stellate with short or absent central ray). Leaves to 20 x 6 cm, more often c. 10-12 x 2-3 cm elliptic with 2-3 broad, shallow lobes on each side, sometimes entire, base cuneate, apex distinctly acuminate; petiole relatively short, less than 5 mm long. *Inflorescence* a short cyme to 2.5 cm long from mid internodal position; peduncle to first flower 1-5 mm long, pedicel c. 6 mm long. Calyx: tube 1.5-2 mm long, lobes 0.5-1 mm, narrowly triangular to linear. *Corolla* stellate, deeply divided, lobes c. 1 cm long. *Stamens*: filaments very short; anthers c. 9 mm long, attenuate, possibly curved. *Ovary* 1.5 mm long, glabrous; style 3-3.5 mm long, glabrous; stigma oblique. *Fruit* cluster usually a single berry; pedicel to 3.5 cm long slightly swollen above; *berry* 1-2 cm diam., globose, orange (3 records) yellow (one). *Seeds* to 7 x 4 mm (relatively large), flattened, reniform, pale in colour. (Fig. 53; Map 14).

Notes

Eight collections have come from altitudes ranging from 55 m to 1432 m (mean 580 m), the collecting sites described as monsoon forest, primary rain forest, fagaceous forest, hill forest and as a weed in a rain forest clearing. The flowers have been described as white, pink, violet, lilac, and deep lilac. The fruits have been described as dull orange, orange, yellow and orange-yellow.

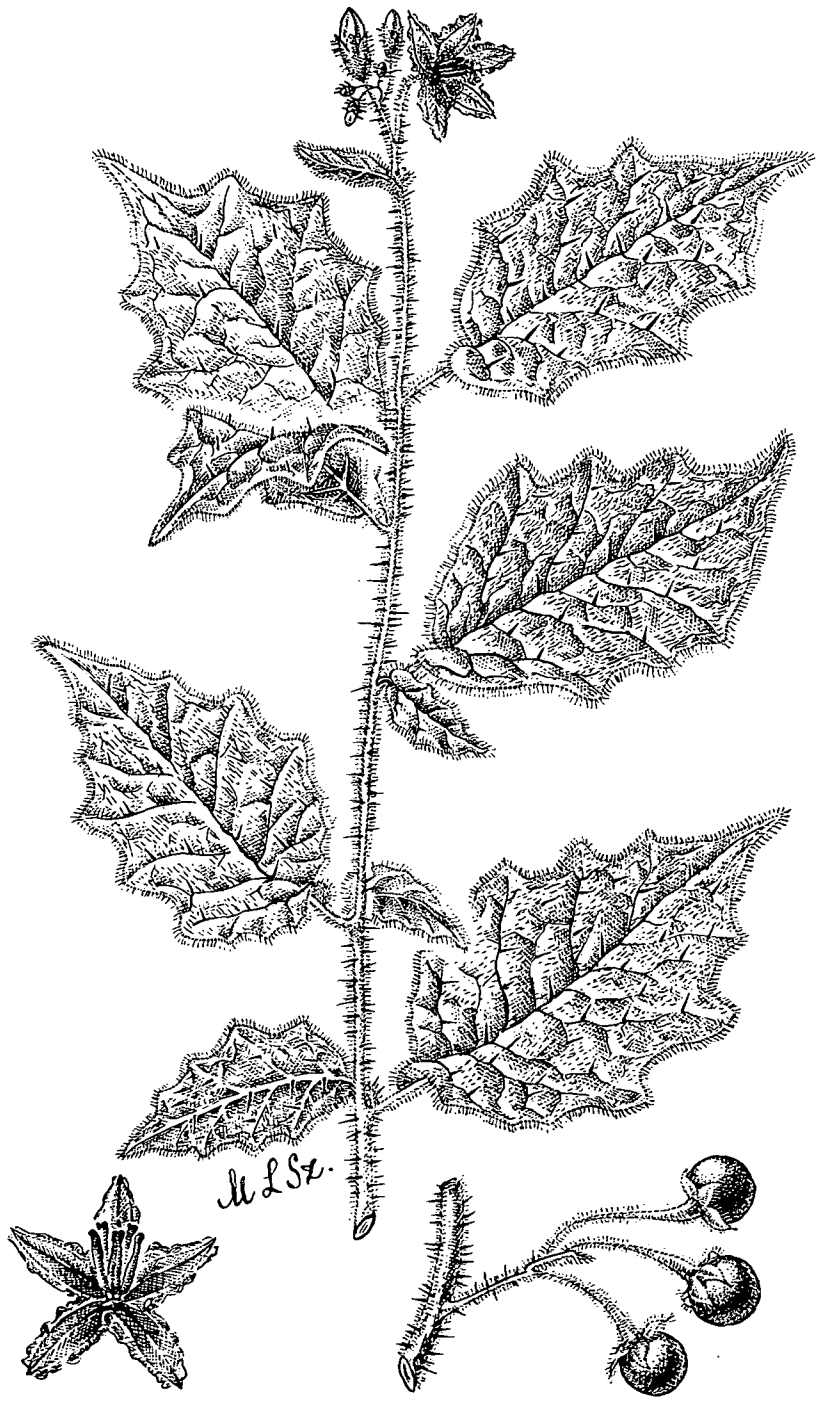

Fig. 50. *S. infuscatum* Symon. Drawn from holotype, *Foreman NGF 48100* (BRI & LAE).

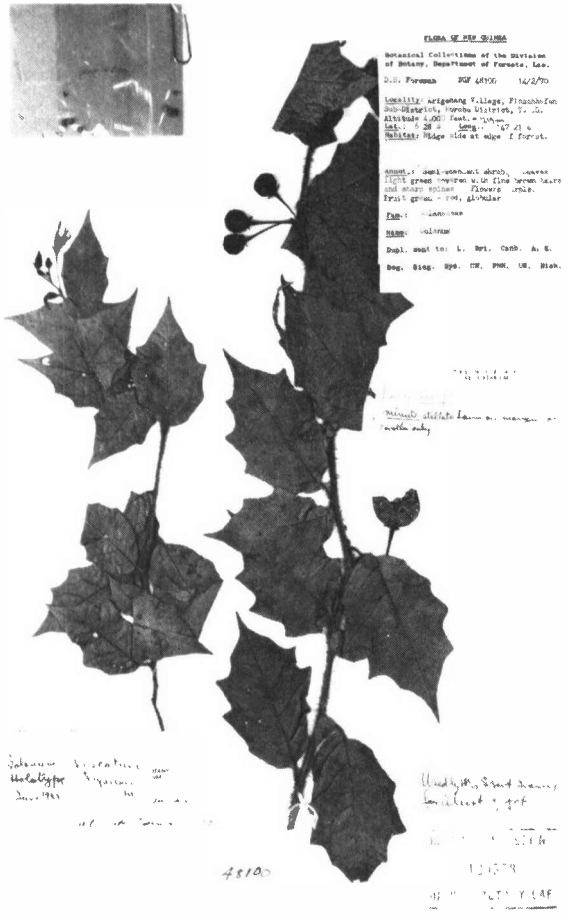

Fig. 51. Holotype of *S. infuscatum* Symon (*Foreman NGF 48100*, LAE).

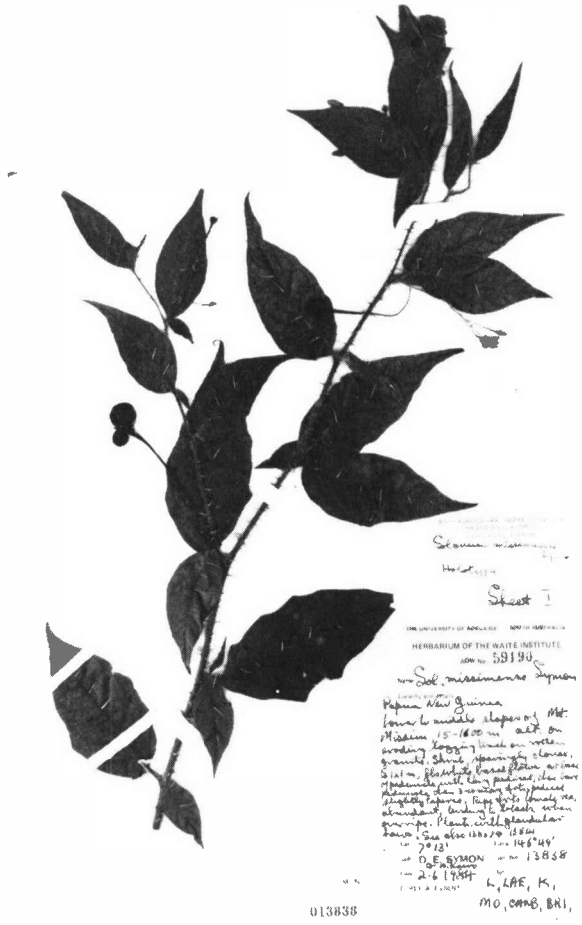

Fig. 52. Holotype of *S. missimense* Symon (*Symon 13838 & Kairo*, ADW).

Specimens seen

IRIAN JAYA: none seen.

PAPUA NEW GUINEA: Western: *Leach 3848*, 26.iv.1981, Balamuk near Bensbach, 8° 52′, 141° 15′, low alt., (UPNG). Gulf: *Craven & Schodde 714*, 14.i.1966, near Ihu, 7° 55′, 145° 23′, 38 m alt., (CANB, L, LAE); *Schodde & Craven 4625*, 8.iii.1966, near junction of Kapau & Tauri rivers, 7° 48′, 146° 08′, 183 m alt., (CANB, LAE). Central: *Brass 972*, 13.ii.1926, Ohu, Vailala River, 9° 38′, 147° 24′, (A, BRI); *Brass 3814*, iv.1933, Ononge River, Dieni, 8° 40′, 147° 15′ 500 m alt., (BO, L, NY); *Brown s.n.*, vi.1898, Astrolabe Range, 9° 27′, 147° 22′, (NSW); *Carr 11657*, 11.iii.1935, Veiya, 9° 03′, 147° 01′, sea level, (BM, K, L, NY); *Carr 11680*, 12.iii.1935, Veiya, 9° 03′, 147° 01′, sea level, (BM, CANB, K, L); *Carr 13172*, 15.ix.1935, Boridi, 9° 05′, 147° 38′, 1432 m alt., (BM, CANB, K, L, NY); *Foreman & Vinas LAE 60090*, 28.ix.1973, above Boridi village, 9° 05′, 147° 38′, 1280 m alt., (BRI, L, LAE); *Wiakabu & Rauveve LAE 70449*, 1.vi.1977, along Pt Moresby road, 10° 05′, 148° 10′, 25 m alt., (BRI, L, LAE, NSW); *Womersley & Simmonds NGF 7131*, 24.i.1955, Brown River Reserve, 9° 12′, 147° 18′, 55 m alt., (BRI, LAE).

Fig. 53. *S. leptacanthum* Merrill & Perry. Drawn from herbarium specimen, *Brass 3814* (BRI).

41. **Solanum missimense** Symon, sp. nov.

Frutex ad 1.5 m altus, supra effusus. Aculei ad 9 mm longi recti flavi plerumque copiosi. Omnes partes pilis longis simplicibus glandulosis; in corollae lobis pauci pili minuti stellati. *Folia* magnitudine varia; folium juvene ad 18 x 11 cm ellipticum 3-4 lobis triangularibus apice acuminato; folium maturum solitarium aut geminatum aut ternatum, maior 9-12 x 3-5 cm lanceolata-ellipticum minoribus lobis; folium secundum et tertium minus. *Inflorescentia* cymosa circa 6 floribus subaxillaris; rhachis 3-5 cm longa, flos primus saepe basalis, ceteri plerumque terminales; pedicellus 2.5-4 cm longus inermis; *calycis* lobi 2 mm longi late triangulares acuminibus linearibus 1-5 mm inaequalibus; *corolla* circa 3 cm diam. late stellata alba; filamenta 2-2.5 mm longa glabra; antherae 6-7 mm longae lanceolatae; *ovarium* 1.5-2 mm longum subglobulare; stylus circa 9 mm longus erectus glabrus; stigma viride. Nonnulli flores masculini cum stylis brevibus 3 mm longis. *Bacca* 1.5 cm diam. globosa phoenicea; pedicellus pro ratione ad 5-8 cm longus. *Semina* 3-4 mm longa depressa, late ovata minime reticulata.

Type collection: *Symon 13838 & Kairo*, 2.vi.1984, Papua New Guinea, lower to middle slopes of Mt Missim, 1500-1600 m alt. on edge of eroding logging track in rotten granitic soil. Shrub sparingly clonal to 1 m, flowers white, basal flower on long pedicel. Ripe fruits tomato red, abundant, tending to black when over ripe. Plants with glandular hairs. Near 7° 13′, 146° 49′.

Type material: Holotype ADW, Isotypes BRI, CANB, K, L, LAE, MO.

Derivation: The name is derived from the locality Mt Missim where the species has been collected.

A *shrub* to 1.5 m, spreading above with almost horizontal branches, sparingly clonal, armed with unequal *prickles* to 9 mm long, straight, pale yellow, abundant on younger stems, on both leaf surfaces, along principal veins, present but less common on distal shoots; *indumentum* of abundant, erect, few celled glandular hairs (?reduced stellate hairs), stellate hairs minute, only seen on exterior apex of corolla lobes. Lower *leaves* of juvenile phase to 18 x 11cm, elliptic in outline with 3-4, triangular lobes up to 2 cm long on each side, lobe apex acute, sinus rounded, leaf apex acuminate, base rounded, oblique; later and more distal leaves solitary, paired or ternate, smaller ones similar in shape, variable in size from 1/4 to 3/4 the size of the larger leaf, 9-12 x 3-5 cm, lanceolate-elliptic, lobing reduced or absent, apex acuminate, base rounded to cuneate, oblique; petiole 3-8 mm long. *Inflorescence* a cyme of c. 6 flowers from a subaxillary position, peduncle 0 if first flower basal, floral rhachis 3-5 cm long, first flower frequently basal, scar visible if shed, remainder tend to be concentrated towards end of rhachis; pedicel 2.5-4 cm long at anthesis, glandular pubescent, unarmed. *Calyx*: lobes 2 mm long, broadly triangular, linear acumens 1-5 mm long, unequal. *Corolla* c. 3 cm diam., stellate, lobes divided about 1/2 their length, lobe apex subacuminate, white. *Stamens*: filaments 2-2.5 mm long, glabrous; anthers 6-7 mm long, lanceolate, erect in a loose cone, apical pores extrorse. *Ovary* 1.5-2 mm long, subglobular, a few minute glandular hairs at apex; style c. 9 mm long, erect, glabrous; stigma terminal, green, just exceeding anther tips, some flowers have styles 3 mm long and may indicate male flowers. *Berry* 1.5 cm diam. globular, bright shining red, pendulous on relatively long pedicels; pedicel of the lowest fruit may be 6-8 cm long, distal fruits on pedicels to 5 cm long; calyx scarcely enlarged. *Seeds* 3-4 mm long, flattened, irregularly broad obovate, surface with shallow reticulation, margin thickened and with coarser reticulation. *Cotyledon* elliptic sparsely pubescent, first leaf broad ovate 10 x 7 mm, marginally pubescent with simple and glandular hairs, second and third leaf similar but fourth leaf narrower with one prominent midrib prickle, no visible stellate hairs, hypocotyl densely pubescent with simple and glandular hairs. (Figs. 52 & 54; Map 11).

Notes

This species appears to be most closely related to *S. infuscatum* with which it shares its usually paired leaves, abundant prickles and glandular pubescence. It differs in having rather narrower leaves, strikingly long pedicels, especially in fruit and white flowers. The plants were occasional along a kilometre of the logging track and have not been recognised in any other collections.

Specimens seen

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: Morobe: *Symon 13837*, 2.vi.1984, middle slopes of Mt Missim, 7° 13′, 146° 49′, juvenile leaves only, (ADW, L, LAE); *Symon 13838*, loc. cit., type collection see above. *Symon 13844*, loc. cit., (BH, BRI, CANB, F, K, L, LAE, MO, US).

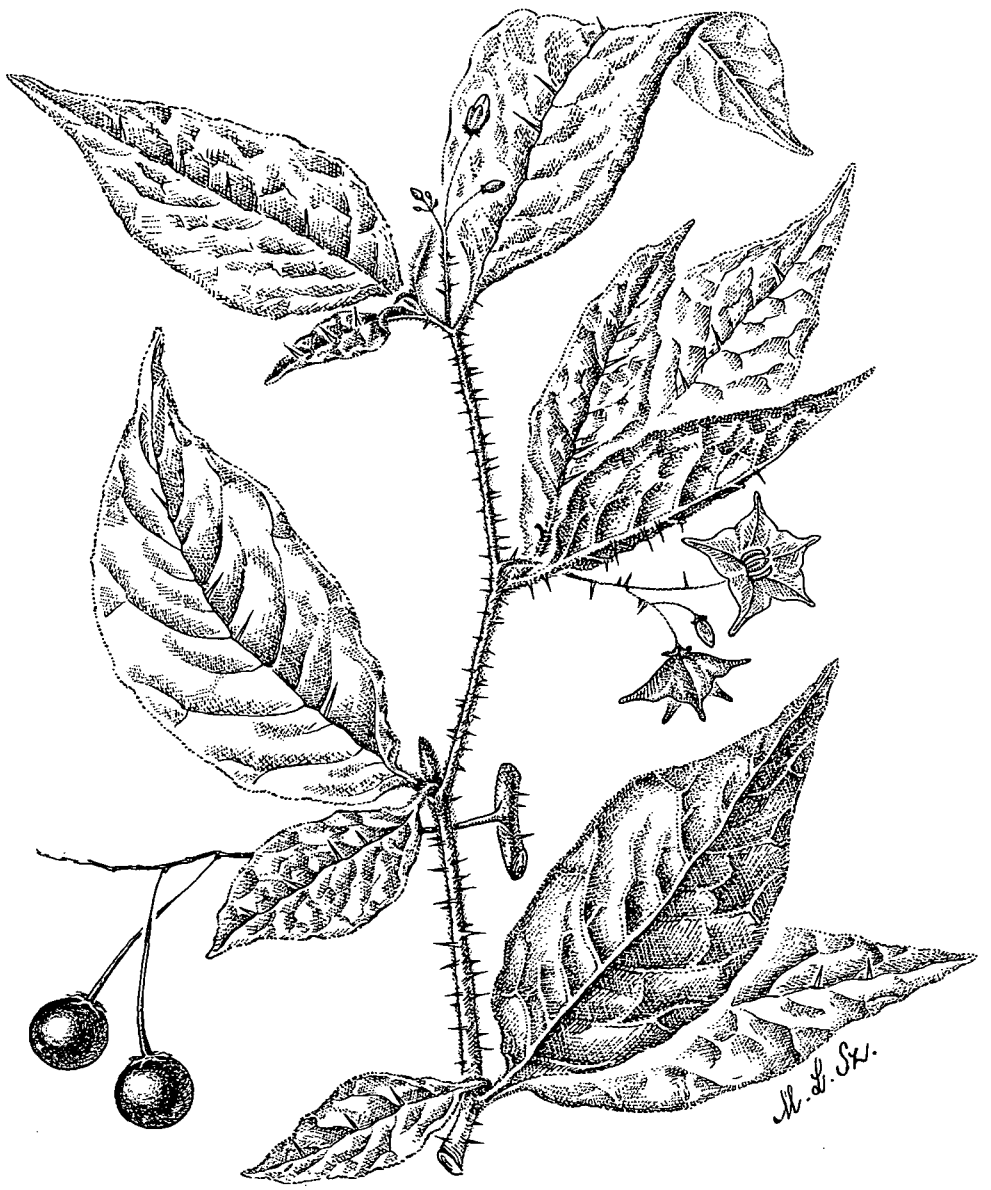

Fig. 54. *S. missimense* Symon. Drawn from herbarium specimen, *Symon 13844 & Kairo* (ADW).

42. **Solanum nolense** Symon, sp. nov.

Frutex ad 2 m altus supra inermis sed in ramis inferioribus cum aculeis 3-4 mm longis praeditis. Omnes partes pilis stellatis densis; adspectu generali sordido aut ferrugineo. *Folia* 6-9 x 2-3 cm elliptica integra aut 1-3 parvis lobis aut dentibus, apice acuto vel acuminato; pedicellus 1.5-2 cm longus. *Inflorescentia* cymosa corymbosa 3-8 floribus ex internodio oriens; pedunculus et rhachis breves; flores non visi. *Fructus* fasciculatus 1-3 baccis fere erectus; pedicellus 2 cm sursum turgidus; *bacca* 1 cm diam. globosa succulenta denim rubiginosa.

Fig. 55. *S. nolense* Symon. Drawn from holotype, *Symon 10688* (ADW).

Type citation: *Symon 10688 & Katik*, 24.vi.1977. "Papua New Guinea, between Nol and Mendi, 6 km from Nol, erect shrub to 2 m in roadside growth, slightly rusty aspect, fruits dull red, no flowers. 2840 m alt.

Type material: Holotype ADW 54154 (two sheets), isotypes CANB, K, L, LAE.

Derivation: the name is derived from the locality Nol near which the species was collected.

An erect *shrub* to 2 m, unarmed above, lower stem with scattered prickles 3-4 mm long; all parts with indumentum of stellate hairs (sessile or shortly stipitate, porrect-stellate, with central ray equal to the laterals, and simple uniseriate, unicellular glandular and reduced stellate glandular) dense on twigs and leaves above and below, some simple glandular and reduced stellate glandular hairs occur on pedicel and calyx, general aspect drab or rusty. *Leaf* lamina 6-9 x 2-3 cm, elliptic, entire or with 1-3 shallow lobes or teeth, lobes broadly, shallowly triangular, lobe apex obtuse or rounded, leaf apex acute to shortly acuminate, base rounded to broadly cuneate, oblique; pedicel 1.5-2 cm long. *Inflorescence* a short corymbose cyme of 3-8 flowers from a mid internodal position; peduncle to first flower c. 5 mm; floral rhachis c. 1 cm; flowers not seen. *Fruits* 1-3, more or less erect; pedicel 2 cm long distinctly swollen upwards; calyx lobes c. 5 mm long, triangular with linear acumen 1-2 mm long; berry c. 1 cm diam., globular, succulent, dull red when mature. (Figs. 55 & 56; Map 6).

Chromosome number: n=24 counted by Randell from *Symon 10688*.

Notes

Only one collection has been recognised and is of ample, non-flowering material. The upper portion of the plant is unarmed.

43. **Solanum papuanum** Symon, sp. nov.

Frutex 2-3 m altus vel arbor parvus. Aculei ad 7mm longi, recti aut minime recurvati porphyrei, in foliis maturis et in ramis adultis absentes. Omnes partes pilis stellatis, adspectu generali ferrugineo et discolori. *Folia* ad 12.5 x 7 cm juvenia, sed in maturitate geminata minor elliptica integra, apice acuto vel acuminato; petiolus 1-2 cm longus. *Inflorescentia* subsessilis cymosa fasciculata; pedunculus absens aut brevissimus, rhachis condensata 6-20 floribus; pedicellus 7-15 mm longus; *calycis* tubus circa 2 mm, lobis 1-3 mm longis breviter triangularibus, acumine parvo; *corolla* late stellata lobis 8-9 mm longis late lanceolatis violaceis; filamenta 2-3 mm longa; antherae 5-6 mm longae lanceolatae; ovarium 2 mm longum; stylus 7-8 mm longus. Fructus fasciculatus 2-3 (-20) baccis; pedicellus 2.5 cm longus sursum turgidus; *bacca* 8-11 mm diam. globosa, in maturitate rubiginosa denim nigra.

Type citation: *Womersley & Sleumer NGF 13992*, 7.ix.1961, Marafunga logging area, Upper Asaro valley near Goroka, Eastern Highlands District, 6° 05′, 145° 15′, 2440 m alt. Shrub to 4 feet overall, occurring in broken bush. Flowers blue-violet, fruits black when ripe.

Type material: Holotype LAE, isotype BRI.

A *shrub* 2-3 (-6) m tall, or small tree, prickles to 7 mm long, straight or slightly recurved, reddish, base somewhat flattened, well developed on juvenile phases reduced or absent on adult leaves and on aged or distal shoots, all parts with dense indumentum of stellate hairs (sessile or stipitate porrect-stellate with short central ray) aspect rusty, often markedly discolorous. *Leaves* to 12.5 x 7 cm in juvenile phases, mostly less and then often geminate, smaller leaf about 3/4 the size of the larger, elliptic, entire, base rounded, oblique, apex acute to acuminate; petiole 1-2 (-2.5) cm long, channelled above. *Inflorescence* a compact, almost sessile cymose cluster from an upper internodal position; peduncle absent or short; rhachis very condensed, to 1 cm long, rarely to 5 cm long, bearing 6-20 flowers; pedicel 7-15 mm long. *Calyx*: tube c. 2 mm long; lobes 1-3 mm long, shortly triangular, with a short acumen. *Corolla* broadly stellate, tube 2-4 mm long, lobes 8-9 mm long, broad lanceolate. *Stamens*: filaments 2-3 mm long; anthers 5-6 mm long, lanceolate. *Ovary* 2 mm long; style 7-8 mm long, often slightly bent, rarely with a few stellate hairs below; stigma capitate, carried 2-3 mm beyond

Fig. 56. Holotype of *S. nolense* Symon, (*Symon 10688 & Katik*, ADW).

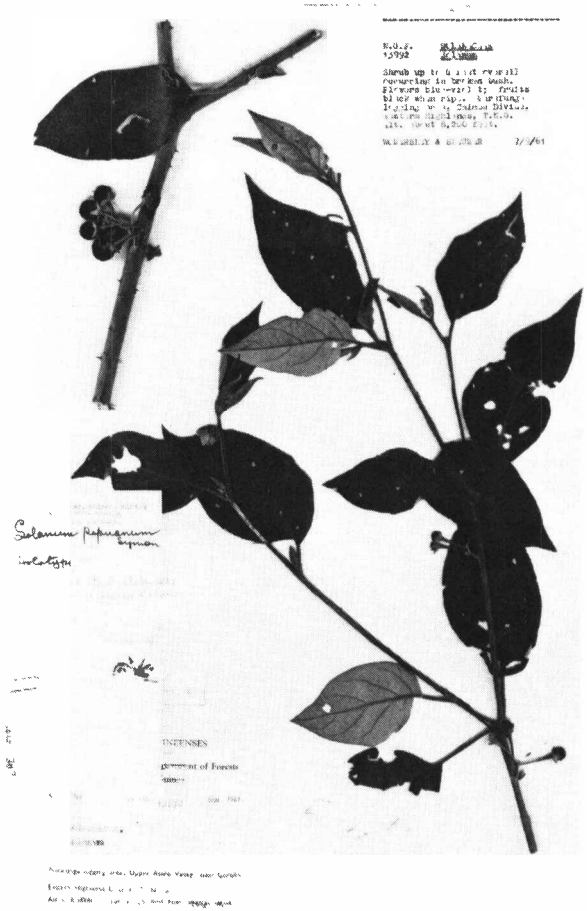

Fig. 57. Holotype of *S. papuanum* Symon, (*Womersley & Sleumer NGF 13992*, LAE).

anther tips. *Fruit* in cluster of (1-) 2-3 (-20) berries; pedicel 2.5 cm long, swollen upwards; calyx lobes triangular-apiculate covering base of berry, *berry* 8-11 mm diam. globose, described as both red and black, probably progressing from green through red to black. (Figs. 57 & 58; Map 10).

Notes

A species from moderate to high altitudes, seventeen collections came from 1097 m to 2900 m, with a mean of 2200 m. The flowers have been described as pale blue, blue-violet and purple. It has been collected from creek banks, river bank regrowth, forest margin, submontane rainforest, scrambling adjacent to grassland and cutover log debris. One small specimen has been collected as an epiphyte. Several collectors refer to the intensely rusty aspect of the foliage.

Specimens seen

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: Chimbu: *Borgmann 169*, 19.ix.1960, Komanimambulo, 5° 53′, 145° 05′, (L, LAE); *Smith ANU 15257*, 19.x.1971, Mt. Wilhelm, 5° 48′, 145° 05′, 2850 m alt., (L, LAE). Morobe: *Symon 13849*, 3.vi.1984, Gumi, 7° 12′, 146° 25′, (ADW, CANB, L, LAE). Western Highlands: *Streimann 8467*, 7.vii.1982, Waghi-Sepik divide 9 km N of Banz, 5° 43′ 144° 38′, 2400 m alt., (BFC, CBG, UPNG); *Streimann 8473*, as above, (CBG, LAE, UPNG). Eastern Highlands: *Brass 31172*, 27.viii.1959, Mt Michael, W-slopes, 6° 24′, 145° 19′, 1920 m alt., (A, CANB, K, L, LAE, NY, US); *McKee & Floyd NGF 6356*, 22.xi.1954, Daulo-Chauve road, 6° 07′, 145° 08′, (A, BM, BO, BRI, CANB, K, L, LAE, NSW); *Millar NGF 22538*, 26.v.1965, Fatima river, 6° 05′, 145° 15′ 2347 m alt., (A, BO, BRI, CANB, L, LAE); *Millar NGF 40708*, 12.xi.1968, Fatima river, 6° 05′, 145° 15′, 2439 m alt., (A, BRI, CANB, K, L, LAE); *Pullen 397*, 29.viii.1957, Daulo Camp, Asaro-Mairifutica divide, 6° 05′, 145° 20′, 2439 m alt., (A, BM, CANB, L, LAE); *Pullen 449*, 3.viii.1957, as above, (A, CANB, L, LAE); *Symon 10679*, 22.vi.1977, top of Daulo Pass, 5° 59′, 145° 30′ 2320 m, (ADW); *Symon 13868*, 12.vi.1984, Upper slopes of Daulo Pass, 5° 59′, 145° 30′, (ADW, L, LAE, MO); *Womersley NGF 13992*, 7.ix.1961, Marafunga, 6° 05′, 145° 20′, 2500 m alt., (A, BO, BRI, CANB, K, L, LAE, MEL, NSW). Southern Highlands: *Symon 10695*, 26.vi.1977, SE slopes of Mt Giluwe, 6° 04′, 143° 53′, 2280 m alt., (ADW); *Symon 13883*, 13.vi.1984, Mur Mur Pass, (ADW, L, LAE, MO); *Symon 13888*, 14.vi.1984, Mt Giluwe 6° 04′, 143° 53′, (ADW, LAE); *Symon 13890*, as above, (ADW, LAE); *Symon 13893*, as above, (ADW, L, LAE, MO); *Womersley NGF 46444*, 3.xi.1973, between Kagoba & Border Gate, 6° 08′, 143° 39′, (A, BISH, BRI, CANB, K, L, LAE, NSW). Central: *Carr 13080*, 10.ix.1935, Boridi, 9° 05′, 147° 38′, 1463 m alt., (A, BM, K, L, NY); *Croft LAE 61900*, 22.vii.1974, E side Lake Myola, 9° 10′, 147° 45′, 2000 m alt., (BISH, CANB, LAE, US); *Croft & Lelean NGF 34817*, 20.ix.1973, SE slopes of Lake Myola, 9° 09′, 147° 43′, (A, BRI, CANB, K, L, LAE); *Gillison 348*, 4.xi.1964, Iolo Crk, Lake Myola, 9° 08′, 147° 43′, 2134 m alt., (LAE). Northern: *Cheeseman 65*, 1933, Kokoda, 8° 52′, 147° 45′, 1067 m alt., (A, L).

44. **Solanum rivicola** Symon, sp. nov.

Frutex effusus ad 2.5 m sed saepe minor. Valde armatus plurimis aculeis 7-10 mm longis rectis aut recurvatis porphyreis. Omnes partes pilis stellatis minutis brevibus, adspectu generali sordido aut sub-purpureo. *Folia* ad 9.5 x 5 cm juvenia, sed in maturitate 4 x 2 cm late elliptica; petiolus 3-5 mm pro ratione brevis. *Inflorescentia* cymosa brevis paucis floribus; pedunculus 0-5 mm brevissimus; pedicellus 6-7 mm tenuis; *calycis* tubus 2-3 mm longus lobis truncatis acumine minuto; *corolla* stellata purpurea lobis 7-10 mm longis anguste lanceolatis; filamenta 1-2 mm longa; antherae 5-6 mm; *ovarium* 1 mm; stylus circa 7 mm longus. Fructus fasciculatus ad 6 baccis plerumque minus; pedicellus 2.5 cm longus sursum turgidus; *bacca* 7-10 mm diam. rubiginosa.

Type citation: *Symon 10638 & Kairo*, 30.v.1977, "Road from Bulolo above Edie Creek, Wau Subdistrict. Sprawling herb to 1.5 m long in dense tangled vegetation along fresh water creekline in peaty soils, flowers deeply stellate, purple with deeper purple midline".

Type material: Holotype ADW 54082, isotypes, A, CANB, K, L, LAE, MO, US.

Derivation: the name means river or creek lover and refers to the several creek banks and mesic sites at which it has been collected.

A sprawling *shrub* to 2.5 m but often less, stems sometimes rooting where they touch ground, ferociously armed with firm, straight or hooked prickles 7-10 mm long, reddish, with slightly flattened base, abundant on stems, petiole, both leaf surfaces, reduced on peduncle,

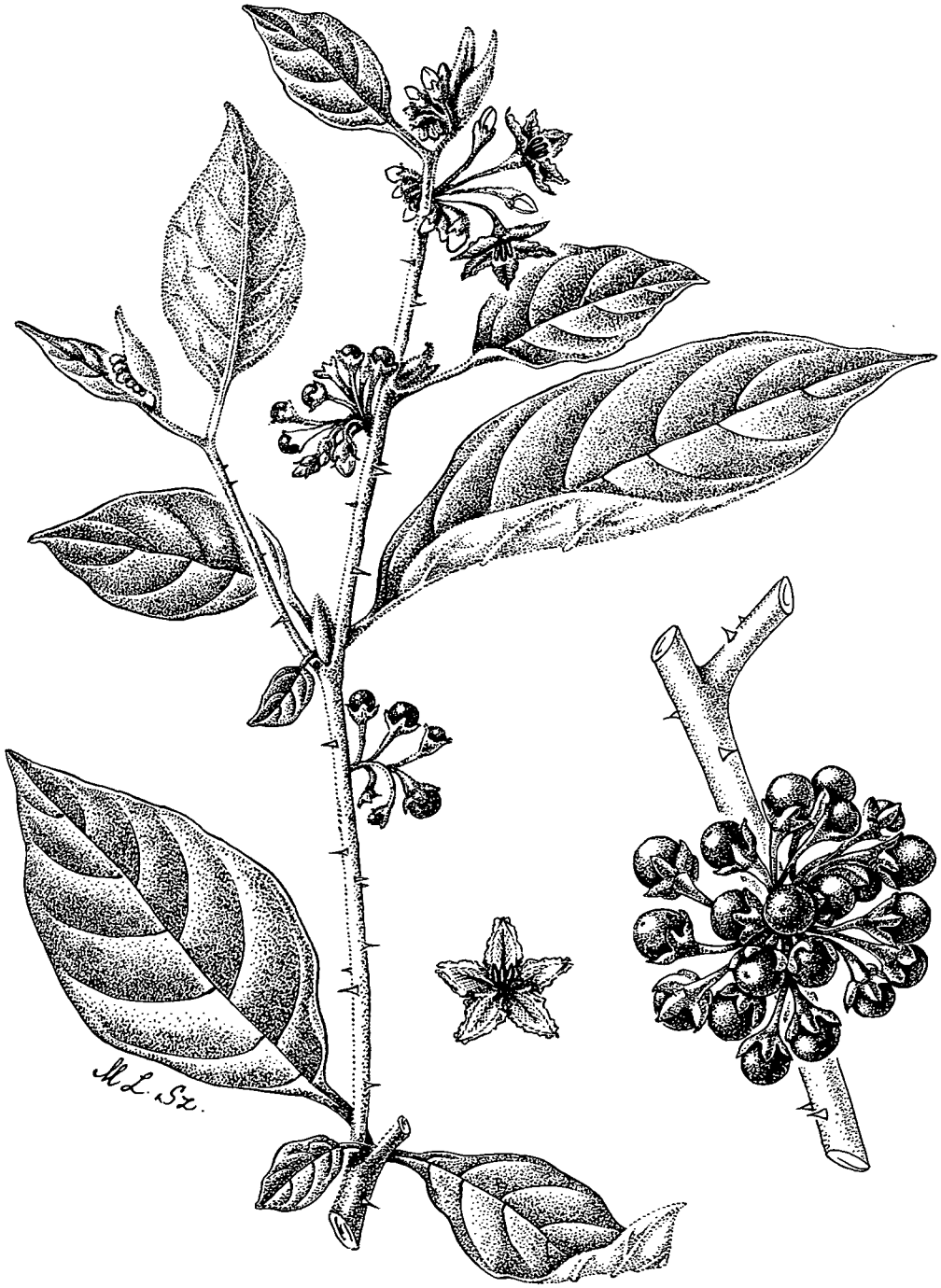

Fig. 58. *S. papuanum* Symon. Drawn from herbarium specimen, *Millar NGF 22538* (LAE).

pedicel and calyx; all parts with indumentum of minute, stout, compact stellate hairs (sessile or shortly stipitate, porrect-stellate with short or medium central ray) sometimes yellowish on leaves below, common on stems, lower leaf surface, scattered on leaves above; general aspect dark, drab or purplish green. *Leaf* lamina to 9.5 x 5 cm on vigorous young growth, commonly c. 4 x 2 cm, in younger phases with 2 (-3) shallow triangular lobes on each side, mature leaves unlobed, broadly elliptic, base broadly cuneate to rounded, oblique, apex acute to shortly acuminate; petiole 3-5 (-20) mm long. *Inflorescence* a short cyme of few flowers from mid or upper internodal position; peduncle 0-5 mm long, very reduced, flowering rhachis to 5 mm long; pedicel 6-7 mm long slender. *Calyx* 2-3 mm long, lobes truncate, with a minute acumen. *Corolla* deeply stellate, purple with deeper purple stripe (*Symon 10638*), lobes 7-10 mm long, narrow lanceolate. *Stamens*: filaments 1-2 mm, anther 5-6 mm. Ovary 1 mm long; style c. 7 mm long; stigma capitate. Fruit cluster of up to 6 but usually fewer; pedicel to 2.5 cm long, often distinctly swollen upwards; calyx proportionately enlarged, lobes 5-7 mm long, covering base of fruit; *berry* 7-10 mm diam., dull or shining red. (Figs. 59 & 60; Map 13).

Chromosome number: n=12 counted by Randell from *Symon 10696, 10638* and n=24 counted by Randell from *Symon 10692.*

Notes

This species is found mostly at medium to high altitudes, from 1760 m to 2926 m and the mean of eight records 2542 m. It has been collected from banks of creeks, logged mountain slopes, track and roadside forest and abandoned garden sites. The flowers have been described as white, very pale lavender, pale purple and white above purple below. It is one of the most prominently armed of the New Guinea species.

Specimens seen

IRIAN JAYA: None seen

PAPUA NEW GUINEA: Morobe: *Fallen 534*, 25.vii.1977, Bulldog road, 7° 00′, 146° 00′, 2650 m alt., (L, LAE); *Rau 100*, 24.viii.1977, Kaisenik, 7° 20′, 146° 40′, 2200 m alt., (BFC, LAE); *Sayers NGF 21222*, 21.ix.1964, Bulldog track Edie Crk, 7° 20′, 146° 45′, 2896 m alt., (A, BRI, CANB, L, LAE); *Sikavea & Streimann NGF 30887*, 24.vii.1967, Meri Creek, Edie, 7° 10′ 146° 40′, 2073 m alt., (BFC, LAE); *Symon 10638 & Kairo*, 30.v.1977, Road from Bulolo above Edie Creek, 7° 21′, 146° 39′, (type), (ADW, L, LAE, MO, US); *Womersley & Millar NGF 8428*, i.1956, Wau-Salamaua road, 7° 10′, 147° 00′, 1677 m alt., (LAE). Western Highlands: *Womersley & Millar NGF 7601*, 10.vi.1955, Jimi valley, c. 5° 50′, 144° 38′, 2300 m alt., (A, BRI, K, LAE). Chimbu: *Borgmann 245*, 10.x.1960, Komanimambulo 5° 53′, 145° 05′, 2900 m alt., (L, LAE). Eastern Highlands: *Brass 30401*, 9.vii.1959, Mt Wilhelm, E slopes, 5° 45′, 145° 00′, 2770 m alt., (A, CANB, K, L, LAE, US); *Johns & Noble NGF 47060*, 26.i.1970, Mt Otto west side, 5° 58′, 144° 28′, 2926 m alt., (A, BISH, BO, BRI, CANB, K, L, LAE, NSW); *Sayers & Millar NGF 19852*, 23.viii.1964, Pengagl Creek, 5° 45′, 145° 05′, 2743 m alt., (A, LAE). Southern Highlands: *Symon 10692 & Katik*, 24.vi.1977, between Nol and Mendi, 6° 08′, 143° 39′, (ADW, LAE); *Symon 10696 & Katik*, 26.vi.1977, Mt Giluwe, southeast slope, 6° 04′ 143° 53′, (ADW, CANB, F, L, LAE, US); *Symon 10698 & Katik*, as above, 2280m alt., (ADW, K, L, LAE, MO); *Symon 13885 & Kerenga*, 14.vi.1984, as above, (ADW, BH, L, LAE, MO); *Vandenberg, Katik & Kairo NGF 39796*, 26.ix.1968, Mendi road, 6° 05′, 143° 50′, 2835 m alt., (BRI, L, LAE). Gulf: *Brown 326*, 1.vi.1953, Moru, 8° 25′, 146° 17′, 1829 m alt., (A). Central: *Carr 13200*, 17.ix.1935, Boridi, 9° 05′, 147° 38′, 1280 m alt., (BM, CANB, K, L, NY). Milne Bay: *Stevens & Veldkamp LAE 55565*, 15.vii.1972, Raba Raba sub-district, 9° 45′ 149° 04′, 1760 m alt., (A, BO, BRI, CANB, K, L, LAE, NSW).

45. **Solanum saruwagedensis** Symon, sp. nov.

Frutex ad 2 m altus valde armatus aculeis ad 1 cm longis confertis. Omnes partes paucis pilis simplicibus glandulosis; ad apicem foliorum juvenium et corollae pili stellati redacti; adspectu generali atrovirenti, infra purpureo. *Folia* circa 9 x 6 cm ovata-elliptica, lobis late triangularibus, apice acuto vel acuminato; petiolus 1.3-2 cm longus armatus. *Inflorescentia* cymosa paucis floribus; pedicellus 4.5 cm longus; *calycis* tubus 3-4 mm longus lobis truncatis vel late triangularibus, acumine lineari 1-2 mm longo; *corolla* circa 12 mm longa late stellata purpurea. *Bacca* ignota.

Type citation: *van Royen NGF 16142*, 24.ii.1963. Papua New Guinea, along slope of Zaran Creek, SW slope of Mt Enggom, Sarawaket Range, Morobe District. 6° 27′, 147° 00′, alt.

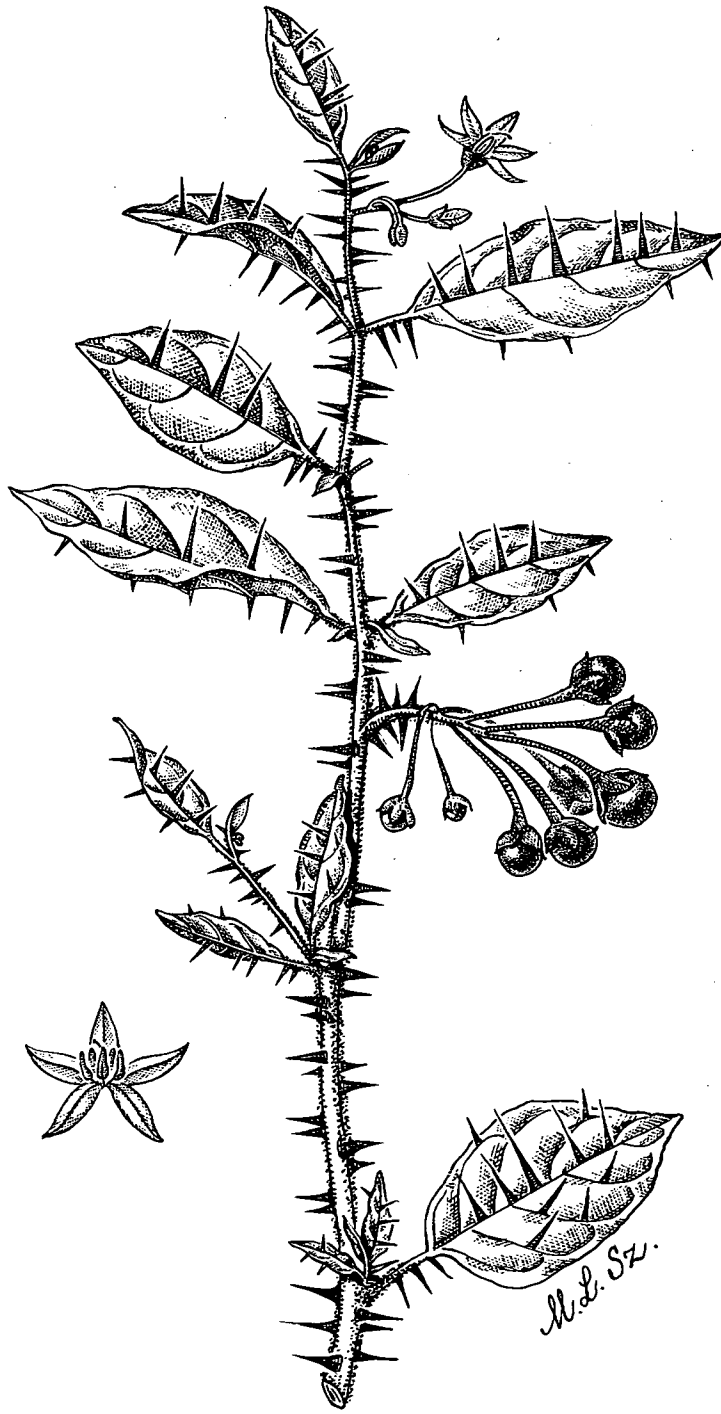

Fig. 59. *S. rivicola* Symon. Drawn from herbarium specimen, *Symon 13885* (ADW).

Fig. 60. Holotype of *S. rivicola* Symon (*Symon 10638 & Kairo*, ADW).

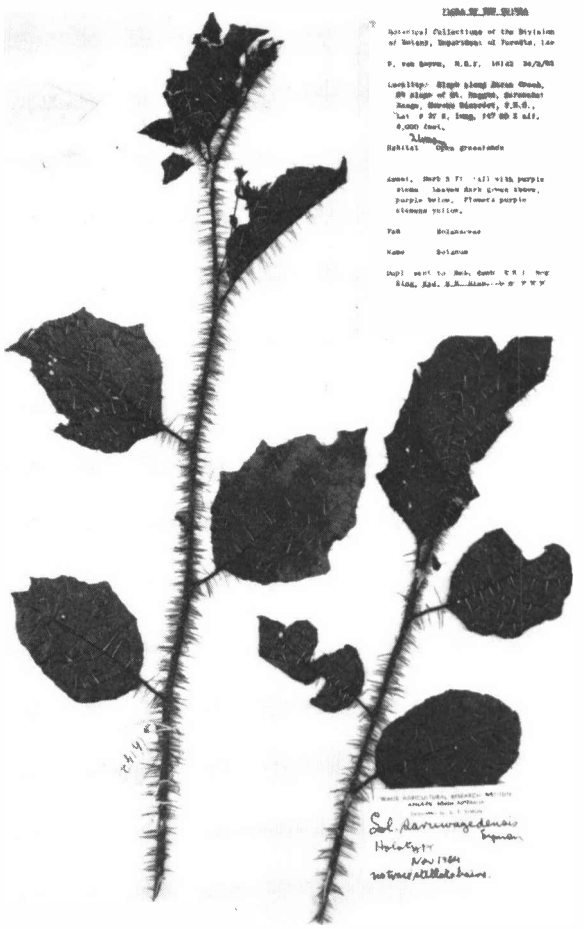

Fig. 61. Holotype of *S. saruwagedensis* Symon (*van Royen NGF 16142*, LAE).

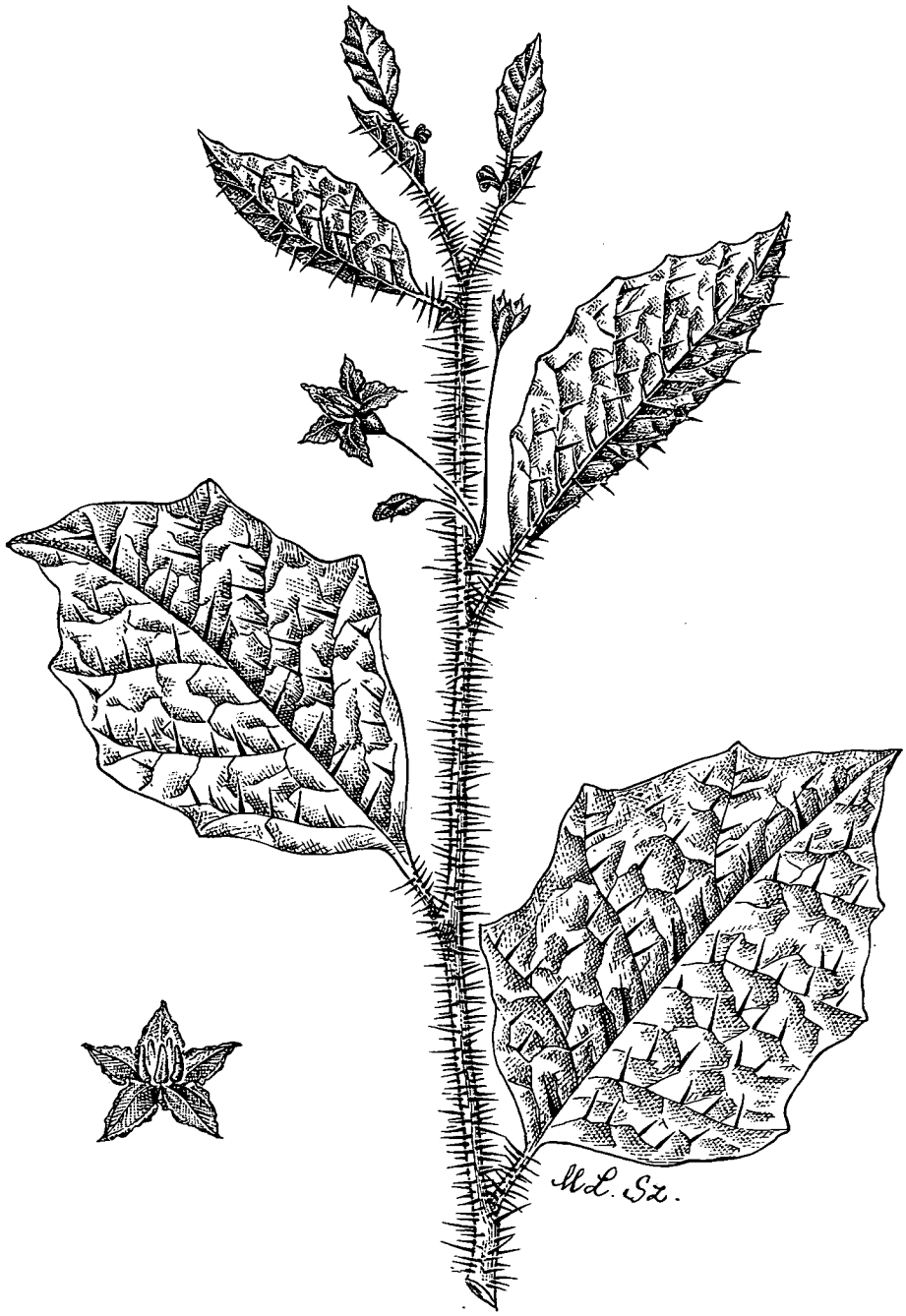

Fig. 62. *S. saruwagedensis* Symon. Drawn from holotype, *van Royen NGF 16142* (LAE).

8000′ (2440m). Open grasslands. Herb 5 ft. tall with purple stems. Leaves dark green above purple below. Flowers purple, stamens yellow.

Type material: Holotype LAE, isotype L.

Derivation: The name refers to the Saruwaged Range the only place where this species has been collected.

A *shrub* to 2 m, strongly armed with prickles to 1 cm long, dense on stem, abundant on petiole, leaves above and below, scattered on pedicel and calyx; indumentum of simple hairs, some with glandular heads, scattered on young growth, sparse on older leaves, minute glandular hairs on young growth and reduced stellate hairs (sessile, porrect-stellate with moderate central cell) sparsely present on tips of young leaves and corolla, general aspect dark green, leaves purplish below. *Leaf* lamina (12-) 9 x 6 (-8) cm, ovate-elliptic, with 2-4 short, broad, triangular lobes on each side, lobes 0.5-1 cm long, apex acute, leaf base rounded, oblique, leaf apex acute to acuminate, all armed especially along veins; petiole 1.3-2 cm long, armed. *Inflorescence* (only one available) a few-flowered cyme from a lower internodal position, basal flower with post anthesis pedicel 4.5 cm long; a second flower with pedicel at anthesis 2.5 cm long, glandular pubescent. *Calyx* 3-4 mm long, lobes truncate to broadly triangular with linear acumen 1-2 mm long. *Corolla* c. 12 mm long, broadly stellate, purple, not available for dissection, anthers 1 cm long, attenuate towards apex. *Fruits* unknown. (Figs. 61 & 62; Map 2).

Notes

Only two collections of this species have been recognised, *Gillison 130* consists of leaves only and in addition has been badly damaged by insects. The second *van Royen NGF 16142*, is in better condition but lacks fruits. The relative abundance of simple glandular hairs, relative absence of stellate hairs and densely prickly stems suggest it may be related to *S. infuscatum* from which this differs in different pubescence, greatly increased prickliness and solitary rather than paired leaves. The only collections come from high altitudes of 2440 m and 2744 m in the Saruwaged Range, Morobe District.

Specimens seen

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: Morobe: *Gillison 130*, 18.ii.1961, near Mt Saruwaged, 6° 12′, 146° 47′, 2744 m alt., (LAE); *van Royen NGF 16142*, see type above.

46. **Solanum trichostylum** Merrill & Perry, J. Arnold Arb. 30 (1949) 47.

Type citation: "British New Guinea: Central Division, Mount Tafa, *Brass 4934* (Type), Sept. 1933, alt. 2400 m., plentiful on clearings in the forest in the vicinity of the road (slender shrub up to 2 m high; branches, petioles, peduncles, and pedicels purple-tinged; pale dull leaves; bright purple flowers; ripe fruit yellow); Wharton Range, Murray Pass, *Brass 4539*, July 1933, alt. 2840 m, a weed plant on forest borders damaged by fire (sparsely branched shrub 1-1.5 m high; leaves pale; corolla purple, anthers bright yellow; soft, globose, black fruit about 1 cm. diameter)."

Type material: Holotype A!, isotypes L! NY!.

Derivation: the name refers to the hairs (trichomes) found towards the base of the style.

A *shrub* 1-3 m tall, armed with *prickles* 2-7 mm long, often brownish or reddish, abundant on stems, there with a flattened base, scattered on petiole and leaves above and below, mostly absent from inflorescence, indumentum of stellate hairs (sessile or shortly stipitate porrect-stellate with central ray about equal to lateral rays) dense on inflorescence, young growth and on leaves below, upper leaf surface with scattered hairs to glabrescent, discolorous, aspect drab,

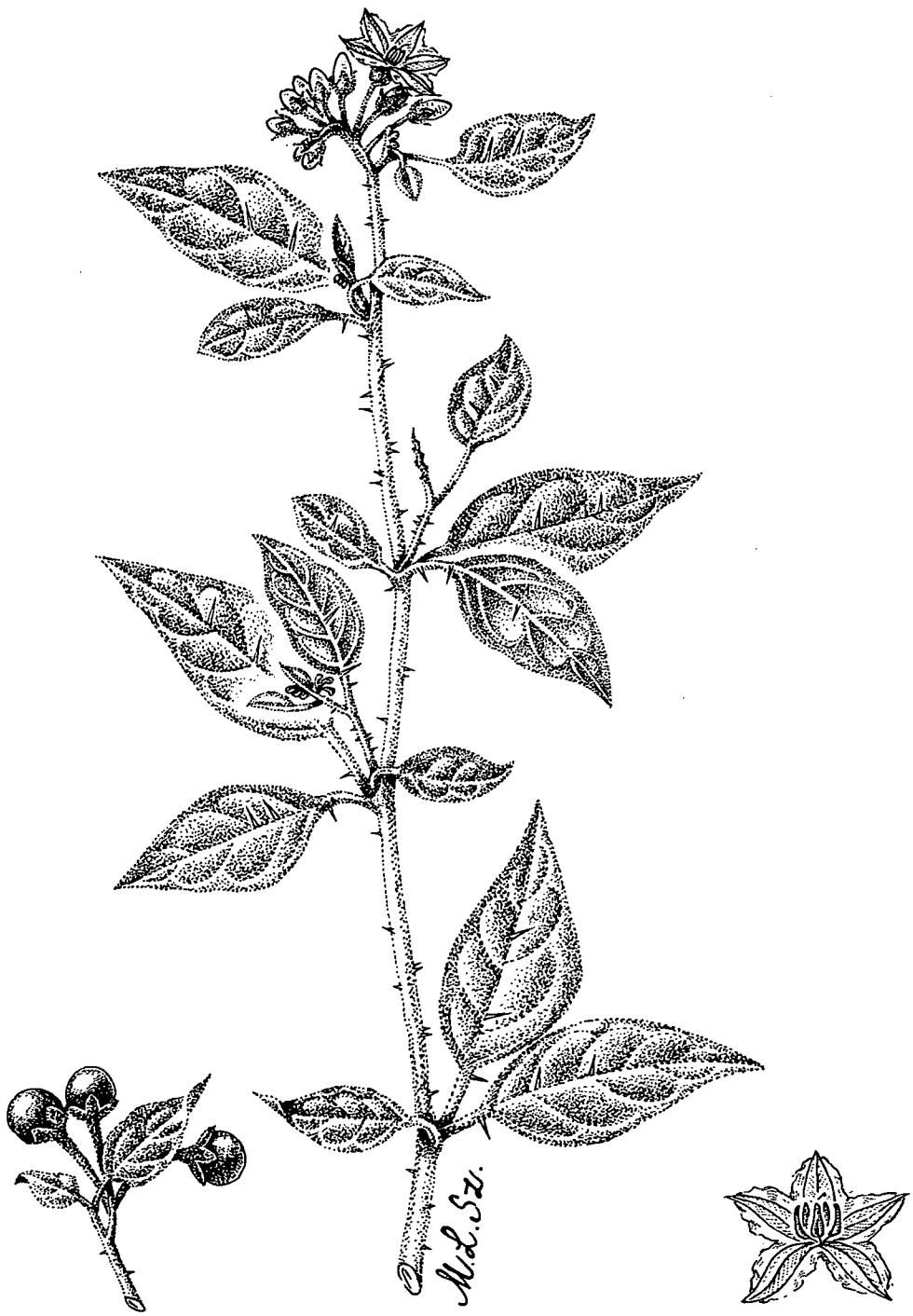

Fig. 63. *S. trichostylum* Merrill & Perry. Drawn from herbarium specimen, *Symon 13825* (ADW).

sometimes rusty. *Leaf* lamina to 12 x 7 cm, more commonly c. 8 x 3.5 cm, ovate to elliptic with 5-7 principal lateral veins, base rounded to broadly cuneate, oblique (especially in juvenile phases), apex acute to acuminate, petiole 1-1.5 (-4) cm long, often with few prickles. *Inflorescence* a simple racemose cyme from an upper internodal position, unarmed, peduncle to first flower c. 1 cm long; floral rhachis to 5 cm long though often less, pedicel c. 1 cm long. *Calyx* 2-3 mm long, lobes short, broad, rounded, acumen 0.5 mm long. *Corolla* broadly stellate, 1.5-2 cm diam., lobes divided more than half the length of corolla, pubescent within, triangular, pale purple. *Stamens*: filaments 2 mm long, anthers 4-5 mm long, lanceolate-elliptic. *Ovary* 2 mm long, pubescent above with stellate hairs, style c. 6 mm long, slightly thickened upwards, pubescent below with stellate hairs, stigma capitate. *Fruit* cluster of 2-3 (-6) berries; pedicel c. 2 cm long, swollen and channelled above, calyx lobes oblong, covering base of berry; berry c. 1 cm diam., globular, orange, red to finally blackish when ripe. (Fig. 63; Map 8).

Notes

A species of moderate to high altitudes, ten collections having come from 1834 m to 3000 m, with a mean of 2616 m. It has been collected from moss forest, mossy forest gully, lower subalpine rainforest, submontane forest, edges of primary forest, regrowth in disturbed montane forest and secondary forest. The flowers have been described as off-white, lavender, mauve, pale purple and purple.

S. trichostylum differs from *S. papuanum* in having a longer floral rhachis (congested in *S. papuanum*). Drab green rather than intensely rusty aspect, it is generally more prickly especially on leaves and distal shoots whereas *S. papuanum* may be unarmed. On the few specimens available it is possible that it also has slightly larger fruits. *S. trichostylum*, *S. papuanum* and *S. expedunculatum* form a trio of closely related species with rather variable foliage and increased shortening and condensation of the floral rhachis and inflorescence from *S. trichostylum* to *S. expedunculatum*.

Specimens seen

IRIAN JAYA: Mimika: *Pulle 593*, 2.xii.1912, Mt Hellwig, 5° 15′, 138° 00′, 2500 m alt., (BO); *Roemer 1269*, xi.1909, Hellwig geb., 5° 15′, 138° 00, 2600 m alt., (BO).

PAPUA NEW GUINEA: Morobe: *Allison 1321*, 11.i.1974, Bulldog road SSW of Wau, 7° 00′, 146° 00′, 2800 m alt., (LAE); *Fallen 427*, 14.vii.1982, Mt Kaindi, 7° 00′, 146° 00′, 1730 m, alt., (L, LAE, MO); *Fallen 582*, 25.vii.1977, Bulldog road, S of Wau, 7° 00′. (L, LAE, MO); *Henty NGF 29062*, 22.xi.1966, Lake Trist, 7° 25′, 146° 57′, 1646 m alt., (A, BO, BRI, K, L, LAE); *Symon 10626*, 29.v.1977, Aseki road from Bulolo, 7° 11′, 146° 39′, 2285 m alt., (ADW); *Symon 10636 & Kairo*, 30.v.1977, above Edie Creek, 7° 21′, 146° 39′, (ADW); *Womersley & Royen NGF 5909*, 30.vi.1954, 1097 m alt., (BO, BRI, CANB, K, L, LAE). Eastern Highlands: *Brass 30725*, 26.vii.1959, E slopes Mt Wilhelm, 5° 45′, 145° 00, 2600 m alt., (A, CANB, K, L, LAE, NY, US). Southern Highlands: *Rau 150*, 7.ix.1977, Onim, 6° 10′, 143° 59′, (BFC, LAE). Central: *Brass 4539*, 1933, Murray Pass, 8° 33′, 147° 23′, 2840 m alt. (paratype), (BRI, L, NY, US); *Brass 4934*, 1933, Mt Tafa, 8° 35′, 147° 10′, 2400 m alt. (type), (A, BO, L, NY); *Chalmers s.n.*, 1878, S.E. New Guinea, (MEL); *Croft & Laravita LAE 61684*, 7.vii.1974, SE slope of Mt Victoria range, 8° 55′, 147° 35′, 3000 m alt., (A, BISH, BO, BRI, L); *Deveson ANU 16434*, 12.xii.1979, Neon Basin E side Wharton Rnge, 2892 m alt., (LAE); *Foreman & Wardle NGF 45531*, 24.vii.1969, trail to Mt Albert Edward, 8° 20′, 147° 28′, 2835 m alt., (BRI, CANB, L, LAE); *Frodin & Hallpike 730*, 22.vi.1971, Goilala, 8° 22′, 146° 59′, (LAE, UPNG); *Millar UPNG 1207*, 25.viii.1971, Goilala, 8° 25′, 147° 25′, 1834 m alt., (L, LAE, UPNG); *Millar & Gebo UPNG 1249*, 26.viii.1971, Goilala, 8° 25′, 147° 25′, 2896 m alt., (LAE, UPNG); *Paijmans 828*, 16.vi.1969, Kemp Welch river, 9° 50′, 147° 43′, 2658 m alt., (CANB, LAE); *Ridsdale NGF 36960*, 6.viii.1968, Murray Pass, Goilala, 8° 30′, 147° 20′, 2743 m alt., (A, BO, BRI, CANB, K, L, LAE, NSW); *van Royen NGF 20224*, 8.i.1965, Woitape to Kosipi Uriko, 8° 33′, 147° 15′, 1981 m alt., (BRI, L, LAE); *van Royen NGF 30154*, 25.i.1965, W slope Wharton range, 8° 33′, 147° 23′, 2652 m alt., (A, BISH, BO, BRI, CANB, K, L, LAE, NSW). Northern: *Croft LAE 61900*, 22.vii.1974, E side Lake Myola, 9° 10′, 147° 45′, 2000 m alt., (BM, BO, BRI, K, L, LAE, MO); *Croft et al. LAE 65050*, 26.vii.1974, W slope Mt Kenive, 9° 10′, 147° 45′ 3000 m alt., (A, BRI, CANB, K, L, LAE); *van Royen 10901*, 21.v.1976, Mt Victoria area, 8° 54′, 147° 32′, 2680 m alt., (BISH, L, LAE); *Veldkamp & Stevens 5812*, 2.vii.1972, Goropu Mntns. Mt Suckling, Goepon, 9° 40′, 148° 56′, 2485 m alt., (L, LAE, US). Milne Bay: *Armitage sd. sn.*, 1894, summit Mt Dayman 9° 50′, 149° 15′, 2743 m alt., (MEL); *Brass 22450*, 30.v.1953, N slopes Mt Dayman, 9° 50′, 149° 17′, 2200 m alt., (A, CANB, K, L, LAE, US); *Brass 22690*, as above, (A, CANB, L, LAE, US).

47. **Solanum turraeaefolium** S. Moore, J. Bot. 61 (1927) suppl. 37.

Type citation: "Near Kerepunu, sine no." (Dr. H.O. Forbes's New Guinea plants).

Type material: Holotype BM! and photo ADW. The label has the additional information "New Guinea, Sogeri Region, Central position 9° 28′ 45″S. Lat., 147° 31′ 37″E. long. H.O. Forbes 1885-6".

Derivation: The name refers to the similarity of the leaves of this species to those of the genus *Turraea* (Meliaceae).

A *shrub* 2-3 (-4) m tall; armed with prickles 0.5-1 cm long, straight, sparse, scattered on stems sometimes absent from distal growths; indumentum of close, yellowish, stellate hairs (sessile or shortly stipitate, porrect-stellate with medium to long central ray) dense on young stems, inflorescence and on leaves below, scattered to absent on leaves above. *Leaves* often paired or ternate, juvenile phase to 20 x 10 cm, broad elliptic, entire, or with few, broad, shallow, obtuse lobes; petiole to 4 cm long; adult phase to 14 x 6 cm more commonly 9 x 4 cm, elliptic to obovate-elliptic, margin with 2-4 shallow, rounded lobes to repand, lobe apex rounded to obtuse, sinus shallow and rounded, leaf base rounded, oblique, apex acute to acuminate; petiole 0.5-1 cm long, relatively short, second or smaller leaf similar but ½-¾ the size of larger, third leaf when present may be only 1-2 cm long, almost sessile. *Inflorescence* a racemose cyme, occasionally forked, of 10-20 flowers from an extra-axillary position, only a few flowers open at a time, unarmed, possibly andromonoecious; peduncle to first flower 1-2 cm long, floral rhachis 2-3 (-6) cm long; pedicel 10-13 mm long, slender. *Calyx* 3-4 mm long, almost truncate, lobes short and rounded with a short acumen or linear point 1-3 mm long. *Corolla* stellate, deeply divided, lobes 8-12 mm long, lanceolate-elliptic, purple. *Stamens*: filaments c. 1 mm long, anther 5-6 mm long, attenuate towards apex. *Ovary* 1.5-2 mm long, a few glandular hairs towards apex, style 7-8.5 mm long, a few stellate hairs towards base, apex a little bent, stigma terminal. (The larger dimensions apply to the hermaphrodite flowers and the smaller ones to the apparently male flowers). *Fruit* in cluster of 2-3 berries; pedicel to 2 cm long, thickened upwards; calyx not much enlarged; berry c. 1-1.5 cm diam., globular, bright shining red to scarlet. *Seeds* 3.5-4 mm long, irregularly reniform, yellowish buff, mature seeds with distinct narrow wing in some cases, reticulate. (Fig. 64; Map 11).

Notes

Most collections have come from low altitudes, several at sea level, others at 'low' altitude, the highest being 1460 m. The species has been found in young secondary growth of oak forest, copses in savannah, logging areas, the forest edge of swamps, garden regrowth and coastal scrub regrowth. The flowers have been described as pale mauve, violet, lilac, lavender and bright purple. The fruits have been described as bright red (4), scarlet (3) and orange yellow (1).

Specimens seen

IRIAN JAYA: none seen.

PAPUA NEW GUINEA: Madang: *Pullen 1207*, 14.x.1958, between Dimir and Basken behind Dylup, 4° 48′, 145° 37′, 244 m alt., (A, CANB, L, LAE). Morobe: *Henty NGF 11957*, 15.iii.1960, Oomsis logging area, 6° 45′, 147° 00′, 61 m alt., (A, BRI, CANB, K, L, LAE, MEL, NSW). Eastern Highlands: *Brass 32309*, 29.x.1959, Kassam Gap, 6° 13′, 146° 01′, 1460 m alt., (A, CANB, K, L, LAE, NY, US). Central: *Carr 11085*, 2.ii.1935, Kanosia, 9° 01′, 146° 53′, sea level, (BM, K, L, NY); *Carr 11401*, 17.ii.1935, Hisiu, 9° 03′, 146° 46′, sea level, (A, BM, CANB, K, L, NY); *Chalmers s.n.*, 1878, Par's near Pt Moresby, 9° 30′, 147° 10′, (MEL); *Forbes s.n.*, 1885-6, near Kerepunu, 10° 06′, 147° 51′, (BM); *Frodin et al s.n.*, 24.ix.1980, Yule Isl. 8° 50′, 146° 32, 60m alt., (UPNG); *Heyligers 1164*, 10.v.1965, Tovobada hills 12 miles N of Pt Moresby, 9° 30′, 147° 10, (A, CANB, L, LAE); *Hoyle s.n.*, viii.1976, Taurama, 9° 32′, 147° 14′, (UPNG); *MacGregor s.n.*, 4.viii.1889, near Rigo, 9° 48′, 147° 32′, (MEL); *Paijmans 1888*, 22.v.1975, Galley Reach, 9° 06′, 146° 57′, (LAE); *Pullen 3546*, 19.viii.1962, near Hisiu, 9° 03′, 146° 45′, 6 m alt., (CANB); *Pullen 6872*, 1.v.1967, Tavai Creek 45 miles SE of Pt. Moresby, 9° 43′, 147° 28′, 152 m alt., (A, CANB, K, L, LAE); *Sayer s.n.*, 1887, New Guinea, 9° 15 m alt., (MEL); *Schlenker s.n.*, xi.1909, ?Bokukumana, (BRI).

Fig. 64. *S. turraeaefolium* S. Moore. Drawn from herbarium specimen, *Pullen 6872* (CANB).

Sect. 12 (subgen. *Leptostemonum* (Dunal) Bitter) **Dunaliana** (Bitter) Symon stat. nov.

Basionym: Grossart *S. dunalianum* Gaud. grad. ambig. Bitter, Bot. Jahrb. Syst. 55 (1919) 70.

Type species: *S. dunalianum* Gaud.

Shrubs or small *trees*, unarmed when mature (but see below), glabrescent or pubescent with sparse, minute stellate hairs. *Leaves* entire, relatively large. *Inflorescence* simple or sparsely branched cyme, flowers numerous. *Corolla* small, stellate. *Anthers* lanceolate opening by terminal pores. *Berry* succulent, red.

The species of this section occur on some Pacific islands, New Guinea and northern Australia. Although Seithe describes the plants as unarmed and most herbarium specimens appear so, the young stems of *S. viridifolium* Dunal are prickly and plants of *S. dunalianum* appear variable in that character.

New Guinea is a centre of speciation and representatives occur in northern Australia and some Pacific Islands. Species of this section are related to *S. giganteum* Jacq. of north-eastern Africa but differ particularly in indumentum.

Whalen (1984) confines sect. *Irenosolanum*, typified by *S. woahense* Dunal, to species occurring in the Hawaiian islands and thus excludes *S. dunalianum* and its allies. He maintains a '*S. dunalianum group*' and considers it to include two series published later by Bitter (i) series *Vaccinioides* typified by *S. vaccinioides* Schlechter, and (ii) series *Irenosolanum* not indicating a type, but not including *S. woahense* amongst the species discussed. The latter series name is thus a later homonym of the sectional name previously published. An unambiguous sectional name is provided here. While agreeing that *S. dunalianum*, *S. torricellense* Bitter, *S. mankiense* Symon, *S. tetrandrum* R.Br., *S. viridifolium* and *S. incanoalabastrum* and perhaps some Pacific island species form a coherent group, I doubt Whalen's extension to some of the New Caledonian species e.g. *S. pseuderanthemoides* Schlechter, *S. hugonis* Heine, *S. pancheri* Guillaumin, *S. vaccinioides*, which seem more closely related to his *S. ferocissimum* group.

48. **Solanum dunalianum** Gaud. in Freyc., Voy. Uranie (1829) 448, t. 58.

Type citation: "In insulis Moluccis (Pisang)"

Type material: not seen, possibly P.

Derivation: The name commemorates M.F. Dunal (1789-1856) eminent French taxonomist who published the early monograph of the Solanaceae in 1852.

S. pulvinaris Scheffer, Ann. Jard. Bot. Buitenzorg 1 (1876) 39.

Type citation: "M. Teysmann découvrit cette espèce à Ajambori, près de Doré, dans la Nouvelle-Guinée".

Type material: Holotype BO, isotype MEL! and photos ADW. The specimen at MEL bears two labels (a) a small piece of paper with the number '7854' and (b) '7854 Herb. Hort. Bot. Bog./Solanum pulvinaris Scheff./Nova Guinea/nr. Dore/Teysmann.

Derivation: The name refers to the pedicels sitting upon a distinct short projection or cushion on the peduncle.

S. dunalianum var. *lanceolatum* Witasek, Feddes Repert 5 (1908) 166.

Type citation: "Insula, 'Neupommern', in monte igniumo 'Kaia' prope 'Matupi', Septembri 1905 (*Rechinger, no. 4821*).

Type material: Holotype W (n.v.), photo ADW.

Derivation: The name refers to the lanceolate shape of the leaves.

S. dunalianum var. *inerme* Witasek, Denkschr. Akad. Wiss. Wien. 89 (1913) 601.

Type citation: "Salomonsinseln: Insel Bougainville. Am Strande bei dem Eingebornendorfe, Numa-Numa. Nr. 3607."

Type material: Holotype W (n.v.), 2 sheets, photos ADW.

Derivation: The name refers to the unarmed nature of the specimen.

Fig. 65. *S. dunalianum* Gaud. Drawn from herbarium specimen, *Swan 141* (ADW).

S. dunalianum var. *puberius* Bitter, Bot. Jahrb. Syst. 55 (1919) 72.

Type citation: "Nordöstl. Neu-Guinea: Kaiser Wilhelmsland, Hauptlager Malu, Alluvialwald mit schönen, 20-25 m hohen Bäumen und ziemlich viel Unterholz, in einer Windbruch lichtung Ledermann n. 12250, Ledermann n. 10718."

Type material: Holotype ? B (destroyed), duplicates not traced.

Derivation: The name refers to the slight pubescence of the specimen.

A *shrub* or small *tree* commonly 2-3 (-4) m tall; prickles present or absent 1-2 mm long, straight, sparse (only 5/14 collections bore prickles); indumentum of sparse ephemeral, minute, yellowish stellate hairs (sessile, porrect stellate with short central ray) on young tips and dense on buds, mature parts mostly glabrous; general aspect deep green, concolorous. Upper *leaves* usually geminate, unequal, larger leaf lamina to 30 x 15 cm, commonly 13 x 5 cm, elliptic, base broadly tapering obliquely to petiole, apex acute to sub-acuminate, mid vein channelled above, conspicuous below, primary lateral veins well developed; petiole 2-3.5 cm long; second of each pair of leaves similar in shape but smaller, to 15 x 5 cm, commonly about 9 x 4 cm, petiole 5-10 mm long. *Inflorescence* a congested cyme often once forked, of 10-20 flowers, from an extra-axillary position frequently below a pair of leaves; peduncle to forking about 1 cm long; floral rhachis 5-10 mm long; pedicel 5-8 mm long. *Calyx* 2-3 mm long, shortly campanulate; lobes unequal, 0.5-5 mm long, narrowly triangular, dentate. *Corolla* 2-3 cm diam., deeply stellate; lobes lanceolate, 4-5 partite in Australian material but reported mostly 4-partite, violet. *Stamens*: filaments 1-1.5 mm long; anthers 4-5 mm long, lanceolate-oblong. *Ovary* 1 mm long, globular, glabrous or with few stellate hairs at summit; style 8 mm long; erect, few stellate hairs towards base; stigma capitate, only slightly bilobed. Infructescence a congested cyme of 3-15 berries; peduncle not much enlarged; pedicel 1-1.5 cm long, erect, enlarged towards summit, slightly grooved; fruiting calyx 5-6 mm diam.; *berry* 8-10 mm diam., globose, orange or orange-red. Seeds 3 mm long, subreniform, slightly notched, flattened, pale, 40 in one fruit counted. (Fig. 65; Map 17).

Notes

S. dunalianum occurs mostly at low altitudes and few collections have been made above 150 m alt. It is essentially a species of disturbed sites and is found in rainforest, secondary forest regrowth, disturbed lowland forest, old garden regrowth, logging areas and roadside regrowth. There is a single early record of a yellow fruit, but all other descriptions state that it is a red to deep crimson berry.

The species appears closely related to *S. torricellense* from which it is not always readily separated; it is less closely related to *S. mankiense*. From the first it may be separated by its larger berries, slightly different pubescence, generally larger leaves, and from *S. mankiense* by its larger leaves, sparser pubescence and greater stature. In my monograph, Symon (1981), I included this species in sect. *Irenosolanum* Seithe. I have since found that an earlier publication of this sectional name had been overlooked and this will lead to different typification of the section.

Selected specimens (50 collections seen)

CELEBES: *Kaudern 57*, 10.iv.1917, Goeroepahii, 600 m alt., (L, NY); *Prawiroatmodjo & Soewoko 1699*, 13.xi.1978, Opa swamp Mt Tenggara 122° , 4° 05′, 20-250 m alt., (L); *Teijsmann*, 1859-60, no locality, (L).

MOLUCCA: *Gaudichaud*, s.d., Pisang, 1° 30′, 129° 00′ (type n.v.), (?P).

IRIAN JAYA: Vogelkop: *Teysmann 7854*, 1869, Ajambori, n.v.? 0° 45′, 134° 05′, (BO, MEL). Jayapura: *Kalkman 128*, 14.v.1956, Cyclop mountains 2° 30′, 140° 30, (CANB, L, LAE). Geelvink Bay: *Britton & Winder 62*, 28.iv.1945, Biak, 3° 30′, 144° 30′, Schouten Islands, 60 m alt., (A, BO, F). Digul: *Kalkman 3720*, 11.vii.1957, between Merauke & Tajam, 8° 30′, 140° 25′, 1 m alt., (A, CANB, L, LAE, P); *van Royen 4553*, 3.viii.1954, road from Merauke airstrip to Mang gatrikka, 8° 30′, 140° 35′, 10 m alt., (A, BO, CANB, L, LAE).

PAPUA NEW GUINEA: East Sepik: *Herre 333*, 26.v.1929, Sepik River, 4° 00′, 144° 15′, (F, NY). Madang: *Pullen 1118*, 6.ix.1958, Atitau lower Ramu, 4° 46′, 145° 20′, 76 m alt., (CANB, LAE); *Weinland 133*, iii.1890, Kalibobo, 5°

13′, 145° 48′, (BO, BRI, US). Morobe: *Coode et al. NGF 32569*, 2.xi.1967, Oomsis, 6° 41′, 146° 48′, 60 m alt. (BRI, CANB, K, L, LAE); *Hartley 10078*, 27.iii.1962, Bewapi creek, 6° 40′, 146° 55′, 60 m alt., (A, BRI, CANB, L, LAE); *Streimann & Kairo NGF 27523*, 8.iii.1966, Bulolo, 7° 10′, 146° 40′, 731 m alt., (A, BFC, BO, BRI, CANB, K, L, LAE). Western: *Asigau 52*, 58, 18.ix.1979, Balamuk near Bensbach, 8° 52′, 141° 15′, 10 m alt., (UPNG); *Brass 8514*, xii.1936, Tarara, 8° 50′, 141° 52′, (A, BM, BRI, L, LAE); *Henty & Foreman NGF 49372*, 11.xi.1972, Bula plains 9° 00′, 141° 15′, 9 m alt., (A, CANB, K, L, LAE, NSW); *Henty NGF 49646*, 11.vi.1973, Sabi lower Wassi Kussa river, 9° 05′, 142° 00′, sea level, (A, CANB, L, LAE). Southern Highlands: *Conn 485, 486, & Kairo*, 27.vii.1977, Mt Kemenge, Lake Kutubu, 6° 24′, 143° 19′, (BFC). Gulf: *Schodde & Craven 4244*, 16.i.1966, summit of Ihu hill, 7° 56′, 145° 23′, 91 m alt., (A, CANB, L, LAE). Central: *Carr 14752*, 26.x.1935, Boridi, 9° 05′, 147° 38′, 1433 m alt., (BM, CANB, L, NY); *Wiakabu & Rauveve LAE 70450*, 1.vi.1977, nr Abau, 10° 05′, 148° 10′, (BISH, BRI, LAE, US). Northern: *Chalmers s.n.*, 1878, S.E. New Guinea, (MEL). Milne Bay: *Brass 27452*, 1938, Mt. Sisa, Misima island, 10° 36′, 152° 45′, (A, L, LAE); *MacGregor s.n.*, 1889, Joannet island, 11° 14′, 153° 11′, (BRI, MEL); *Streimann & Lelean, LAE 52624*, 23.x.1971, Miadeba, Normanby island, 9° 50′, 150° 50′ sea level, (A, BO, BRI, CANB, K, L, LAE). New Britain: *Betche 11 & 87*, 21.vii.1881, Miako, Duke of York Is., 4° 10′, 152° 25′, (MEL, NSW); *Schlechter 13749*, vi.1901, Mussava, 4° 13′, 151° 48′, (BM, BO, K); *Warburg 21251*, 1889, Kerewa (?Karawa), 4° 16′, 152° 07′, (BM). Bougainville: *Kajewski 1790*, 1.vi.1930, Kugu-Maru, Buin, 6° 45′, 155° 40′, 150 m alt., (A, BISH, BM, BRI); *Rechinger 5365*, ix.1905, Numa Numa, 5° 50′, 155° 10′ (n.v. photo ADW), (W); *Schodde & Craven 3938*, 28.viii.1964, nr. Baribo village 6 miles N of Buin, 6° 46′, 155° 41′, 152 m alt., (A, BO, BRI, CANB, K, L, LAE).

NEW HEBRIDES: *MacDonald s.n.*, s.d. New Hebrides, (MEL); *Parkinson s.n.*, 1885, New Hebrides, (MEL).

49. **Solanum incanoalabastrum** Symon, sp. nov.

Frutex 2-5 m altus aut arbor parvus. Aculei 1-2 mm longi, in ramis solum. Omnes partes glabrae praeter corollam pilis minutiis confertis stellatis. *Folia* circa 9 x 3.5 cm alternata vel geminata elliptica integra acuminata, adspectu generali atrovirenti; petiolus circa 1.5 cm longus. *Inflorescentia* cymosa conferta 7-15 (-30) floribus; pedunculus 0-5 mm longus; rhachis 5-10 mm longa; pedicellus circa 1.5 cm longus; *calycis* tubus 1-2 mm campanulatus, lobis 2-3 mm late triangularibus, acumine 1-3 mm longo; *corolla* 1.5-2 cm diam. stellata, lobis 1.5cm oblongo-lanceolata purpurpea; filamenta 2 mm longa antherae 6 mm longae; *ovarium* 2 mm longum; stylus 7-8 mm erectus. Fructus fasciculatus 1-9 baccis; pedicellus 3-3.5 cm deflexus sursum turgidus; *bacca* 1-1.5 cm diam. globosa denim rubra.

Type citation: *Symon 10703*, 27.vi.1977, "Papua-New Guinea, on the Wahgi-Sepik divide between Banz and Tabibuga, 15 km from Banz and 45 km from Tabibuga, about 2000 m alt. dark green shrub, flowers purple, no ripe fruit, erect habit, branching above, 2-3 m high."

Type material: Holotype ADW, isotypes CANB, LAE.

Derivation: The name refers to the hoary pubescent buds which contrast to the glabrous nature of the rest of the plant.

Woody *shrub* or small *tree* 2-5 (-6) m; prickles 1-2 mm long, broad based, scattered on stems only; glabrous except for dense minute stellate indumentum on corolla giving it a hoary appearance, occasional minute stellate hairs on young tips. *Leaf* lamina (6-) 8-10 (-14) by (2.5-) 3-4 (-5) cm, alternate or geminate, (when geminate the pair similar in size) elliptic, entire, acuminate, base broadly cuneate, often oblique, general aspect dark green; petiole 0.5-1.5 cm long. *Inflorescence* a congested cyme from mid or upper internodal position up to 30 flowers, more often 7-15 buds visible at one time; peduncle 0 or 1-5 mm long, rhachis c. 5-10 mm long; pedicels c. 1.5 cm long. *Calyx* tube 1-2 mm long, campanulate, lobes 2-3 mm long, bluntly triangular with acumen of 1-3 mm; *corolla* c. 1.5-2 cm diam., deeply divided, lobes 1.5 cm long, oblong-lanceolate, purple. *Stamens*: filaments 2 mm long, flattened below; anther 6 mm long, oblong-lanceolate. *Ovary* 2 mm long; style 7-8 mm long, erect, slightly enlarged upwards; stigma capitate. *Fruit* in cluster of (1-) 4 (-9) berries; pedicel 3-3.5 cm long, mostly deflexed, slightly swollen upwards; calyx not much enlarged, *berry* 1-1.5 cm diam. globular, deep red at maturity. (Figs. 66 & 67; Map 12).

Chromosome number: n = 12, counted by Randell from *Symon 10703*.

Notes

Ten collections have come from altitudes which range from 457 m to 2440 m with a mean of 1638 m. The species has been collected from stream banks in forest, roadside in rain forest,

Fig. 66. *S. incanoalabastrum* Symon. Drawn from herbarium specimen, *Millar & van Royen NGF 15997* (BRI).

Fig. 67. Holotype of *S. incanoalabastrum* Symon (*Symon 10703*, ADW).

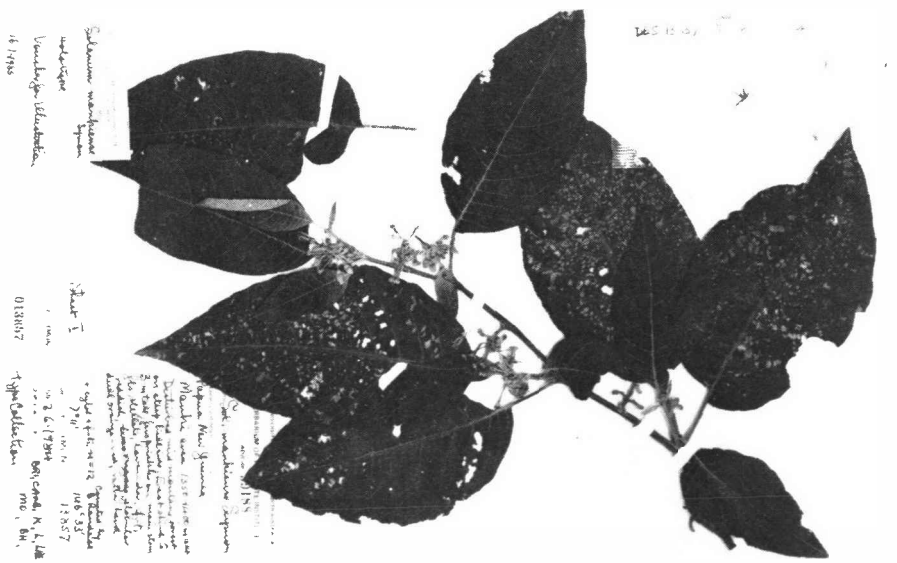

Fig. 68. Holotype of *S. mankiense* Symon (*Symon 13857*, ADW).

secondary forest, gully in forest, mixed riverine forest and gravelly riverbed. The species appears related to *S. dunalianum* and *S. torricellense* from both of which it differs in its condensed inflorescence, reflexed rather than erect flowers and fruits, generally prickly stems, smaller leaves and its ecology. It differs from *S. mankiense* in its narrower leaves and larger more succulent berries. Many herbarium specimens dry dark brown to nearly black in colour.

Specimens cited

IRIAN JAYA: None seen

PAPUA NEW GUINEA: West Sepik: *Vinas & Wiakabu LAE 59560*, 21.v.1975, on Busilmin-Folongonom track, 5° 00′, 141° 05′, 609 m alt., (BISH, BRI, K, L, LAE, US). Western Highlands: *Symon 10703*, 27.vi.1977, on Wahgi-Sepik divide between Banz & Tabibuga, nr 5° 50′, 144° 35′, 2000 m alt.(type), (ADW, CANB, LAE). Eastern Highlands: *Brass 31613*, 21.ix.1959, Purosa, 6° 04′, 145° 32′, 1950 m alt., (A, BO, CANB, K, L, LAE, NY, US); *Broadhurst 20*, i.1964, Okapa subdist., (LAE); *Hornibrook 185*, s.d., near Okapa, 6° 30′, 145° 35′, 1829 m alt., (LAE); *Millar & van Royen NGF 15997*, 30.viii.1963, Below Daulo, 6° 05′, 145° 25′, 2439 m alt., (A, BRI, BO, CANB, K, L, LAE). Southern Highlands: *Schodde 1599*, 25.vii.1961, near Ebenda, Anga valley, c. 6° 15′, 143° 42′, 1920 m alt., (A, BRI, CANB, K, L, LAE). Central: *Carr 12854*, 21.vii.1935, Koitaki, 9° 24′, 147° 28′, 457 m alt., (BM, K, L, NY); *Carr 15955*, 5.iii.1936, Isuarava, 8° 59′, 147° 73′, (BM, CANB, L); *Gillison 347*, 4.xi.1964, Iolo creek, Lake Myola, 9° 08′, 147° 43′, 2134 m alt., (LAE); *Kanis 1433*, 15.ix.1970, east of Efogi village, 9° 10′, 146° 40′, 1500 m alt., (A, CANB, K, LAE). Northern: *Carr 13967*, 23.xii.1935, Yodda river, 8° 47′, 147° 40′, 1372 m alt., (BM, CANB, K, L, NY); *Veldkamp & Stevens 5950*, 18.vii.1972, Tapan Mayu, Mt Suckling, 9° 34′, 148° 56′, 1400 m alt., (BISH, L, LAE, US); *Veldkamp & Stevens 5957*, 18.vii.1972, Mt Suckling, 9° 34′, 148° 56, 1400 m alt., (BISH, L, LAE, US). Milne Bay: *Brass 24599*, 11.x.1953, Goodenough Island, 9° 22′, 150° 22′, 1550 m alt., (A, CANB, K, L, LAE, US).

50. **Solanum mankiense** Symon, sp. nov.

Frutex 3 m altus vel arbor parvus. In juventate partes inferiores aculeis rectis sparsim armatae. In omnibus partibus pili stellati, sed in foliis glabrescentes supra dum infra persistentes. *Folia* inferiora 26 x 12 cm late elliptica acuminata basi valde obliqua, folia vetustiora circa 15 x 7 cm nervis infra valde reticulata; petiolus 1-4 cm. *Inflorescentia* cymosa conferta furcata multis floribus (ad 100); pedunculus circa 1 cm; rhachis 1-2 cm; pedicellus circa 7 mm; *calycis* tubus 3 mm, lobis truncatis, acumine 0.5-1 mm; *corolla* circa 17 mm diam stellata, lobis 8 mm longis angustis lilacinis minime reflexis; filamenta 1 mm; antherae 4 mm longae linear-lanceolatae, *ovarium* 1.5 mm diam. glabrum; stylus 5 mm. *Fructus* fasciculatus multis baccis (ad 40); pedicellus 15-17 mm paulum sursum turgidus; *bacca* circa 1 cm diam., firma armeniaca. *Semina* 2 mm longa depressa subreniformia.

Type collection: *Symon 13857*, 3.vi.1984, Papua New Guinea, Manki area, 7° 11′, 146° 33′, 1350-1400 m alt. Disturbed mid montane forest on steep hillside. Erect shrub to 3 m tall, few prickles on main stem, flowers stellate, lavender, fruits globular dull orange-red rather hard.

Type specimen: Holotype ADW, isotypes BH, BRI, CANB, K, L, LAE, MO.

Derivation: The name is derived from the locality Manki where the species has been collected.

A *shrub* or small *tree* to 3 m tall, branching above, juvenile phases and lower parts armed with stout conical prickles, absent from distal shoots; indumentum of stellate hairs, (multiseriate-stalked, porrect or short stalked porrect stellate hair, central cell rarely longer than lateral cells), dense and yellowish on young growths, main stems and upper leaf surface glabrescent, remaining dense on lower leaf surface. Lower *leaf* lamina to 26 x 12 cm, broad elliptic, acuminate, base strongly oblique; *petiole* 4-6 cm long; later leaves 12-20 x 5-10 cm, 12 principal lateral veins impressed above, conspicuous below, petiole 1-4 cm long. *Inflorescence* a congested once or twice forked cyme of up to 100 flowers; peduncle less than 1 cm long at anthesis; floral rhachis 1-2 cm long, unarmed, densely pubescent; pedicel c. 7 mm long. *Calyx* 3 mm long, including short truncate lobes with acumens 0.5-0.75 mm long, shallowly 5-ribbed. *Corolla* c. 17 mm diam., deeply divided, lobes c. 8 mm long, marginal membranes narrow, pale lavender, somewhat reflexed at anthesis, densely pubescent outside where exposed in bud. *Stamens*: filaments 1 mm; *anthers* c. 4 mm long, linear-lanceolate, erect in cone, small apical pores. *Ovary* 1.5 mm diam., glabrous; style 5 mm long, slightly sigmoid; stigma small, terminal.

Fig. 69. *S. mankiense* Symon. Drawn from holotype, *Symon 13857 & Vinas* (ADW).

Fruit with peduncle to 2.5 cm long, the fruiting branches c. 2 cm long, pedicel 15-17 mm long, slightly enlarged upwards; calyx not much enlarged, lobes truncate; *berry* c. 1 cm diam., up to 40 per truss, dull orange red, rather hard. *Seeds* 2 mm long, flattened, irregularly reniform, yellowish buff. Cotyledons 8 x 3.5 mm with sparse marginal simple hairs; hypocotyl pubescent with slightly antrorse simple hairs, first leaf c. 10 x 8 mm, ovate, apex rounded, scattered pubescence of mostly marginal simple and few glandular hairs, no stellate hairs visible. (Figs. 68 & 69; Map 12).

Chromosome number: n = 12, *Symon 13857*, type collection, counted by B. Randell.

Notes

This new species appears most closely related to *S. dunalianum*. It differs in the leaf venation impressed above and conspicuous below, dense pubescence of young tips and lower leaf surfaces, more numerous flowers per inflorescence and the dull orange-red rather than crimson fruits.

Specimens seen

IRIAN JAYA: None seen

PAPUA NEW GUINEA: Morobe: *Kairo 67*, 17.i.1979, Manki area, Bulolo, 7° 12′, 146° 39′, (BFC, CBG, LAE) [n.v. A, CANB, K, L, UPNG]; *Kairo 540*, 13.viii.1982, Upper Watut river near Nauti village, 7° 19′, 146° 35′, 1300 m alt., (BFC, CBG, L) [A, K, LAE, UPNG]; *Symon 13857*, 3.vi.1984, Manki area, 7° 11′, 146° 33′, 1350-1400 m alt., type collection, see above.

51. **Solanum peekelii** Bitter, Bot. Jahrb. Syst. 55 (1917) 73.

Type citation: "Bismarck-Archipel: Neu-Mecklenburg; Buragamata bei Namatanai, auf lehmigem Boden auf Wegrande, 12 m ü.M. (G. Peekel n. 523—blühend im Juli)."

Type material: Holotype ? B (destroyed), duplicates not traced. *Womersley NGF 8678* (see below) is proposed as neotype, photo ADW.

Derivation: The name commemorates G. Peekel (1876-1949) a missionary in New Guinea who collected especially in the Bismarck Archipelago and prepared a manuscript flora of the area which is now at Leiden.

An erect shrub 3 (-5) m tall, branching above, main stem strongly armed with stout prickles in juvenile phase, distal shoots (and most herbarium collections) unarmed, leaves and stems purplish green (*Womersley NGF 8678*), glabrous except for minute stellate hairs (sessile porrect stellate with central ray about equal to lateral rays) common on corolla lobes, sparse on young tips, flowering rhachis and pedicels, rare on mature parts. *Leaf* lamina lanceolate-elliptic, 8-14 x 2-3 cm, base cuneate, apex acute to acuminate, lamina with c. 10-12 principal veins on each site of mid rib, leaves usually geminate or ternate;second leaf not much smaller than first, third leaf half as big as the other two; petiole 5-7 mm long. *Inflorescence* a simple or forked cyme from mid internodal position; peduncle to fork c. 5-7 mm long, rhachis to 2 cm long, closely marked with pedicel scars, up to 60 flowers per inflorescence most falling only a few out at any one time; pedicel 10-15 mm long slender. *Calyx* tube c. 2 mm long, calyx lobes c. 1 mm, oblong, with abrupt acumens, *corolla* deeply stellate, tube c. 1.5 mm long, lobes 6-7 mm long, narrow triangular to linear. *Stamens*: filaments 0.5 mm long; anthers 4-5 mm long, lanceolate. *Ovary* 1.5 mm long; style 6-7 mm long, erect; stigma slightly oblique. *Fruit* not seen; a berry, globose 4-6 mm diam. (*Brass 25460*), red. (Fig. 70; Map 1).

Notes

Apart from the type collection which has not been located, only three other collections have been recognised. All come from Normanby Island, D'Entrecasteaux Islands.

The species appears to be related to the *S. dunalianum-S. torricellense-S. incanoalabastrum* complex. It differs from the first two in its smaller and narrower leaves, and from the last in inflorescence and fruit characters. Peekel (1948) states that this species "is one of the first plants to appear in abandoned gardens, also in secondary forest. The Pala bind the stems crosswise to a grid, which serves as a grater for taro and yams." He also considers the species quite variable in pubescense leaf margin and berry size.

Fig. 70. *S. peekelii* Bitter. Drawn from herbarium specimen *Womersley NGF 8678* (LAE), fruit from *Brass 25460* (LAE)

Specimens seen

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: Milne Bay: *Brass 25460*, 17.iv.1956, Waikaiuna, Normanby island, 10° 00′, 151° 13′, 5 m alt., (A, K, L, LAE, US); *Fitzgerald 16*, ix.1895, Awaiama, 10° 14′, 150° 31, (MEL); *Womersley 8678*, 20.iv.1956, Waikaiuna Bay, Normanby Island, 10° 00′, 150° 5′, 182 m alt., (A, BM, BO, BRI, CANB, K, L, LAE, NSW).

52. **Solanum tetrandrum** R. Br., Prodr. (1810) 445.

Type citation: "(T)v.v." T denotes Littus intra tropicum, i.e. the coast of Queensland and the Northern Territory to Arnhem Bay.

Type material: BM, R. Brown, "2 Solanum tetrandrum Arnheim North Bay Feb. 14 Desc. 15 Island y^1 y^2", lectotype, Symon (1981), today Island y^1 is called Cottons Island and y^2 is Pobassoo Island.

Derivation: The name refers to the four anthers as many flowers are 4-partite in contrast to the generally 5-partite form.

A *shrub* to about 1 (-3) m high, almost completely deciduous during dry season, mostly without prickles, all parts pubescent with stellate hairs (sessile, porrect-stellate, with long central ray), scattered on upper leaf surface, denser below, general aspect green. *Leaf* lamina slightly discolorous, 8 (-18) by 5 (-15) cm, broad-elliptic, entire, juvenile leaves with shallowly repand margin, veins distinctly white above, apex rounded or acute, base cuneate or rounded, oblique; petiole 1-3 (-6) cm long. *Inflorescence* a short congested cyme of 5-50 flowers; peduncle to 5 mm long; floral rhachis 5-25 mm long; pedicel 5 mm long, slender, slightly thickened upwards. *Calyx* c. 2 mm long; lobes 2-3 mm long, lanceolate, variable in length. *Corolla* 2.5 cm diam., deeply stellate, flat or reflexed, lobe 3-4 mm wide, lanceolate, white or pale blue, generally 4-partite. *Stamens*: filaments 1 mm long; anthers 4-5 mm long, oblong, scarcely tapered, erect in cone. *Ovary* glabrous, style 9 mm long, slender, erect, bent at tip; stigma terminal, exceeding anthers by 2-3 mm. Fruiting peduncle and calyx not much enlarged; *fruit* 5-7 mm diam., globular, bright orange-red, at first succulent, finally brownish-orange when dry, held erect or nearly so. *Seeds* 2-2.5 mm diam., pale or light grey, minutely reticulate, sixteen fruits from *Symon 7774* had (5-) 12 (-18) seeds per fruit (Australian collection) two fruits from *Vinas & Kairo 289* had 90, 104 seeds per fruit. (Fig. 71; Map 6).

Chromosome number: n=12 Randell & Symon (1976).

Notes

Very few collections of *S. tetrandrum* have been made in New Guinea. The species occurs on the north coast of Australia and closely related material extends eastward into Pacific Islands where its relationships are at present obscure. *Solanum tetrandrum* is most closely related to *S. dunalianum* from which it differs in its smaller stature, denser indumentum, fewer and smaller fruits and mostly total lack of prickles. It differs from *S. torricellense* in leaf shape and characters of the inflorescence. The widely dispersed subcoastal distribution is notable. The *Vinas & Kairo* collections differ in their 5-partite flowers, greater pubescence, very numerous fruits (to 35) stem prickles and shallowly lobed juvenile leaves.

Specimens seen

IRIAN JAYA: Digul: *Vertenten s.n.*, 1924, Merauke, (L).

PAPUA NEW GUINEA: Morobe: *Vinas & Kairo 289, 290, 301, 302*, 18.vi.1984, Buso river SW of Buso camp, 20-100 m alt., (A, ADW, BFC, CBG, K, L, LAE). Western District: *Kwapena UPNG 1205*, 14.i.1974, East Balimuk Stn, Bensbach River, 9° 06′, 141° 09′, (UPNG). Central: *Brass 529*, 30.x.1925, Laloki river, 9° 10′, 147° 00′, 304 m alt., (BRI). Milne Bay: *Frodin UPNG 2169*, 2.xi.1972, Kailola village, Kiriwina Island 8° 29′ 151° 04′, (UPNG). East New Britain: *Bradtke 38*, iii.1917, Duke of York Island, 4° 10′, 152° 30′, (BRI).

SOLOMON ISLANDS: *Waterhouse 31*, 21.v.1929, New Georgia, (A, K, L, LAE).

Fig. 71. *S. tetrandrum* R. Br. Drawn from live plant ex *Symon 7774* (ADW).

53. **Solanum torricellense** Bitter, Bot. Jahrb. Syst. 55 (1917) 75.

Type citation: "Nordöstl Neu-Guinea: Kaiser-Wilhelmsland; in den Wäldern des Torricelli-Gebirges, 900 m ü.M. (R. Schlechter, Pflanzen des Monsun Gebietes n. 20268-blühend und fruchtend im September)."

Type material: Holotype ? B, (destroyed); isotypes P!, UC! and photos ADW.

Derivation: The name refers to the Torricelli Mountains where the plant was first collected.

A *shrub* or small *tree* 2-3 (-4) m tall, unarmed, indumentum of minute sometimes yellowish stellate hairs (sessile porrect-stellate with short central ray) dense on buds outside, scattered on inflorescence, sparse to absent and mainly on main veins on stem and leaves. *Leaf* lamina to 19 x 8cm more commonly c. 13 x 6 cm, ovate-elliptic, c. 13 principal lateral veins, entire, base rounded to broadly cuneate, oblique, apex acuminate; petiole 1.5-3 cm long. *Inflorescence* a condensed forked cyme, up to 50 flowers from an upper internodal position; peduncle to fork 1-1.5 cm long, floral rhachis c. 2 cm long, pedicel 5-8 mm long. *Calyx* c. 2 mm long, lobes short and rounded, acumen 0.5 mm long. *Corolla* stellate, deeply divided, lobes c. 6 mm long. *Stamens*: filaments very short; anthers 3-4 mm long linear-lanceolate. *Ovary* c. 1 mm long; style c. 5 mm long, erect; stigma capitate. Fruiting cluster of few to 30 berries, pedicel and calyx not much enlarged, more or less erect, *berry* 4-5 mm diam. globular, red when ripe. *Seeds* 2-2.5 mm long, flattened, sub-reniform, minutely reticulate. (Fig. 72; Map 16).

Notes

This species is found at low altitudes from sea level to 700 m. It has been collected from old garden clearings, forest edge of beach and of lake, ridge top, disturbed rain forest and well drained secondary forest. *S. torricellense* is closely related to *S. dunalianum* from which it may at times be difficult to separate. The leaves are very similar, those of *S. torricellense* tend to be smaller, the berries when available are consistently smaller and more numerous, the scant pubescence is more abundant on the inflorescence. It differs from *S. mankiense* in leaf form and inflorescence.

Specimens seen

IRIAN JAYA: Digul: *Jensen 385*, 15.v.1922, Ohoidir Key Eilanden, 5° 37′, 139° 30′, (BISH).

PAPUA NEW GUINEA: West Sepik: *Schlechter 20268*, 19.ix.1909, Torricelli mountains, 3° 23′, 142° 23′, (P, UC). Madang: *Essig & Lelean LAE 55039*, 4.x.1971, Long Island, 5° 30′, 147° 10′, 122 m alt., (BH, BO, BRI, CANB, K, L, LAE, NY); *Vandenburg & Katik NGF 42331*, 15.xi.1969, 8 km N of Matafuma village Long Island, 5° 20′, 147° 05′, 15 m alt., (A, CANB, K, L, LAE). West New Britain: *Floyd 6549*, 16.viii.1954, Malalia near Cape Hoskins, 5° 25′, 150° 30′, (A, BISH, BM, BO, CANB, K, L, LAE, MEL, NSW, US). East New Britain: *Sayers NGF 24265*, 27.iii.1965, Toriu River, 5° 45′, 151° 10′, 1067 m alt., (A, BO, BRI, CANB, L, LAE). Bougainville: *Nachman 308, 525*, x.1971, Nissan Island, 4° 30′, 154° 15′, (LAE).

SOLOMON ISLANDS: Santa Isabel: *Brass 3231*, 26.xi.1932, Suwa, 8° 00′, 159° 00, (A, ADW, BISH, BRI, L); *Hunt 2835*, 1.x.1965, Tatemba Bay, 8° 00′, 159° 00′, (A, CANB, K, L, LAE, P). Malaita: *Mauriasi & collectors BSIP 13463*, 21.xi.1968, NE Malaita, 9° 10′, 160° 58′, 137 m alt., (K, L, LAE); *Mauriasi & collectors BSIP 13601*, 2.xii.1968, Su'u area, 9° 10′ 168° 58′, 150 m alt., (A, K, L, LAE); *Gafui & collectors BSIP 12869*, 28.xi.1968, Haveniia-Maru Bay, 168 m alt., (K, L, LAE).

54. **Solanum viridifolium** Dunal in DC., Prodr. 13 (1852) 73, No. 138.

Type citation: "In Novae Hollandiae Nova Cambria australia circa promontorium Grafton (Banks)"

Type material: Holotype BM.

S. viride R. Br., Prodr. (1810) 445, non *S. viride* Forst. f. ex Sprengel.

Fig. 72. *S. torricellense* Bitter. Drawn from herbarium specimen, *Nachman 525* (LAE).

Type citation: "(T) v.v.". T. denotes Littus intra Tropicum, i.e. the coast of Queensland and Northern Territory to Arnhem Bay.

Lectotype: *R. Brown* [Bennett 2664] "Prope littus inter . . . harbors ad Port 1 and Broadsound. 3. *Solanum viride* prodr. 445. B.M."

Derivation: The name refers to the green leaves of the species which are virtually glabrous.

Shrub to 2 m tall, not known to be clonal, branched above, prickles present on stem of young plants absent from mature twigs, absent from most herbarium specimens; indumentum of minute, pale, stellate hairs (sessile, porrect-stellate with short or medium central cell) sparse on young tips and corolla lobes, general aspect green. *Leaf* lamina commonly c. 10 x 4 cm, elliptic entire, apex acuminate, base truncate oblique; petiole 1-2 cm long. *Inflorescence* a simple or forked cyme of 10-50 flowers; peduncle 1-2 cm long to first fork; floral rhachis 2-4 cm long; pedicels 1-1.5 cm long slender, slightly thickened upwards. *Calyx*: tube 1-2 mm long; lobes 1-2 mm long, triangular, acumen 1 mm long. *Corolla* c. 1.5 cm diam., 4-5 partite, stellate, lobes deeply divided, narrow, open or reflexed, interacuminal membrane scarcely developed, pale or dark purple. *Stamens*: filaments 1 mm long; anthers 4-5 mm long, in cone or loosely erect, distinctly tapered upward. *Ovary* with few glandular hairs; style 5 mm long, erect, curved at tip; stigma green. Fruiting pedicels to 2 cm long; calyx scarcely covering base of fruit; *berry* c. 1 cm diam. globular finally red. *Seeds* 2.5-3 mm long, light grey-brown, distinctly minutely reticulate. (Fig. 73; Map 6).

Note

The five collections on which the presence of this species in Papua New Guinea is based are not of good quality. Elsewhere it occurs in Queensland from Cape York to about Rockhampton. The local plants are reported to be up to 2 m tall whereas Australian plants are often small trees. However, I have been unable to separate them and more information and better specimens are needed. None show any signs of prickles which may occur only on young plants. The description has been drawn in part from Queensland material.

Specimens seen

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: Western: *Brass 6498*, iv.1936, Mabaduan, 9° 17′, 142° 44′, (A, L); *Gideon LAE 76196*, 7.xii.1979, Parama Island (mouth of Fly River, 9° 01′, 143° 24′, sea level, (LAE); *Henty & Foreman NGF 49372*, 11.xi.1972, Bula plains 9° 00′, 141° 15′, 9 m alt., (A, CANB, K, L, LAE, NSW); *Henty NGF 49646*, 11.vi.1972, Sabi lower Wassi Kussa river, 9° 05′, 142° 00′, sea level, (A, CANB, L, LAE); *Kwapena s.n.*, 11.i.1974, near Wando between Bale and Tambori camps, 9° 04′, 143° 12′, (UPNG).

AUSTRALIA: *Clarkson 3903*, 21.x.1981, Saibai Island, 9° 22′, 142° 41′, (ADW, QRS).

Sect. 13 (subgen. *Leptostemonum* (Dunal) Bitter) **Micracantha** Dunal, Hist. nat. *Solanum* (1813) 128, 193.

Type species: *S. micracanthos* Lamk.

Group *S. lanceifolium*, Whalen (1984).

Sprawling or climbing *shrubs*, abundantly armed with hooked prickles, simple acicular prickles may occur on leaf blade, *indumentum* of stellate hairs, minute, often sparse on upper leaf surface. *Leaves* angularly lobed, geminate, relatively large. *Inflorescence* a condensed cyme with relatively few flowers. *Corolla* is broadly stellate. *Anthers* lanceolate opening by terminal pores. *Berry* relatively large, succulent, orange-red to greenish yellow.

Species of this section, which is not well defined, are mainly in South and Central America. Two are considered native to Australia, one occurs in New Guinea and another in the Philippines, *S. lianoides* Elmer. It is possible all may be early introductions from the Americas (they tend to be weedy), but to date have not been identifed with any American species.

Fig. 73. *S. viridifolium* Dunal. Drawn from herbarium specimen, *Moriarity 833* (ADW); fruit from *Webb & Tracey 8351* (ADW).

55. **Solanum schefferi** F. Muell., Desc. Notes Papuan Pl. 1 (1876) 44.

Type citation: "Near Andaj; Teysmann".

Type material: BO two sheets, and photos ADW, both labelled 7853 and annotated by Bitter as *S. smilacocladum*.

Derivation: The name commemorates R.H.C.C. Scheffer, (1844-1880) a Dutch botanist who was active in Indonesia.

Solanum incanum Scheffer, Ann. Jard. Bot. Buitenz. 1 (1876) 39, non L.

Solanum smilacocladum Bitter, Bot. Jahrb. Syst. 55 (1917) 79.

Type citation: "Nördl. Neu-Guinea: Andai (an der Nordküste der Halbinsel Berou) Herb. Buitenzorg n. 9853! sub nom. *S. incanum* Scheff. Nordöstl. New Guinea: Kletterstrauch in den Wäldern des Kaui-Gebirges, etwa 700 m ü.M. (Schlechter, Pflanzen des Monsun-Gebietes n. 17627).—Hierher gehört auch die von Warburg am Sattleberg unter n. 21246 gesammelte Pflanze, die in Pl. Papuan. 414 sowie in der Fl. d. deutsch. Schutzgebiete in der Süds. 533 zu *S. torvum* Sw. gezogen worden ist.

Celebes: Minahassa: Lolomboelan bei Pakoe-Oere (Koorders n. 18033β); Oerwoud by bivak Totok nahe bei Ratotok (Koorders n. 18046β—beide im Herb. Buitenzorg; Nord-Celebes: Bojong (Warburg n. 15072)."

Type material: (1) see *S. schefferi* above. (2) a duplicate of *Schlechter 17627* is at P (3 leaves and piece of stem) photo ADW.

Derivation: The name refers to the *Smilax* like stem, referring to the numerous small hooked prickles.

A sprawling subscandent *shrub* or *climber* to 1-2 m or more (flowering in canopy, *Kanis 1095*), armed with hooked *prickles* 1-2 mm long, common on stems, rare on distal parts, occasional on main veins of leaves below, rare on upper surface; indumentum of minute stellate hairs (sessile or stipitate porrect stellate with few lateral rays, central cell about as long as lateral) abundant on leaves below, sparser above, shortly stipitate on stems and inflorescence. *Leaf* lamina to 12 x 6 cm, commonly c. 8 x 3 cm ovate to elliptic, entire, apex acute to acuminate, base rounded to broadly cuneate, mostly very oblique, dark green above, paler below; petiole 0.8-1.5 cm long. *Inflorescence* variable, from a few flowers on a short simple peduncle in a mid-internodal position to a terminal panicle of several dichotomously branched cymes bearing over 100 flowers, apparently androdioecious, upper flowers male, lower ones hermaphrodite; peduncle to first fork c. 1 cm long, floral rhachis with branches to 5 cm long; pedicel 1 cm long; *male flower*: *calyx*: tube 2 mm long; calyx lobes 2 mm, truncate with short acumen; *corolla* stellate, deeply divided, tube 2 mm long, lobes 12-15 mm long, lanceolate. *Stamens*: filaments very short; anthers 7 mm long, attenuate; *ovary* style and stigma vestigial; *hermaphrodite flower*; similar but ovary 2 mm long, glabrous, style 9-10 mm long, erect, glabrous, exceeding anther tips by 4 mm. Fruit a berry, solitary in specimens to hand; pedicel to 3 cm long somewhat thickened upwards; calyx enlarged to cover base of fruit; *berry* to 5 x 3 cm, ovate to long ovate, only recorded fruit colour green (mature?). (Fig. 74; Map 2).

Notes

This species has been found at altitudes of 5 m to 1000 m with a mean of 550 m. Flower colour has been recorded as purple, violet and deep purpleblue; *Brass 24330* a collection from Milne Bay describes the flowers as showy. It has been collected from the edges of rain-forest, growth on coral limestone, creek banks, abandoned native garden on limestone, disturbed gully forest, roadside vegetation and rain forest.

It is possible that *Solanum lianoides* Elmer, Leafl. Philipp. Bot. 2 (1910) 733, is also a synonym of *S. schefferi*. The type, *Elmer 10752*, May 1910, comes from Todaya (Mt. Apo) Mindanao, Philippines, with specimens at BISH, K, L, NY, US and photos ADW. This is also a climber "to the top of lofty trees" with small hooked prickles, rather broader leaves with very shallow angular lobes, similar pale yellow anthers, and large ovoid to elliptic fruit. I have only seen the type collection of this species which consists of leafy shoots and on some specimens,

isolated fruits. The affinities of *S. schefferi* remain a problem. I had considered the New Guinea species to be close to *S. lianoides* from the Philippines, that Whalen includes in the otherwise Australian "*S. macoorai* group". However, *S. schefferi* may have a complex paniculate inflorescence with numerous flowers, distinct pale yellow stamens (seen also in the very different *S. capsicoides* All.) as well as a large ovate berry. This combination of characters does not occur in any of the Australian species of the *S. macoorai* group. Using Whalen's key *S. schefferi* seems closest to sect. *Micracantha* (the *S. lanceifolium* group of Whalen) from

Fig. 74. *S. schefferi* F. Muell. Drawn from herbarium specimen, *Hoogland 3334* (CANB), fruit from *Kanis 1095* (CANB).

which it differs in having a complex rather than simple inflorescence. *S. schefferi* and *S. lianoides* may be an early introduction to South-East Asia from Central America as most members of sect. *Micracantha* are found there, but it has not yet been identified with any American species. *S. smilacocladum* was also collected in the Celebes and the disjunct distribution together with its discordant characters (compared with other local species) suggest an introduction to the area.

Specimens seen

MOLUCCAS: Tanimbar Island: *Buwalder 4147*, 13.iii.1938, P. Jamdena, between Kpilgnei and Otimmer, low alt., (L).

IRIAN JAYA: Vogeklop: *Pleyte 613*, 19.viii.1948, Sorong near Klamono 0° 45′, 131° 15′, (BO, K, L).

PAPUA NEW GUINEA: Madang: *Clunie LAE 63521*, 4.ii.1978, Sapi Catchment, 5° 13′, 145° 30′, 60 m alt., (LAE); *Schlechter 17627*, 29.iii.1908, Kani-Gebirges, 0° 50′, 133° 30′, 700 m alt., (P). Morobe: *Clemens 1699*, 25.i.1936, Sattleburg, 6° 30′, 147° 46′, 915 m alt., (L). Western Highlands; *Millar NGF 40815*, 23.i.1959, Baiyer River, 5° 35′, 144° 10′, 1220 m alt., (LAE). Central: *Burke s.n.*, (1897) between Owen Stanley range and the coast, (K). Northern: *Hoogland 3334*, 15.vii.1953, NW slope of Mt Lamington, 8° 56′, 148° 10′, (A, BRI, CANB, K, L, LAE). Milne Bay: *Brass 23950*, 10.viii.1953, Biniguni Camp Gwariu river, 9° 40′, 149° 16′, 200 m alt., (A, CANB, L, LAE, US); *Brass 24330*, 9.ix.1953, Baiawa, Moi Biri Bay, 9° 36′, 149° 28′, 25-30 m alt., (A, CANB, L, LAE, US); *Brass 27637*, 6.viii.1956, Misima island, 10° 36′, 152° 45′, 5 m alt., (A, L, LAE, US); *Chalmers s.n.*, 1878, 1880, ?Lorne Range, (MEL); *Hoogland 4349*, 21.vii.1954, Tapio, Cape Vogel, 9° 39′, 149° 53′, (A, BM, BRI, CANB, K, L, LAE, US); *Kanis 1095*, 1.vii.1959, SW of Nowata airstrip, 9° 59′, 149° 44′, 500 m alt., (CANB, LAE); *Lister Turner 13*, ix.1930, Fife Bay, 10° 36′, 150° 01′, (BRI); *Armit, s.n.*, 1884, Islands near the south east coast, (MEL).

SOLOMON ISLANDS: *Gafui et al BSIP 10800*, 12.ix.1968, Takwa area North Malaita Isl., 9° 10′, 168° 58′, (K, L, LAE).

Sect. 14 (subgen. *Leptostemonum* (Dunal) Bitter) **Torva** Nees, Trans. Linn. Soc. Lond. 17 (1834) 51.

Type species: *S. torvum* Sw.

Large *shrubs* or small *trees*, abundantly armed with prickles, indumentum of stellate hairs. *Leaves* (often large) entire or deeply lobed. *Inflorescence* many-flowered, peduncle branched several times individual cymes short. *Corolla* stellate, often white. *Anthers* lanceolate, opening by terminal pores, distal flowers may be male. *Berry* globose, yellowish, firm mucilaginous.

Species of this section are concentrated in tropical Central America. *S. torvum* described here is an aggressive weed of tropical areas and is now widespread. Only the weedy introductions occur in Australia and the presence of several native species in New Guinea is of phytogeographical interest.

56. **Solanum dammerianum** Lauterb. & Schum., Notizbl. Königl. Bot. Gart. Berlin 2 (1898) 147.

Type citation: "Ralum, auf dem Vulkan Wunakukur (Varzin) auf rotem, vulkanischen Lehm, bei 600 m (Dahl, blühend im Februar 1897)."

Type material: Holotype ?B (destroyed), no duplicates traced.

Derivation: The name commemorates C.L.U. Dammer (1860-1920) a German botanist and curator of the Botanic Garden, Berlin-Dahlem.

Solanum oligolobum Merrill & Perry, J. Arnold Arb. 30 (1949) 46-47.

Type citation: "Netherlands New Guinea: 9 km NE of Lake Habbema, *Brass 10876* (type), Oct. 1938, alt. 2650 m, sunny situation at base of landslip (large shrub with violet flowers)".

Type material: Holotype A!, photo ADW, isotypes BM!, BRI!, K!, L!, photos at ADW.

Derivation: The name refers to the few (large) lobes of the leaves.

Fig. 75. *S. dammerianum* Lauterb. & K. Schumann. Drawn from herbarium specimen grown from *Symon 10637* (ADW).

A *shrub* or small *tree* to 3 m tall, erect when young, branching above to a spreading top when mature; armed with scattered erect prickles to 5 mm long on lower stems, leaves of seedlings and juvenile phases, mostly absent from distal shoots and mature leaves, indumentum of stellate hairs (sessile or multiseriate-stalked porrect-stellate with central ray about equal to laterals) dense on all parts, newer growth often rusty, later growth drab green. *Leaf* lamina of juvenile phase large, to 20 x 20 cm, broad ovate, deeply lobed with 3-4 principal lobes on each side, sinuses cut 1/3-1/2 to mid rib, narrow, lobe apices acute or rounded, leaf apex acute, base cordate (basal lobes may overlap) oblique; petiole to 12 cm long, later leaves smaller and less deeply lobed, then to 15 x 9 cm, ovate to ovate-elliptic, up to 4 shallow lobes on each side or margin repand, lobes acute, sinuses rounded and cut 1/5 to mid-rib, leaf apex acute to acuminate, base rounded, may be oblique; petiole 2-4 cm long. *Inflorescence* a 1-2 branched, congested, corymbose cyme of 20-30 flowers; *peduncle* to 1 cm long to first branch, or 0 if flower basal; floral rhachis to 4 cm long; *pedicel* c. 1 cm long at anthesis. *Calyx*: tube c. 3 mm long; lobes triangular and with linear acumen 5 mm long. *Corolla* broadly stellate, c. 1 cm long. *Stamens*: filaments c. 1 mm long glabrous; anthers 4 mm long oblong-lanceolate, pores apical. *Ovary* 2 mm long, broadly conical glabrous; style 6-7 mm long, erect, glabrous; stigma shortly bilobed. *Infructescence* a corymbose truss of few to 30 fruits; pedicel to 2 cm long somewhat enlarged upwards; calyx lobes c. 1 cm long triangular; berry 1-1.5 cm diam. globular, first green then yellow orange to reddish, finally blackish-brown when over ripe, often wrinkled in dried herbarium specimens (cf. *S. torvoideum*). Two fruits from *Symon 10672* yielded 127 and 189 seeds respectively. *Seeds* c. 3 mm long, light brown. (Fig. 75; Map 6).

Notes

The loss of the type material makes application of the name tentative. The species is closely related to *S. torvoideum* from which it is not easily separated at times, but the leaves tend to be drab rather than intensely rusty and are often broader, the inflorescence more compact, the fruits larger and usually wrinkled when dry. Collectors notes describe the flowers as white (six), or blueish (three). However it is known that temperature influences the colour of some of the pale flowered species and flowers may be white under hot conditions and blue when colder a factor influenced both by time of year and altitude. The species also has affinities with the alien *S. torvum* but this differs in leaf and pubescence, its flowers are smaller and the fruits rarely as large or robust.

Specimens seen

LOMBOK: *Elbert 1062*, 5.v.1909, Psulgulan, Rindjani Vulkangebirge, 2200-2300 m., (L); *Elbert 1253*, 11.v.1909, Rindjani Vulkangebirge, N-Seite 1925-2000 m alt., (L).

SULAWESI: *Johansson et al. 419*, 17.iii.1981, c. Sulawesi, near river S of Tongoa, 1° 10′, 120° 10′, 650 m alt., (L).

IRIAN JAYA: Snow Mountains: *Versteegh BW 10459*, 24.vi.1961, Wiligimaan, Baliem, (A, L); *Eyma 4380*, 22.i.1939, Wissel Lakes 3° 50′, 136° 15′, 1750 m alt., (A, BO, K, L); *Hiepko & Schultze-Motel 1403*, 11.iii.1976, Eipomek-Tal 4° 25′, 140° 01′, (L); *Brass 11802*, Dec. 1938, Baliem River, 3° 55′, 138° 30′, 1600 m alt., (A, BM, BO, BRI, L, LAE).

PAPUA NEW GUINEA: West Sepik: *Henty et al. NGF 41599*, 17.x.1968, Oksapmin, 5° 20′, 142° 15′, 1585 m alt., (A, BRI, L, LAE). Madang: *Bulmer 139*, vii.1964, N Kaironk Valley, 5° 13′, 144° 23′, 1859 m alt., (K, LAE). Morobe: *Henty s.n.*, xi.1952, Kudjeru near Wau, 7° 30′, 146° 44′, 1829 m alt., (LAE); *Streimann & Kairo NGF 47570*, 14.iii.1970, New Yamap, 7° 08′, 146° 46′, 1371 m alt., (A, BFC, BISH, BO, BRI, CANB, K, L, LAE, US); *Symon 10637 & Kairo*, 30.v.1976, above Edie Creek 7° 21′, 146° 39′, (ADW, LAE); *Symon 13833*, 1.vi.1984, upper Salamaua track, 7° 03′, 147° 04′, (ADW, L, LAE, MO); *Symon 13851*, 3.vi.1984, Gumi, 7° 12′, 146° 25′, (ADW, K, L, LAE, MO); *Webster & Hildreth 15166*, 8.ix.1968, above Edie Creek near Kunai Creek, 7° 21′, 146° 39′, 1411 m alt., (CANB). Western Highlands: *Bowers 642*, 6.ii.1969, Alipe Nokeln, Kepaka, 5° 56′, 144° 01′, 2317 m alt., (LAE); *Symon 10701*, 27.vi.1977, Wahgi-Sepik divide, (ADW); *Vinas UPNG 4955*, 21.ii.1981, Bombo village, (L, LAE); *Vink 16545*, 9.ix.1963, Uinba Nona-Minj divide 6° 00′, 144° 18′, 1960 m alt., (A, BISH, K, L, LAE, P); Eastern Highlands: *Flenley ANU 2626*, 21.iii.1965, NE of Par Mission, Wabag 5° 26′, 143° 42′, (LAE); *Symon 10672 & Katik*, 21.vi.1977, Daulo Pass, 5° 59′, 145° 30′, (ADW); *Symon 13860*, 11.vi.1984, Reserve above Goroka, 6° 04′,

145° 24′, (ADW, L, LAE, MO); *Symon 13871*, 12.vi.1984, lower slopes of Daulo Pass, 5° 59′, 145° 30′, (ADW, K, LAE). Central: *Carr 13230*, 17.ix.1935, Boridi, 9° 05′, 147° 38′, 1280 m alt., (BM, CANB, K, L). New Britain: *Stevens & Lelean LAE 58207*, s.d., lower slopes Mt Lulula, 5° 43′, 151° 02′, 1065 m alt., (BRI, L, LAE). New Ireland: *Brown s.n.*, 1876, interior New Ireland, (MEL). Bougainville: *Kajewski 2080*, 13.viii.1930, Koniguru, Buin, 6° 46′, 155° 41′, 900 m alt., (BRI).

57. **Solanum torvoideum** Merrill & Perry, J. Arnold Arb. 30 (1949) 47-48.

Type citation: "British New Guinea: Central Divison, Mafulu, *Brass 5411* (type), Oct. 1933, alt. 1250 m, forest regrowths (tall bush or small tree; very few small prickles on branches; flowers white; fruit orange-brown)."

Type material: Holotype A!, isotypes BM!, BRI!, L!, NY! and photos ADW.

Derivation: the name refers to the similarity of this species to *S. torvum.*

An erect *shrub* or small *tree* 2-3 (-4) m tall, sparsely branched, armed with scattered prickles 3-8 mm long on stem, petiole and juvenile leaves, distal branches and leaves mostly unarmed; all parts with dense indumentum of stellate hairs (sessile or stipitate, porrect stellate with long central ray) general aspect rusty. *Juvenile leaf* lamina to 30 x 26 cm, broad ovate in outline with 3-4 principal lobes cut 1/3 to 1/4 way to midrib, lobes to 7 x 4 cm, broadly triangular, apex acute to obtuse, sinus rounded, main lobes with 1-2 broad shallow lobes; *petiole* to 11 cm long; *mature leaves* often geminate, the larger 13-20 x 8-11 cm, broad-elliptic with 2-5 shallow, or well developed lobes on each side, lobes 1-3 cm long, broadly triangular, their apices obtuse or acute, sinuses rounded and cut 1/5 to 1/3 way to midrib, lobing of late or distal leaves reduced, leaf base rounded to broadly cuneate, very oblique, apex acuminate, the second leaf similar, but about 3/4 the size of the larger; petiole 1.5-4 cm long. *Inflorescence* corymbose, of simple or divided cymes of up to 40 flowers from a mid-internodal position; peduncle to fork 1-2 cm, some inflorescences with a flower at base; floral rhachis 1-8 cm long; pedicel 10-15 mm long, densely pubescent with simple and reduced stellate hairs often with glandular tips. *Calyx*: tube 2-3 mm long; calyx lobes 2-3 mm long triangular with linear acumen 2-5 mm long. *Corolla* broadly stellate, white, lobes c. 7 mm long. *Stamens*: filaments c. 1.5 mm long, anthers 5 mm long, oblong-lanceolate. *Ovary* c. 2 mm long, with a few glandular hairs, style 7 mm long, erect, stigma capitate, shortly bilobed. Fruiting pedicels 1.5-2 cm long, stout, pubescent, thickened upwards; calyx lobes 1 cm long, triangular acuminate; *berry* 1-1.5 cm diam., globular, mucilaginous, yellow to orange-yellow, aging to brownish or almost black, up to 20 per truss. *Seeds* 2 mm long, orbicular-ovate, reticulation scarcely evident, yellow-brown. (Fig. 76; Map 15).

Chromosome number: n = 12 counted by Randell from *Symon 10669.*

Notes

Solanum torvoideum is one of the largest, most obvious and most frequently collected of all New Guinea species. The lowest recorded altitude is 457 m, the highest 2530 m and the mean of 26 records, 1430 m, shows it to be a species of moderate to higher altitudes. It has been collected most frequently from old garden sites, secondary forests and from regrowth along roadsides, less often from *Casuarina* fallow, stream bed gravels and fagaceous forest. The closest relative in Papua New Guinea appears to be *S. dammerianum* from which it is not easily separated. *S. dammerianum* has a sordid and drab appearance (not brightly ferruginous) the inflorescence and especially infructescence is more compact (the cyme branches not somewhat elongated). It is usually readily separated from *S. torvum* which has leaves more ovate, a drab aspect and different growth habit.

The section *Torvum* to which this and *S. dammerianum* belong has a centre of diversity in Central America, so that these two species are of phytogeographical interest. *S. torvoideum*

appears closely related to *S. hispidum* Persoon, but differs from it in the denser pubescence, smaller ovate-elliptic rather than ovate leaves, and acicular not broadly flattened bases of the prickles.

Fig. 76. *S. torvoideum* Merrill & Perry. Drawn from herbarium specimen *Symon 13864* (ADW).

Specimens seen

IRIAN JAYA: Vogelkop: *Koster BW 13829*, 17.v.1962, Minjambau, 1° 05′, 134° 05′, (BO, L, LAE). Jayapura: *Mayr 90*, 1.vi.1928, Ditschi, Arfak, 1200 m alt., (BO).

PAPUA NEW GUINEA: Madang: *Sayers NGF 21505*, 25.xi.1964, Moro, 5° 37′, 146° 28′, 1585 m alt., (BM, L, LAE). Morobe: *Henty NGF 11553°* , 6.x.1959, Boana, 6° 25′, 146° 50′, 914 m alt., (A, BM, BO, BRI, CANB, K, L, LAE, MEL, NSW); *Millar & Holttum NGF 15801*, 7.viii.1963, Road to Kauli Creek near Wau, 7° 20′, 146° 45′, 1067 m alt., (A, K, LAE); *Symon 13856 & Vinas*, 3.vi.1984, Manki 7° 11′, 146° 33′, 1400 m alt., (ADW, K, L, LAE, MO); *Symon 13855 & Vinas* , 3.vi.1984, Gumi, 7° 12′, 146° 25′, 1500 m alt., (ADW, L, LAE, MO). Western Highlands: *Bulmer 103717*, 24.vii.1964, Kaironk Valley, 5° 13′, 144° 23′, 1859 m alt., (K); *Robbins 79*, 27.vi.1957, Ogelbeng-Gumanch road, 5° 45′, 144° 17′, 1585 m alt., (CANB, L, LAE); *Symon 10693*, 25.vi.1977, Baiyer River sanctuary, 5° 33′, 144° 00′, (ADW); *Symon 10705*, 28.vi.1977, from Tabibuga to Jimi Valley, 1170 m alt., (ADW); *Wheeler ANU 6451*, 28.viii.1967, nr Kwip sawmill, 5° 47′, 144° 08′, (CANB, K); *Womersley et al. NGF 37340*, 4.xi.1968, near Kopiago, 5° 22′, 142° 33′, 1707 m alt., (L, LAE). Eastern Highlands: *Durand & Nelson 191*, 11.vii.1974, Daulo Pass, 5° 59′, 145° 30′, (LAE); *Kairo 443*, 11.iv.1982, Lapegu, 6° 06′, 145° 20′, (BFC, CBG, L, LAE); *Moi 188*, 21.iv.1977, Lufa, 6° 20′, 145° 15′, 1000 m alt., (BFC, K, L, LAE); *Robbins 808*, 5.ix.1957, Goroka, 6° 01′, 145° 11′, 2134 m alt., (A, BM, CANB, L, LAE); *Wheeler ANU 5987*, x.1966, Noriekora Valley, 6° 30′, 145° 75′, 1615 m alt., (CANB, L, LAE). Southern Highlands: *Gray NGF 8094*, 21.v.1956, Lake Kutubu, 6° 23′, 143° 19′, (A, BRI, CANB, L, LAE); *Powell UPNG 1705*, 26.vi.1972, Telabo area, 5° 52′, 142° 50′ 1585 m alt., (BISH, CANB, L, LAE, UPNG); *Schodde 2141*, 16.ix.1961, near Tage, Lake Kutubu, 6° 23′, 143° 19′, 823 m alt., (A, BRI, CANB, K, L, LAE). Gulf: *Brown 189*, s.d., Vicinity of Yule, 8° 00′, 146° 27′, 1219 m alt., (A). Central: *Armit 102*, 1883, Sogeri, (MEL); *Brass 5411*, x.1933, Mafulu, 1250 m alt., (BRI, BO, L, NY); *Carr 12748*, 29.vi.1935, Koitaki, 9° 24′, 147° 28′, 457 m alt., (BM, CANB, K, L, LAE); *Carr 13198*, 17.ix.1935, Boridi, 9° 05′, 147° 38′, 1280 m alt., (A, BM, K, L, NY); *Carr 15417* , 6.ii.1936, Isuarava, 8° 59′, 147° 43′, 1402 m alt., (A, BM, CANB, K, L, NY); *Guilianetti s.n.*, 1896, Neneba, Mt. Scratchley, 8° 43′, 147° 27′, 1219 m alt., (K). Eastern Highlands: *Symon 13864*, 11.vi.1984, 16 km after Kainantu, 12 km before Henganofi, 6° 15′, 145° 38′, (ADW, L, LAE, MO). Milne Bay: *Pullen 8060*, 18.viii.1969, Bonenau village, 9° 52′, 149° 23′, 1143 m alt., (CANB, L, LAE).

*58. **Solanum torvum** Sw., Nov. gen. sp. pl. prodr. (1788) 47.

Type citation: "Provenit in sepibus Jamaicae, Hispaniolae, Insulis Bermudensibus". Swartz, Florae Indiae Occid. 1 (1797) 456.

Type material: Not seen, possibly at S. For note on typification see Heine (1976:168).

Derivation: The name means savage, gloomy, grim and fierce and could refer to the drab aspect of the plant or the stout prickles on the stems.

A spreading or scrambling *shrub* to 2-3 m tall; prickles 3-7 mm long, slightly hooked, broad-based, scattered on stems, upper and lower leaf surface, main veins, sparse on aged and mature growth; all parts with indumentum of stellate hairs, (sessile to long multiseriate-stalked, porrect-stellate, with short or long central ray), sparse on upper surface, dense below, general aspect dark green, discolorous. *Leaves* variable in size, 10-15 x 8-10 cm, often smaller, broadly oval-ovate, with 7 broad lobes; lobes somewhat triangular, acute or obtuse, 3-4 cm long, sinuses rounded, cut about one quarter of way to midrib; leaf base equal or unequal, somewhat sagittate to auriculate; petiole 2-5 cm long. *Inflorescence* a compact, branched, many-flowered (50-100) corymb, at first terminal, later becoming lateral, upper and late season flowers may be male; common peduncle short, 1-2 cm long; pedicels 5-10 mm long, pubescent with glandular and stellate hairs. *Calyx* 3-4 mm long; lobes apiculate, 2-3 mm long. *Corolla* to 2.5 cm across, stellate, white, the lanceolate lobes acute or obtuse, 1 cm long. *Stamens*: filaments 1 mm long; anthers 6-7 mm long, attenuate. *Ovary* globose, pubescent; style 8-10 mm long. Fruiting pedicels 1-1.5 cm long, thickened below calyx which is not much enlarged; *fruit* 1-1.5 cm diam., globular, drab, yellow, few flowers set seed, produced in clusters of few to 10. *Seeds* 1.5-2 mm long, flat, drab brownish, slightly reticulate, (300-) 360 (-400) per fruit. (Fig. 77; Map 8).

Notes

This aggressive weedy species is widespread and generally found at low altitude, invariably below 1000 m and mostly from sea level to 300 m. It commonly occurs on disturbed sites such as old gardens, pastures, roadsides and waste places. The flowers are uniformly white and

Fig. 77. *S. torvum* Sw. Drawn from live plant ex *Symon 4755* (ADW).

the two records of yellow flowers (an uncommon colour in *Solanum*) surely refer to the prominent yellow anthers.

S. torvum has become a weed in many tropical areas. It is believed to have originated in the islands of the West Indies. It is listed and illustrated in Henty (1980).

Selected Specimens (65 collections seen)

IRIAN JAYA: None seen, but highly likely to be present.

PAPUA NEW GUINEA: Madang: *Hoogland 4845*, 2.vi.1955, near Biti Biti village, 5° 18′, 145° 46′, 3 m alt., (A, BRI, CANB, K, L); *Millar NGF 37690*, 12.vii.1968, Mis, Kaurius, 5° 40′, 142° 00′, (BRI, CANB, K, L, LAE); *Symon 13811*, 22.v.1984, near Baku village Gogol Valley, 5° 15′, 145° 35′, (ADW, L, LAE); *Womersley NGF 13459*, vi.1961, Gogol Valley, 5° 10′, 145° 25′, 61 m alt., (A, BRI, CANB, K, L, LAE). Morobe: *Hoogland 8853*, 1.v.1964, Mongi river N of Pindiu, 6° 29′, 147° 32′, 609 m alt., (A, BRI, K, L, LAE); *Millar NGF 22622*, vii.1966, Hopahandon, 304 m alt., (L, LAE); *Streimann & Kairo NGF 26020*, iii.1971, Manki village, 7° 11′, 146° 33′, 762 m alt., (A, BFC, BISH, BRI, K, L, LAE, NSW). Central: *Darbyshire 796*, 10.viii.1962, 1.5 miles E of Delena, 8° 51′, 146° 33′, 15 m alt., (A, BRI, CANB, K, L); *Forbes 10*, 16.x.1958, Sogeri, 7° 55′ 143° 27′, 609 m alt., (BM, L); *Millar et al, s.n.*, 15.iii.1971, Sirinumu Dam, 9° 25′ 147° 26′ 609 m alt., (UPNG, NSW); *Schodde 2826*, 27.viii.1962, Sirinumu 3 m S of Sogeri, 9° 26′, 147° 26′ 457 m alt., (A, BRI, K, L). Milne Bay: *Brass 28657*, 7.xi.1956, Woodlark Island, 9° 14′, 152° 57′ 100 m alt., (A, K, L, US); *Brass 28855*, 5.xii.1956, Dawa Dawa River, 10° 25′ 150° 29′, (A, K, L, US); *LeHunte s.n.*, 7.i.1882, Trobriand Island, 8° 40′, 151° 00′, (BRI, K). East New Britain: *Kingston 15*, s.d., Gazelle Peninsula, 4° 35′, 152° 00′, (CANB, LAE, NSW); *Millar NGF 40552*, 16.x.1968, Sali village, 5° 30′, 151° 30′ sea level, (A, BISH, BRI, CANB, K, L, LAE, NSW); *Stevens & Lelean NGF 58630*, 8.vi.1973, edge of Mengen massif, 5° 44′, 151° 48′, 885 m alt., (A, BRI, CANB, K, L, LAE); *Womersley NGF 3408*, 21.v.1953, Keravat, 4° 35′, 152° 00′, 121 m alt., (A, BM, BRI, K, L, LAE, NSW). West New Britain: *Buderus NGF 23938*, s.d., road to Kandrian, 6° 00′, 149° 35′, 152 m alt., (A, BRI, CANB, K, L, LAE); *Floyd NGF 3506*, 1.viii.1954, Galilo village, near Cape Hoskins, 5° 28′, 150° 34′, (A, BISH, BM, BRI, K, L, LAE, NSW); *Lelean & Stevens LAE 51317*, 23.ii.1971, Nuau logging area, 5° 02′, 151° 22′, (A, K, LAE); *Sayers NGF 21800*, 3.iii.1965, Fullerborn Harbour, 6° 06′, 150° 40′, 15 m alt., (A, BISH, BRI, CANB, K, L, LAE, NSW). New Ireland: *Coode et al. NGF 29781*, 7.ii.1967, Namatanai, 3° 38′, 152° 26′, sea level, (A, BRI, K, L, LAE). Bougainville: *Craven 89 & Schodde*, 24.vii.1964, near Koniguru, 9 miles N of Buin, 6° 46′, 155° 41′, 243 m alt., (BRI, CANB); *Nachman 472*, x.1971, Nissan Island, 4° 30′, 154° 15′, (LAE).

SOLOMON ISLANDS: Guadalcanal: *Whitmore BSIP 759*, 12.iii.1963, Lengakiki water catchment, 9° 30′, 160° 00′, (K, L, LAE); *Mauriasi BSIP 11209*, 19.ix.1968, Makina area, 9° 30′, 160° 00′, 3 m alt., (K, L, LAE).

Sect. 15 (subgen. *Leptostemonum* (Dunal) Bitter) **Melongena** Dunal, Hist. nat. *Solanum* (1813) 130, 208.

Lectotype species: *Melongena ovata* Mill. = *S. melongena* L. (Seithe, 1962).

Group *S. incanum*, Whalen (1984).

Woody *shrubs* rarely herbaceous, armed with prickles, indumentum of stellate hairs, sometimes glandular. *Leaves* often relatively large, entire, shallowly or deeply lobed, mostly ovate in outline. *Inflorescence* of one or few hermaphrodite flowers below few to many male flowers; peduncle and floral rhachis generally unbranched. *Corolla* rotate or broadly stellate, mostly purple. Anthers lanceolate, opening by small terminal pores; ovary and style with few stellate or glandular hairs, stigma generally bilobed. *Berry* globose, often yellowish relatively large, mostly glabrous, mucilaginous and rarely pulpy. *Seeds* discoid, pale or (in Australian species) black.

One species, *S. melongena* is widely cultivated as a vegetable and several others are weedy. Species of this section occur in Africa, India and Australia. The only one occurring in New Guinea is the widely cultivated egg plant.

*59. **Solanum melongena** L., Sp. Pl. (1753) 186.

Type citation: "Habitat in Asia, Africa, America".

Type material: Herb. Linn. 248.28 LINN; microfiche AD.

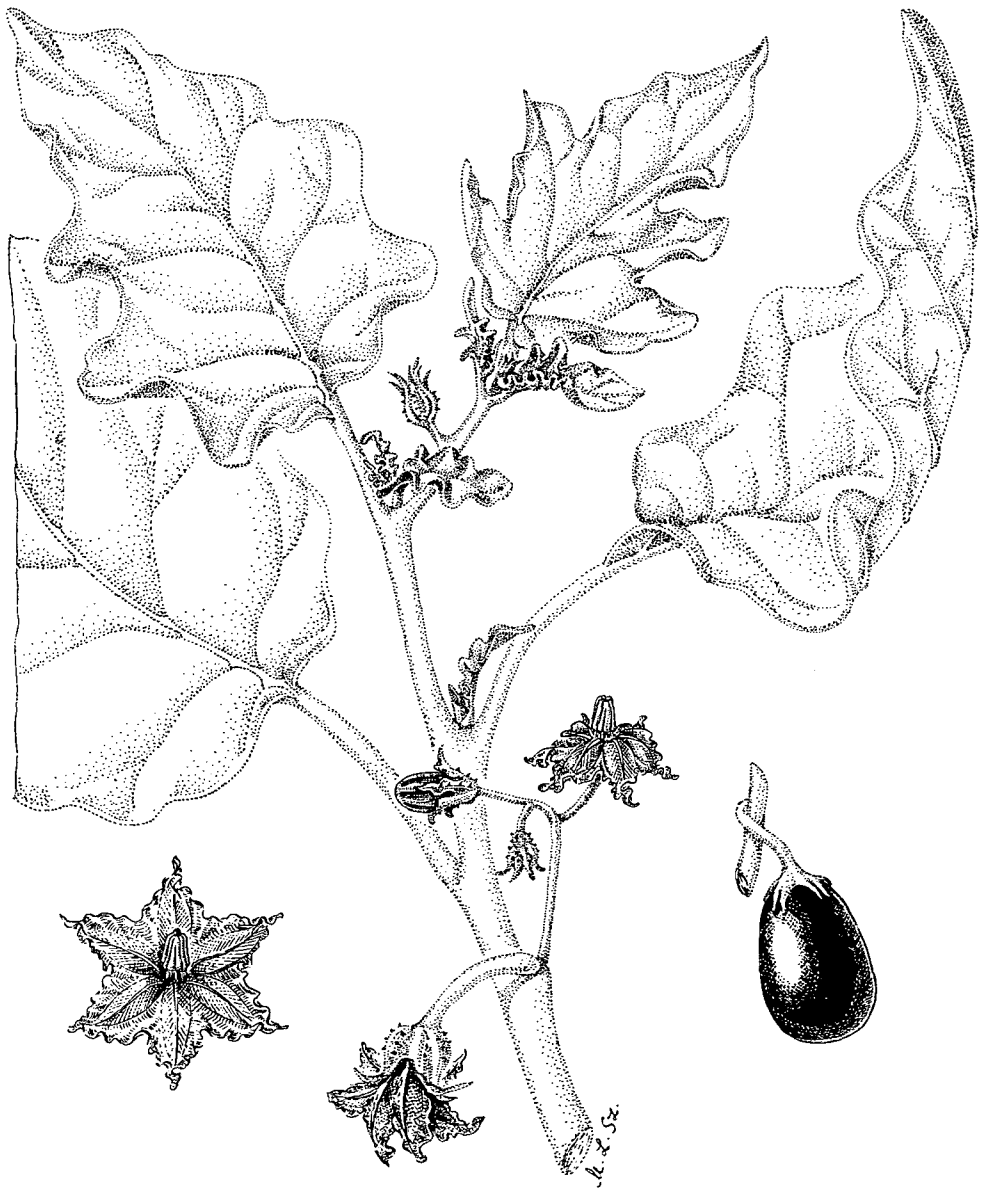

Fig. 78. *S. melongena* L. Drawn from live plant cultivated at Zenag, Papua New Guinea, no voucher.

Derivation: Etymology obscure, possibly from the Italian *melazana* meaning 'mad apple' a reference to toxic nature of some *Solanum* species.

An annual *herb* or short-lived soft-wooded *shrub* to 1 m tall; cultivated forms lack prickles (except for a few soft ones on calyx), elsewhere forms with prickles occur; all parts with indumentum of sparse or dense stellate hairs (sessile or stalked porrect-stellate), glandular hairs not obvious, aspect grey or purplish-green. *Leaf* lamina to 20 x 10 cm, ovate or ovate-oblong, entire or with 5-9 shallow sinuate lobes, lobes and sinuses rounded, base unequal; petiole 2-8 cm long. *Inflorescence* a single, large, hermaphrodite flower below a short raceme of few, smaller, male flowers; in domesticated plants male flowers may be lacking on some or all inflorescences; flowers frequently with 5-7 lobes and anthers. *Hermaphrodite flower*: pedicel 1.5-3 cm long, relatively stout, soon deflexed;*calyx*: tube 5 mm long; lobes 1-1.5 cm long, oblong-lanceolate, tapering into acumens 3-5 mm long, with a few soft prickles;*corolla* 3-4 cm diam., broadly stellate; *Stamens*: filaments 3-4 mm long; anthers 5-7 mm long, oblong, stout, erect; *ovary* pubescent at summit with stellate hairs; style 1-1.5 cm long, erect, stout; stigma terminal. *Male flower*: peduncle 2-4 cm long with 1-5 flowers; pedicel 1-1.5 cm long, slender; *calyx* tube to 5 mm long; lobes 5-8 mm long, triangular. *Corolla* 3-3.5 cm diam., broadly stellate, *filaments* 2-3 mm long; anthers 5-6 mm long, oblong, erect, *ovary*, style and stigma vestigial or absent. Fruiting pedicel massive, deflexed; *berry* 10-20 cm long, globose, obovate or oblong, glabrous, usually dark shining-purple, pale forms are known, flesh pale. *Seeds* 3-4 mm long, numerous, flattened, subreniform, pale yellow to light brown. (Fig. 78).

Chromosome number: n = 12, 18, 24 Fedorov (1969).

Specimens seen

IRIAN JAYA: Geelvink Bay: *Bruyn 429*, 1.ix.1915, Biak island, (BO). Mimika: *Warburg 21253*, 1889, Archip. Key (?Kai island), (A).

PAPUA NEW GUINEA: West Sepik: *Atastrip 58*, 1906, ?Pulu Fatimar, (BO, L); Morobe: *Symon 10649 & Kairo*, 30.v.1977, Bulolo 7° 15′, 146° 40′, (ADW, LAE).

Sect. 16 (subgen. *Leptostemonum* (Dunal) Bitter) **Stellatipilum** sensu Seithe, Bot. Jahrb. Syst. 81 (1962) 261.

Group *S. crinitum* Whalen, Gentes Herbarum 12 (1984) 246.

Large *shrubs* to tall *trees*; armed especially in juvenile phases less at maturity; *indumentum* of stellate hairs with coarse multiseriate stalks and reduced lateral rays. *Leaves*, in juvenile phases, large, shallowly lobed, later leaves broadly-ovate, ovate or obovate, sometimes decurrent on petiole. *Inflorescence* unbranched or bifurcate cyme, distant from leaves, plants strongly andromonoecious, buds much enveloped by bristly calyx lobes. *Corolla* large, showy, pentagonal-stellate, violet or lavender often fading to near white. *Anthers* long, tapering, sometimes stellate pubescent; gynoecia reduced in many flowers. *Berries* amongst largest in *Solanum* (to 10 cm diam.) globose drab-green. *Seeds* large.

According to Whalen *loc. cit.* a group of about 8 species mainly in north-western South America. Of these *S. grandiflorum* has been widely used in the tropics as an ornamental.

*60. **Solanum grandiflorum** Ruiz & Pavon, Fl. Peruv. 2 (1799) 35, pl. 168 fig. b.

Type citation: Dunal gives "In nemoribus imis et calidis Peruviae".

Type material: Not seen.

Derivation: The name refers to the large and showy flowers.

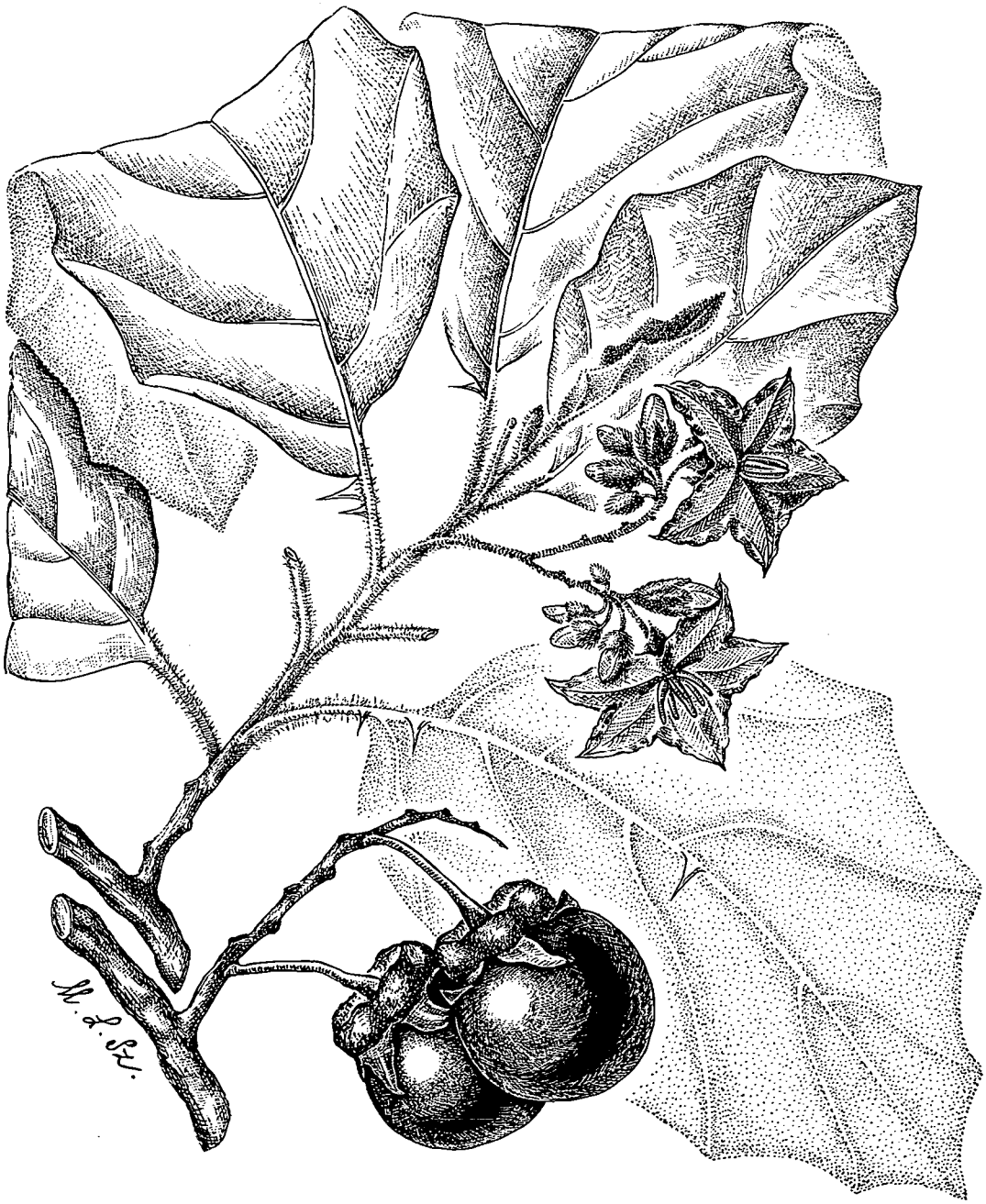

Fig. 79. *S. grandiflorum* Ruiz & Pavon. Drawn from herbarium specimen, *Symon 10623* (ADW).

Solanum macranthum Dunal, Syn. Sol. (1816) 43, no.267.

Type citation: "Hab. in Brasilia (v.s.h. mus. Par.)"

Type material: Not seen.

Derivation: The name refers to the large showy flowers.

Solanum wrightii Benth., Fl. Hongk. (1861) 243.

Type citation: "Hongkong, Wright".

Type material: Holotype K!, isotype GH! and photos ADW.

Derivation: The name commemorates Wright who made the type collection in Hong Kong.

A small spreading *tree* 4-5 m, trunk grey to 30 cm diam., armed with strong prickles to 1 cm long, straight or slightly curved with somewhat flattened base, scattered on petioles and lower leaf midrib, sparse or absent from stems; indumentum dense on leaves below with stipitate stellate hairs, leaves pubescent above with stout simple hairs, densely pubescent on the buds and inflorescence with long simple hairs (reduced stellate hairs) long stipitate stellate hairs and short glandular hairs; on stem pubescent with mixed simple and stipitate stellate hairs. *Juvenile leaf* lamina to at least 25 x 20 cm, broad ovate in outline, 3-4 lobes on each side, lobes to 6 x 3 cm, deeply or shallowly cut (halfway to midrib), sinus rounded, later leaves 13 x 11 cm lobes broader, leaf and lobe apex acute, base rounded to subcordate, very oblique, discolorous, general aspect dark, drab green, petiole 2-4 cm long with few prickles. *Inflorescence* a simple or divided cyme of numerous (to 50) flowers from a mid or upper internodal position; peduncle to fork 3-5 cm long, floral rhachis to 7 cm long, pedicel scars conspicuous, pedicel and buds conspicuously pubescent with long simple hairs; lower flowers hermaphrodite, upper flowers male. *Female flower* not seen. *Male flower*: pedicel 2 cm long; *calyx* lobes to 1.5 cm long deeply divided, long lanceolate with linear acumens, densely pubescent outside; *corolla* to 5-6 cm diam. broadly stellate, at first showy purple soon fading to pale blue. *Stamens*: filaments 2 mm long, anthers 15-16 mm long, attenuate; style and stigma 4-5 mm long, greatly reduced. *Fruit* in cluster of one to several berries; pedicel to 3 cm long; calyx tube enlarged to cover base of fruit, thickened and hardened to a raised, firm, rim-like structure, lobes to 1.5 cm long, triangular; *berry* 4-5 cm diam., slightly depressed globular, softening when ripe, skin firm, drab, blotchy yellowish-green when mature, finally drying a dark blackish-brown, pulp soft, drab green. *Seeds* 3-3.5 mm diam. discoidal, reddish-brown, reticulate, numerous, 258 seeds in one fruit counted. (Fig. 79; Map 14).

Notes

Possibly naturalised between Bulolo and Wau. Bentham when naming *S. wrightii* realised that it was not native to Hong Kong, but was unable to match it in the collections available to him. The large showy flowers with their rapid change of colour have made it a popular small tree for tropical gardening and it has been widely distributed.

Specimens seen

IRIAN JAYA: None seen.

PAPUA NEW GUINEA: Morobe: *Anon BFC 31*, 4.v.1968, Bulolo, 7° 12′, 146° 39′, (BFC); *Benjamin LAE 67854*, 12.vi.1977, Garaina, 7° 53′, 147° 09′, (BRI, LAE); *Henty NGF 16728*, 6.i.1964, Lae Bot Gard, 6° 45′, 147° 00, (BRI, LAE); *Stone 10226*, 15.v.1971, Garaina, 7° 54′, 147° 7′, 731 m alt., (LAE); *Symon 10623*, 17.v.1977, Lae Bot. Gard. 6° 45′, 147° 00′, (ADW, LAE); *Wiakabu & Umba LAE 70377*, 6.iv.1977, Lae Bot. Gard. 6° 44′, 147° 00, (BISH, BM, BRI, LAE, NSW, US); Eastern Highlands: *Symon 10670*, 21.vi.1977, Goroka, 6° 03′, 145° 24′, (ADW).

Species Excluded

1. *Solanum inaequilaterale* Merrill, Phillip. J. Science 1 (1906) 236, a species from the Philippines was attributed to New Guinea by Merrill & Perry, J. Arnold Arb. 30 (1949) 45-52. This was based on the collection *Brass 11590*, from Bele River, 18 km NE of Lake Habbema [Irian Jaya, Snow Mountains]. This has since been redetermined as affin. *S. dammerianum* Lauterb. & K. Schum.

2. *Duboisia myoporoides* R. Br., Prodr. (1810) 448. This species, native to eastern Australia and New Caledonia, was reported for New Guinea by Everist, "Poisonous plants of Australia" (1979) 451, and Barnard, The Duboisias of Australia, Econ. Bot. 6 (1952) 317. No specimens have been located collected in New Guinea. *Duboisia myoporoides* was introduced at various agricultural stations for cultivation, but did not succeed, (pers. comm. J.S. Womersley).

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Many people have assisted me in completing this work. Firstly, thanks must go to Aubeto Kairo and Paul Katik whose remarkable ability to find plants in the jungle welter has enriched the collections of so many botanists visiting Papua New Guinea.

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In Adelaide, J. Womersley (late of Lae) has been an unfailing source of information and advice. In this Institute, R. Pearce has curated collections and done the mapping, chasing numerous obscure localities. Mary Marlow assisted with the Latin descriptions.

The following principal herbaria have either been visited or have lent specimens—A, BFC, BH, BISH, BM, BO, BRI, CANB, F, K, L, LAE, MEL, MO, NSW, NY, P, RSA, UC, UPNG, US, WRSL.

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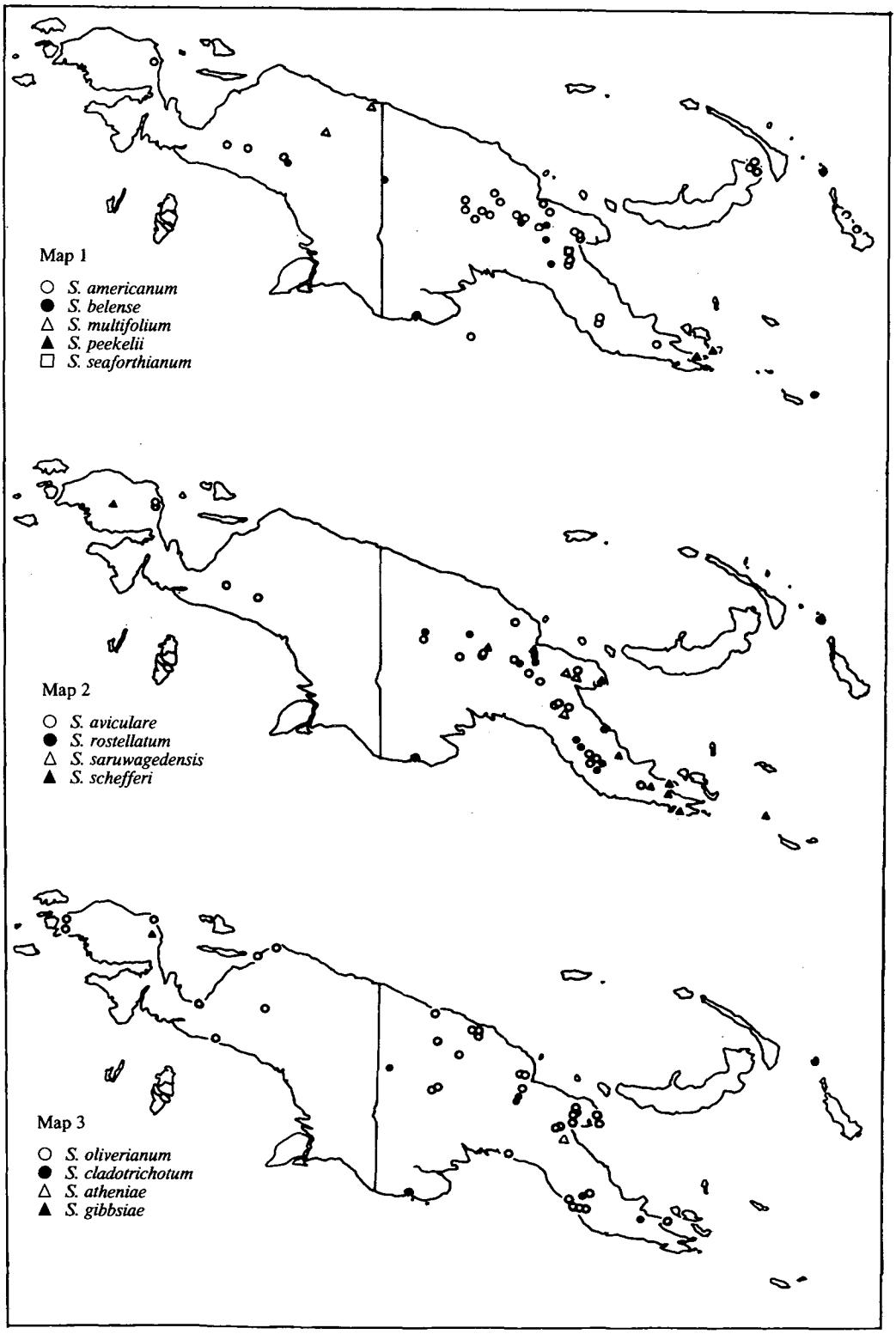
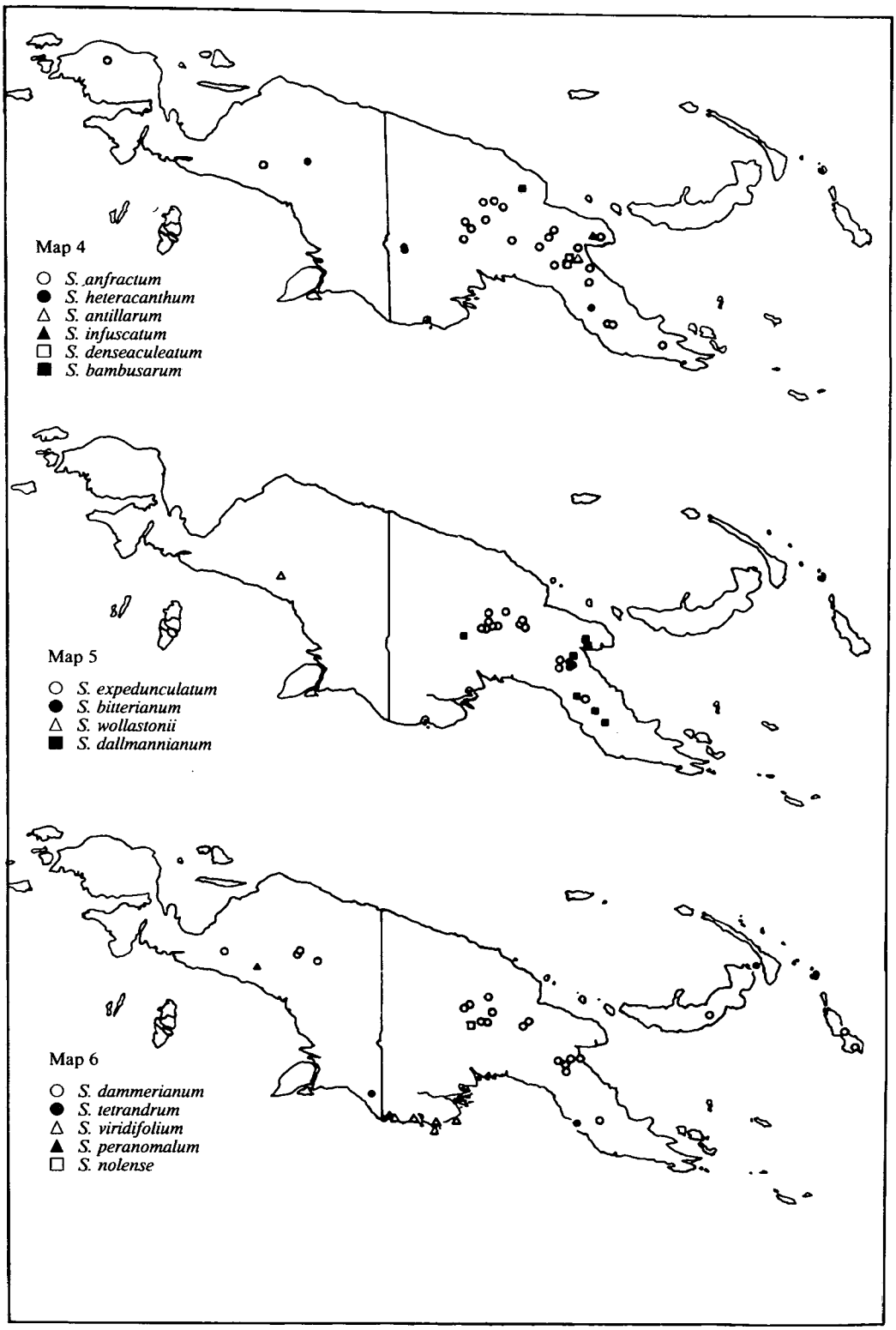
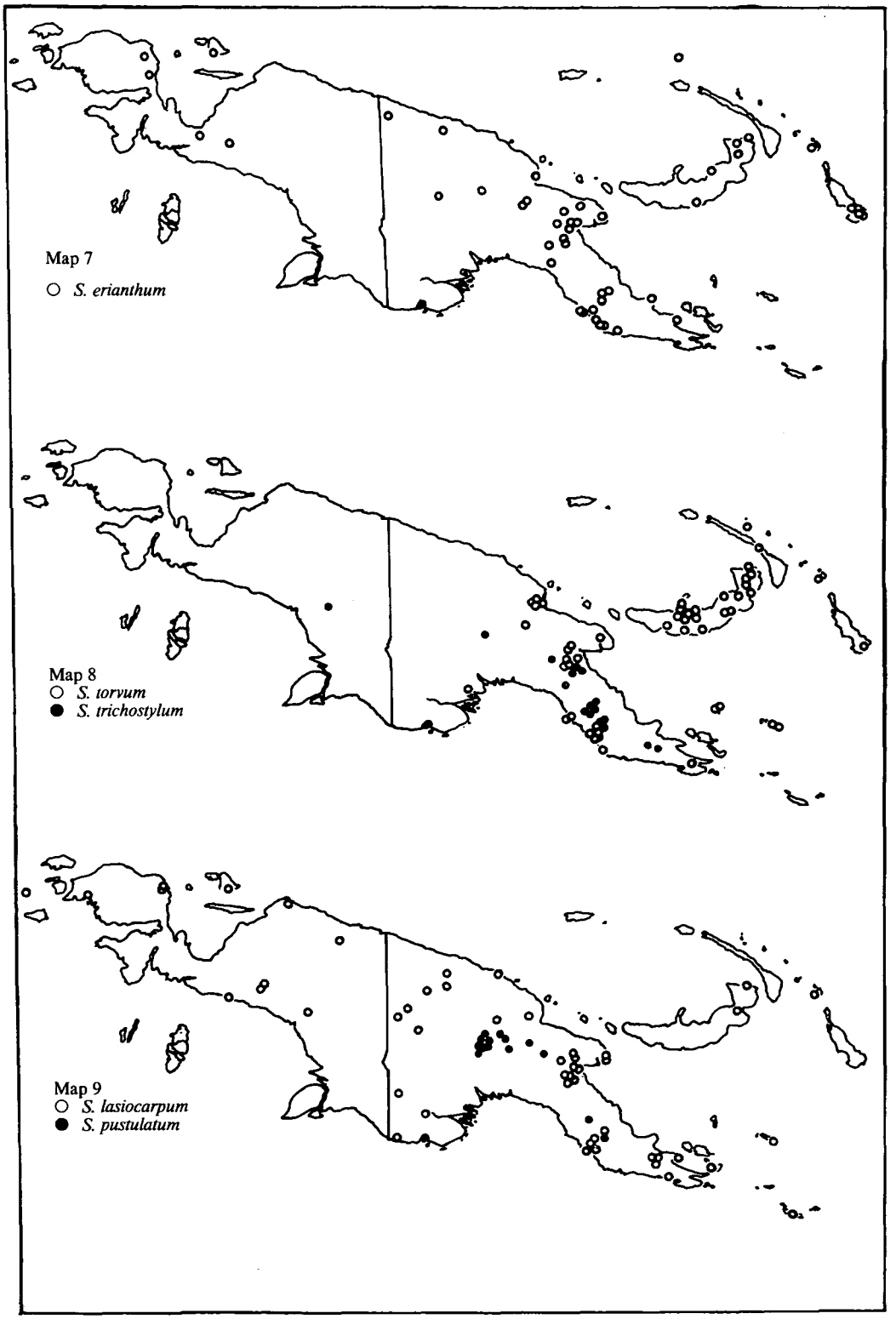
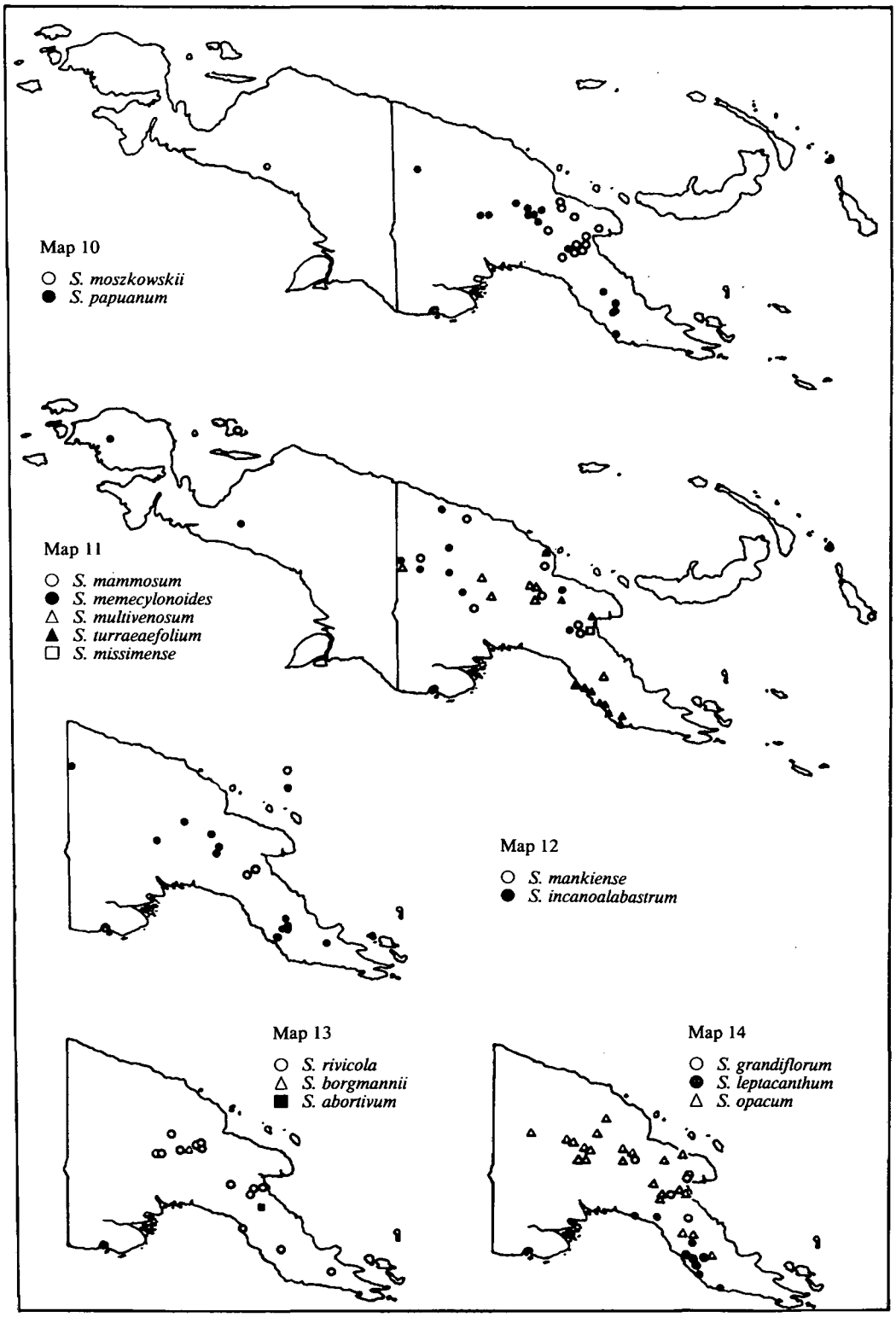
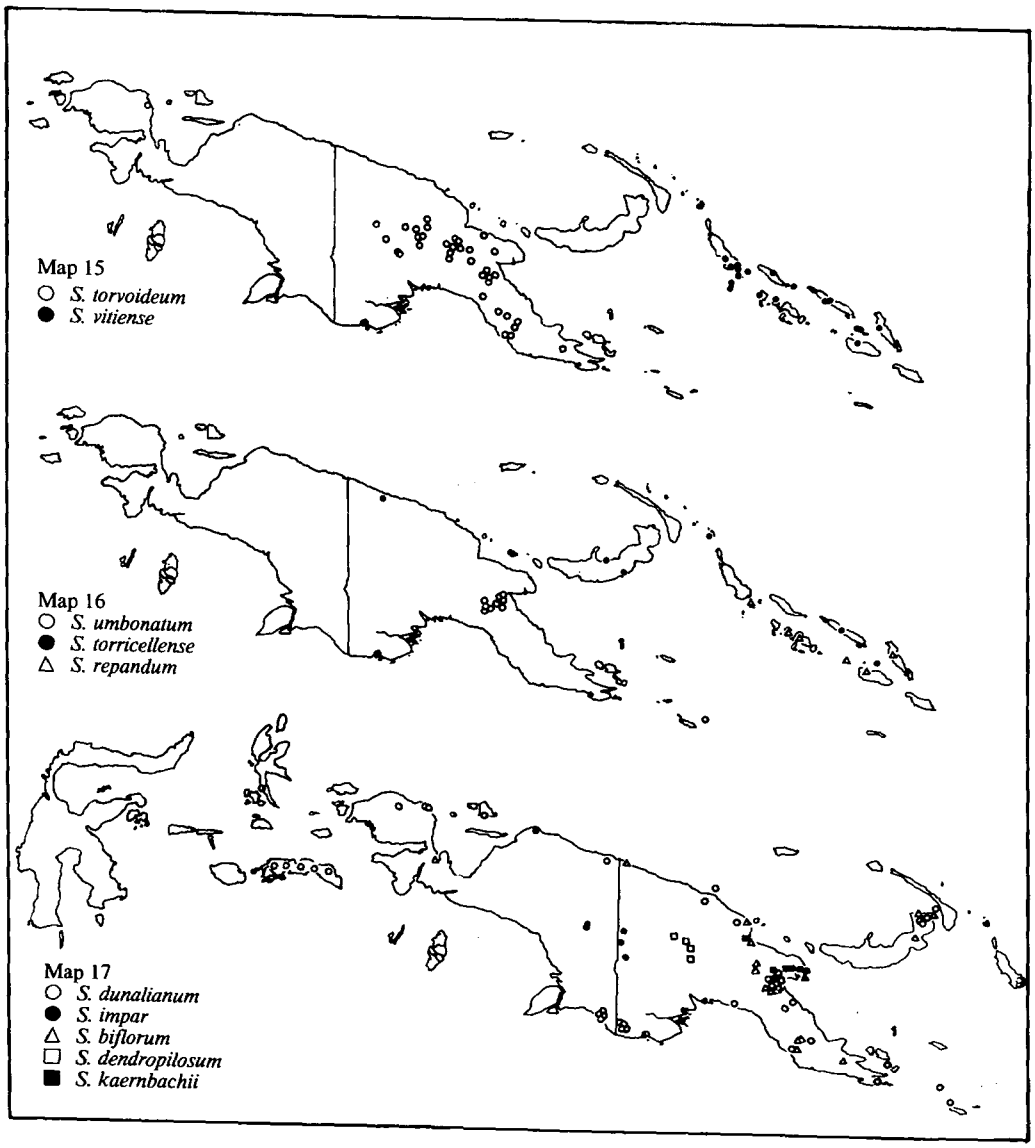

Map 1
○ S. americanum
● S. belense
△ S. multifolium
▲ S. peekelii
□ S. seaforthianum
Map 2
○ S. aviculare
● S. rostellatum
△ S. saruwagedensis
▲ S. schefferi
Map 3
○ S. oliverianum
● S. cladotrichotum
△ S. atheniae
▲ S. gibbsiae


Map 4
○ S. anfractum
● S. heteracanthum
△ S. antillarum
▲ S. infuscatum
□ S. denseaculeatum
■ S. bambusarum
Map 5
○ S. expedunculatum
● S. bitterianum
△ S. wollastonii
■ S. dallmannianum
Map 6
○ S. dammerianum
● S. tetrandrum
△ S. viridifolium
▲ S. peranomalum
□ S. nolense


Map 7
○ S. erianthum
Map 8
○ S. torvum
● S. trichostylum
Map 9
○ S. lasiocarpum
● S. pustulatum


Map 10
○ S. moszkowskii
● S. papuanum
Map 11
○ S. mammosum
● S. memecylonoides
△ S. multivenosum
▲ S. turraeaefolium
□ S. missimense
Map 12
○ S. mankiense
● S. incanoalabastrum
Map 13
○ S. rivicola
△ S. borgmannii
■ S. abortivum
Map 14
○ S. grandiflorum
● S. leptacanthum
△ S. opacum


Map 15
○ S. torvoideum
● S. vitiense
Map 16
○ S. umbonatum
● S. torricellense
△ S. repandum
Map 17
○ S. dunalianum
● S. impar
△ S. biflorum
□ S. dendropilosum
■ S. kaernbachii

An Index to Collectors of *Solanum* (including *Lycianthes*) from New Guinea

Jaya Names are presented in alphabetical order followed by collectors number or if that is lacking, by date or sheet number. The first name only of multiple collectors is given and institutional numbers are given as collectors number, e.g. *J.R. Croft & Y. Lelean NGF 34552* is given as *Croft 34552*. Institute numbers are listed in a separate index. The taxa are abbreviated as follows:

S. abortivum	abor	S. grandiflorum	gran	S. peekelii	peek
americanum	amer	heteracanthum	het	peranomalum	peran
anfractum	anfr	impar	imp	pustulatum	pust
antillarum	antil	incanoalabastrum	incan	repandum	rep
atheniae	athen	infuscatum	inf	rivicola	riv
aviculare	avic	kaernbachii	kaern	rostellatum	rost
bambusarum	bam	lasiocarpum	las	saruwagedensis	saru
belense	bel	leptacanthum	lep	schefferi	schef
biflorum	bifl	mammosum	mam	seaforthianum	sea
bitterianum	bitt	mankiense	mank	tetrandrum	tetr
borgmannii	borg	melongena	mel	torricellense	torr
cladotrichotum	clad	memecylonoides	mem	torvoideum	torvoid
dallmannianum	dall	missimense	miss	torvum	torv
dammerianum	dam	moszkowskii	mosz	trichostylum	tri
dendropilosum	dendr	multifolium	multif	tuberosum	tub
denseaculeatum	dens	multivenosum	multiv	turraeaefolium	tur
dunalianum	dun	nolense	nol	umbonatum	umb
erianthum	erian	oliverianum	oliv	viridifolium	vir
expedunculatum	exp	opacum	opac	vitiense	vit
gibbsiae	gib	papuanum	pap	wollastonii	wol

Aet 39/dun, *106*/erian, *218*/oliv, *395*/oliv, *407*/imp, *581*/las; *D'Albertis 1876*/las; *A.Allison 1321*/trich; *Anta 6/1*/las, *41*/las; *Anon BSIP112*/rep, *BFC31*/gran, *NGF3104*/umb, *NGF4408A*/pust-rostell; *W.E. Armit 1883*/las, *1884*/schef, *1894*/torvoid, *102*/torvoid; *W. Asigau 52*/dun, *58*/dun; *Atastrip 24*/bifl, *58*/mel, *108*/erian; *W.E. Armitage 1894*/trich.

N. Balat 39/dun; *M.M.J. Balgooy 986*/avic; *W.R. Barker 66672*/torv; *J. Barrau 1954*/rep; *E.J. Batari 817*/dun; *G. Bateson 121*/amer, *146*/las; *H.L. Bell 37*/torv; *W. Beer 7225*/viti, *7305*/las, *7306*/viti; *M.A. Benjamin 67842*/torv, *67854*/gran; *E. Betche 11*/dun, *59*/amer, *87*/dun, *88*/erian; *E. Borgmann ix.1960*/amer, *145*/amer, *169*/pap, *213*/borg, *245*/riv, *303*/avic, *322*/mixed papdam; *N.D. Bowers 257*/opac, *347*/pust, *437*/pust, *495*/opac, *616*/pust, *642*/dam, *796*/pust, *802*/exped; *W. Bradtke 38*/tetr, *62*/dun, *184*/dun; *L.J. Brass 529*/tetr, *581*/erian, *972*/lept, *1406*/erian, *3231*/torr, *3314*/viti, *3814*/lept, *3815*/dun, *4135*/rost, *4539*/trich, *4934*/trich, *5411*/torvoid, *6498*/vir, *6796*/imp, *7467*/las, *8514*/dun, *10764*/heter, *10876*/dam, *11223*/bel, *11277*/amer, *11505*/heter, *11802*/dam, *12907*/multif, *21729*/erian, *22030*/las, *22450*/trich, *22690*/trich, *22707*/trich, *22934*/opac, *23363*/borg, *23950*/schef, *23962*/las, *23978*/bifl, *24330*/schef, *24599*/incan, *25460*/peek, *27452*/dun, *27637*/schef, *28146*/las, *28494*/umb, *28657*/torv, *28809*/las, *28855*/torv, *30401*/rivi, *30725*/trich, *30845*/clad, *31172*/pap, *31613*/incan, *31690*/pap. *31807*/anf, *32309*/tur, *32400*/bel; *M.E. Britton 6*/las, *62*/dun; *E.S. Brown 876c*/torv; *F.H. Brown vi.1898*/lept; *G. Brown 1876*/dam; *H.A. Brown 65*/dall, *189*/torvoid, *256*/avic, *326*/rivi; *J.F. Brown 19217*/rep; *H. Broadhurst 20*/incan, *W.F. de Bruyn 319*/dun, *415*/mam, *429*/mel, *467*/dun; *J. Buderus 23913*/multiv, *23938*/torv; *R.N.H. Bulmer 11*/opac, *139*/dam, *103717*/torv; *D. Burke s.n.*/s.d. erian, las, schef; *Buwalda 4147*/schef.

K. Carman 5/dun; *C.E. Carr 11085*/tur, *11401*/tur, *11657*/lept, *11670*/oliv, *11680*/lept, *12747*/las, *12748*/torvoid, *12846*/erian, *12854*/incan, *12985*/amer, *13080*/pap, *13172*/lept, *13198*/torvoid, *13200*/rivi, *13230*/dam, *13611*/pust, *13737*/pust, *13738*/pust, *13967*/incan, *14091*/avic, *14357*/pust, *14366*/avic, *14752*/incan, *14955*/dall, *14991*/bifl, *15417*/torvoid, *15613*/las, *15672*/heter, *15675*/heter, *15868*/indet, *15946*/clad, *15955*/incan, *15965*/bifl, *16109*/clad, *16195*/oliv; *J. Chalmers 1878*/dun,/las,/schef,/trich,/tur; *L.E. Cheeseman 36*/erian, *65*/pap, *209*/heter; *J.R. Clarkson 3903*/vir; *M.S. Clemens 1289*/kaern, *1426*/kaern, *1528*/indet, *1627*/indet, *1699*/scheff, *1821*/oliv, *2217*/oliv, *5104*/mosz, *5193*/bifl, *5338*/erian, *7054*/avic, *7715a*/indet, *9386*/indet, *40753*/erian, *40900*/opac, *41609*/las; *N.M.U. Clunie 63521*/schef, *63522*/torv, *63523*/las; *R.B. Comins 235*/viti; *B. Conn 87*/las, *88*/amer, *142*/umb, *323*/amer, *444*/mosz, *451*/torv, *452*/torv, *483*/anf, *485*/dun, *486*/dun, *487*/dall, *489*/torv, *490*/amer, *491*/amer; *M. Coode 29781*/torv, *29876*/las, *32569*/dun, *32719*/dun, *32920*/opac; *L.A. Craven 89*/torv, *93*/erian, *714*/lept, *848*/oliv, *1258*/umb, *1482*/erian; *J. Croft 14979*/erian, *34532*/amer, *34552*/anf, *34800*/rost, *34817*/pap, *60818*/pust, *61684*/trich, *61900*/trich, *61910*/opac, *61993*/rost, *65003*/anf, *65050*/trich, *65694*/umb; *N.E.G. Cruttwell 795*/anfr, *1861*/dendr, *1871*/clad, *1878*/clad.

P.J. Darbyshire 796/torv, *1153*/erian; *E. Deveson 16434*/trich; *H. Dissing 2554*/torv, *2578*/torv, 2720/amer; *H.K. Durand 189*/erian, *191*/torvoid.

Hj. Eichler 18243/avic; *J. Elbert 1062*/dam, *1253*/dam; *F.B. Essig 55039*/torr; *P.J. Eyma 2131*/oliv, *2672*/oliv, *4380*/dam, *4505*/avic, 4553/avic, *4627*/erian, *4649*/amer.

M. Fallen 218/torv, *328*/las, *342*/erian, *374*/umb, *427*/indet, *534*/rivi, *582*/trich; *W.V. Fitzgerald 4*/erian, *12*/erian, *16*/peek, *87*/dun; *J.R. Flenley 2192*/opac, *2621*/multiv, *2626*/dam; *I. Flierl 1886*/las; *A. Floyd 3506*/torv, *6312*/opac, *6549*/torr, *7459*/bifl, *7509*/bifl; *H.O. Forbes 1885-6*/tur, *10*/torv, *882*/bifl; *D. Foreman 45516*/multiv, *45531*/trich, *45698*/viti, *45764*/imp, *48100*/infus, *60090*/lept, *60091*/torvoid, *60230*/erian, *60242*/bifl; *D.G. Frodin 661*/rost, *671*/exp, *730*/trich, *2169*/tetr, *3704*/tur, *32059*/exped.

I.H Gafui 10800/schef, *12869*/torr, *14730*/torv, *16450*/viti, *16787*/viti, *18862*/viti; *P. Ganguinan 58*/dun; *A. Gebo 1688*/oliv; *J.M. Geno 70*/las; *L.S. Gibbs 5974*/gib; *O. Gideon 76196*/vir; *Giffen 5*/torv; *E.T. Gilliard 13*/exped; *A. Gillison 130*/saru, *347*/incan, *348*/pap, *361*/anfr, *371*/rost, *410*/opac, *22120*/las; *A. Guillianetti*/1896/avic, dall, torvoid; *K. Gjellerup 375*/erian, *423*/dun, *613*/oliv, *651*/las, *696*/dun, *1190*/avic; *S. Glasse 123*/mosz; *A. Goldie 3*/erian, oliv; *E.C. Gray 8094*/torvoid, *8125*/incan, *12874*/las; *L.F. Green 1962*/avic; *P.J. Grubb 240*/rost, *364*/rost; *H.B. Guppy 109*/rep, *160*/viti, *314*/rep.

J. Hainsworth 133/amer; *J. Hansell 1968*/mam; *T.G. Hartley 10002*/erian, *10033*/anf, *10065*/oliv, *10078*/dun, *10136*/oliv, *10405*/las, *11362*/dall, *11428*/oliv, *11434*/umb, *11579*/torvoid, *11756*/umb, *12219*/erian, *12523a*/mosz,*13214*/anfr; *C. Hartmann 1887*/dun, *15*/amer; *T.E. Hays 83*/bel, *90*/opac, *128*/mosz, *165*/tuber, *246*/avic, *414*/torvoid; *A.W. Here 252*/las, *333*/dun; *E.E. Henty xi.1952*/dam, *300*/torv, *10667*/erian, *11553*/torvoid, *11583*/las, *11646*/torvoid, *11957*/turr, *16728*/gran, *29062*/trich, *29195*/anfr, *29203*/bifl, *29292*/bel, *29322*/bel, *41506*/opac, *41599*/torv, *41640*/rost, *41641*/avic, *42805*/imp, *49372*/vir, *49450*/las, *49646*/vir; *P.C. Heyligers 1164*/turr; *R.L. Hide 128*/opac, *458*/exped, *700*/anfr; *Hiepko 1403*/dam; *D.K. Holdsworth s.n. s.d.*/oliv, *10*/kaern, *22*/kaern; *M. Hollrung 38*/las, *776*/oliv; *B. Hooley 155*/opac; *R.D. Hoogland 3334*/schef, *3928*/erian, *3979*/clad, *4349*/schef, *4845*/torv, *4907*/oliv, *5112*/erian, *5318*/avic, *5803*/pust, *6014*/opac, *6054*/exped, *7291*/dendr, *7444*/opac, *8805*/oliv, *8853*/torv; *Hornibrook 185*/incan; *M.A. Hoyle viii. 1976*/turr; *P.F. Hunt 2835*/torr; *Hyn 342*/mem.

J. Ibali 9/torv; *S. Isles 33832*/las, *33899*/bifl, *34491*/las; *P. Ivalova 2260*/torv.

G. Jackson 103/amer; *M. Jacobs 9558*/anfr; *R.F. Janowsky 131*/oliv, *541*/dun; *H. Jensen 385*/torr; *R.J. Johns 47060*/riv, *47288*/erian.

A. Kairo 43/dun, *60*/amer, *62*/mosz, *67*/mank, *70*/mosz, *73*/mosz, *79*/mosz, *215*/torv, *283*/las, *292*/antil, *443*/torvoid, *513*/opac, *540*/mank, *762*/avic, *766*/dense, *27869*/bifl, *30692*/las, *30943*/kaern, *30983*/kaern; *S.F. Kajewski D*/viti, *1590*/dam, *1790*/dun, *1800*/viti, *1881*/mam, *1930*/viti, *2080*/dam, *2276*/erian, *2388*/viti, *2451*/viti; *C. Kalkman 3479*/multif, *3480*/multif, *3492*/dun, *3720*/dun, *4386*/oliv, *5217*/anfr, *5230*/mem; *R. Kanehira 11553*/erian, *12359*/oliv, *13888*/avic, *14127*/erian; *A. Kanis 1095*/schef, *1416*/anf, *1433*/incan; *P. Katik 23.iv.1977*/dall, *18.iii.1979*/umbon, *62167*/mam, *70804*/las, *70809*/dun, *70928*/bel, 70954/umb; *W. Kaudern 57*/dun; *E.T. Kenman i.1970*/rep; *F. Kere 4936*/viti, *5048*/torv, *5057*/viti, *5058*/viti; *K. Kerenga v.1980*/mosz, *viii.1981*/pust, *73982*/las, *74247/* torv, *77239*/sea; *J. Kingston 15*/torv, *C.B. Kloss xi.1912, xii.1912*/peran, *i.1913*/avic, *i.1913*/las, *ii.1913*/mosz, *Camp VIII-IX*/wollast, *18977*/indet; *J.W.R. Koch 382*/las, *383*/dun; *M. Koie 1483*/erian; *Kornassi 484*/oliv, *649*/oliv; *C. Koster 11054*/oliv, *13817*/erian, *13829*/torvoid, *13976*/las; *A. Kostermans 2047*/amer, *2704*/oliv; *M. Kuduk 12*/torv; *N. Kwapena 28*/torv, *92*/torv, *126*/torv, *1091*/torv, *1105*/dun, *1205*/tetr.

H.J. Lam 636/las, *706*/imp, *767*/oliv, *C.E. Lane-Poole 544*/avic; *Lauterbach 16*/erian, *417*/erian; *W.G. Lawes 1882*/torvoid; *G. Leach 3848*/lept; *Ledermann 6898*/las, *12606*/clad; *W.M.D. van Leeuwen 9884*/oliv, *10489*/amer, *10574*/anfr, *10586*/las, *11108*/imp; *G.R. LeHunte*/torv; *Y. Lelean 51317*/torv, *52534*/las; *P. Liahy 1976*/torv; *R. Lister-Turner*/erian, *13*/schef.

Macdonald/dun; *H.S. McKee 1358*/indet, *6356*/pap; *J.R. McAlpine 31*/torv; *McArthur 1956*/pac; *W. McGregor 1889*/dun, erian, turr; *H. Manner 7*/anfr, *351*/indet, *3007*/anfr; *R. Mauriasi 8109*/amer, *8491*/viti, *11209*/torv, *13463*/torr, *13601*/torr, *13952*/viti, *14089*/viti, *14154*/viti; *E. Mayr 90*/torvoid, *392*/oliv; *M.J. Meggett 25*/amer; *A.N. Millar 1016*/torv, *1207*/trich, *1249*/trich, *11795*/bifl, *13880*/dall, *14496*/erian, *15605*/las, *15801*/torvoid, *15825*/amer, *15961*/opac, *15997*/incan, *18664*/pust, *22538*/pap, *22622*/torv, *22645*/torv, *22741*/amer, *23144*/avic, *23260*/mixed oliv & kaern, *23365*/oliv, *23549*/clad, *23858*/oliv, *35176*/oliv, *37683*/erian, *37690*/torv, *38438*/rost, *40552*/torv, *40698*/multiv, *40708*/exped, *40709*/pap, *40737*/clad, *40815*/schef; *W. Moi 188*/torvoid, *25972*/torv; *V.W. Moll 9529*/bifl; *Morren 56*/mam, *58*/las; *C. Morrison 125*/torv; *J. Mukiu 66*/dun.

S. Nachman 161/erian, *308*/torr, *327*/las, *472*/torv, *524*/erian, *5258torr; T. Nagari 7314*/torv; *A. Nakisi 8013*/viti; *Nedi 494*/dun; *D. Nelson 191*/torvoid.

K. Paijmans 828/trich, *1308*/exped, *1331*/pust, *1888*/tur; *M. Panoff 27*/torv, *161*/erian, *318*/las, *335*/erian, *342*/mixed las-torv; *R. Parkinson 1885*/dun, *1901*/amer, *1901*/bifl, *1901*/dun, *1901*/erian; *D.R. Pleyte 476*/erian, *613*/schef, *623*/oliv, *633*/oliv, *671*/las; *J.M. Powell 1705*/torvoid; *T.K. Pratt 1076*/mosz; *A. Pulle 593*/trich; *R. Pullen 397*/pap, *449*/pap, *1118* dun, *1207*/tur, *1846*/oliv, *3546*/tur, *6011*/mosz, *6872*/tur, *8005*/amer, *8043*/anfr, *8060*/torvoid, *8374*/las; *M. Pulsford 109*/torv, *154*/torv.

E. Quisumbing 493/exped.

K. Rau 73/mosz, *100*/rivi, *150*/trich, *297*/torv, *380*/bifl; *J.C. Riley 45*/viti; *S. Reksodihardj 196A*/dun, *199*/dun; *C. Ridsdale 36896*/multiv, *36960*/trich; *R.G. Robbins 79*/torvoid, *198*/pust, *388*/opac, *666-7*/avic, *808*/torvoid, *1068*/anfr, *3179*/torvoid, *3216*/dendr; *M. v. Roemer 121*/las, *1063*/rost, *1269*/trich; *P. van Royen 3136*/las,

3594/oliv, *4553*/dun, *7256*/anfr, *7621*/oliv, *7716*/oliv, *8103*/torvoid, *10901*/trich, *11511*/pust, *16142*/saru, *18229*/pust, *18275*/pust, *20224*/trich, *30154*/trich; *Rutten 1813*/oliv, *2037*/oliv.

R. Saki 4587/erian; *M. Sands 272*/bifl, *333*/amer, *477*/torv, *507*/bifl, *1384*/torr, *2000*/torv, *2020*/torv; *W.S. Sayer 1887*/turr; *C.D. Sayers 19830*/mosz, *19832*/anfr, *19852*/rivi, *19896*/opac, *21222*/rivi, *21473*/amer, *21505*/torvoid, *21517*/mosz, *21800*/torv, *24160*/torv, *24265*/torr; *Schieffelin 8*/oliv; *R. Schlechter 13748*/bifl, *13749*/bifl, *13749*/dun, *16407*/amer, *17305*/bifl, *17339*/kaern, *17627*/schef, *17961*/mem, *18319*/oliv, *18427*/oliv, *20256*/mem, *20268*/torr; *H.P. Schlencker 1909*/turr, *13*/erian, *50*/tetr; *R. Schodde 1599*/incan, *2141*/torvoid, *2330a*/mam, *2758*/erian, *2826*/torv, *3938*/dun, *4094*/viti, *4244*/dun, *4625*/lept, *5015*/opac, *5705*/rost; *F.A.W. Schram 6110*/mem, *10620*/oliv, *10645*/bifl, *10744*/bifl; *B. Scully 128*/torv; *S. Sikavea 30887*/rivi; *D. Skerman 1954*/torv; *J.M.B. Smith 15257*/pap, *15352*/amer; *S.H. Sohmer 75332*/torv; *P.F. Stevens 51095*/exped, *54158*/avic, *54766*/umb, *55565*/rivi, *58207*/dam, *58630*/torv, *58631*/las, *58668*/bifl; *B.C. Stone 10162*/anfr, *10226*/gran; J. Street 165/las; *W. Street 351*/anfr; *H. Streimann 8383*/exped, *8467*/exped, *8473*/pap, *8498*/las, *9635*/umb, *21198*/dense, *24441*/anfr, *25853*/bifl, *25854*/bitt, *26020*/torv, *27523*/dun, *27634*/mosz, *27798*/avic, *34091*/clad, *35924*/mosz, *35988*/umb, *39463*/erian, *42460*/anfr, *44518*/opac, *45291*/multiv, *47570*/dam, *51786*/imp, *52624*/dun, *52968*/bel, *53892*/umb, *53987*/anfr; *D.E. Symon 10623*/gran, *10624*/amer, *10626*/trich, *10628*/opac, *10629*/avic, *10630*/umb, *10631*/mosz, *10632*/umb *10634*/bifl, *10635*/dun, *10636*/trich, *10637*/dam, *10638*/rivi, *10639*/opac, *10641*/amer, *10647*/torvoid, *10649*/mel, *10650*/las, *10651*/bitt, *10652*/bifl, *10653*/athen, *10655*/oliv, *10657*/torv, *10659*/oliv, *10660*/amer, *10662*/dall, *10664*/bifl, *10665*/amer, *10666*/oliv, *10667*/bel, *10668*/torvoid, *10669*/torvoid, *10670*/gran, *10672*/dam, *10673*/amer, *10675*/exped, *10676*/clad, *10677*/rost, *10678*/rost, *10679*/pap, *10680*/exped, *10681*/pust, *10683*/tuber, *10685*/torvoid, *10686*/dam, *10687*/pust, *10687a*/avic, *10688*/nol, *10689*/anfr, *10690*/rost, *10691*/dendr, *10692*/rivi, *10693*/torvoid, *10694*/indet, *10695*/pap, *10696*/rivi, *10697*/multiv, *10698*/rivi, *10699*/indet, *10700*/exped, *10701*/dam, *10702*/exped, *10703*/incan, *10704*/indet, *10705*/torvoid, *10706*/exped, *10707*/erian, *13800*/torv, *13801*/erian, *13804*/torv 13808/oliv, *13811*/torv, *13816*/mam, *13819*/antil, *13820*/amer, *13822*/umb, *13823*/mosz, *13824*/bifl, *13825*/exped, *13827*/umb, *13828*/mem, *13829*/umb, *13830*/bel, *13831*/sea, *13833*/dam, *13837*/miss, *13838*/miss, *13839*/torvoid, *13840*/abort, *13841*/indet, *13842*/dun, *13843*/mosz, *13844*/miss, *13845*/mosz, *13846*/mosz, *13847*/mosz, *13848*/mosz, *13849*/pap, *13850*/torv, *13851*/dam, *13852*/avic, *13853*/mosz, *13854*/mosz, *13855*/torvoid, *13856*/torvoid, *13857*/mank, *13858*/torv, *13859*/las, *13860*/dam, *13863*/mam, *13864*/torvoid, *13865*/bel, *13866*/clad, *13868*/pap, *13869*/rost, *13871*/dam, *13872*/torvoid, *13874*/pust, *13875*/pust, *13876*/pust, *13877*/ *13878*/opac, *13879*/pap, *13883*/pap, *13885*/rivi, *13888*/pap, *13889*/multiv, *13890*/pap, *13893*/pap, *13895*/umb, *13896*/oliv.

R. Teona 6362/viti; *J.E. Teysmann 7854*/dun; *S. Thomas 1168*/vir; *Townsend 55*/las, *177*/las.

J. Vandenberg 35007/exped, *39796*/riv, *39883*/pust, *40062*/opac, *42331*/torr; *P.F. Veldkamp 5495*/pust, *5601*/pap, *5812*/trich, *5950*/incan, *5957*/incan, *6790*/mem; *R.J. v. Velsen 1965*/amer; *G. Versteeg 1137*/imp, *1351*/imp, *8330*/las, *10459*/dam, *12516*/amer, *12682*/amer; *P. Vertenten 1924*/tetr; *A. Vinas 306*/oliv, *307*/kaern, *308*/kaern, *321*/mam, *962*/erian, *4938*/opac, *4955*/dam, *59477*/bel, *59502*/multiv, *59560*/incan, *59876*/anfr; *W. Vink 8850*/mem, *16311*/amer, *16545*/dam, *16847*/mem.

E.W. Waddell 2/amer; *Walker 903*/amer; *O. Warburg 21250*/bifl, *21251*/dun, *21253*/mel; *J.H.L. Waterhouse 31*/tetr, *61*/rep, *66*/viti, *76*/erian, *272*/viti, *298*/torv, *304*/erian, *342*/erian, *428*/erian, *446B*/erian, *691*/amer, *727B*/erian, *976*/erian; *G.L. Webster 15166*/dam; K. Weinland 35/erian, *133*/dun; *J. Wells 7565*/bitt, *7569*/bifl; J.M. Wheeler 5682/anfr, *5730*/amer, *5971*/pust, *5987*/ torvoid, *6194*/avic, *6291*/pust, *6451*/torvoid; *C.T. White 98*/erian, *216*/las, *282*/dun, *369*/torvoid; *T.C. Whitmore 776*/viti, *2437*/viti, *2567*/viti, *3081*/viti, *5483*/viti; *J.W. Wiakabu 70354*/torv, *70377*/gran, *70448*/erian, *70449*/lept, *70450*/dun, *70476*/bifl, *73343*/mam, *73480*/las, *73484*/mam; *A. de Wilde 427*/torv; *J.H. Willis 1975*/torv; *J. Womersley 3408*/torv, *4389*/pust, *4883*/pust, *5909*/trich, *6014*/anfr, *7131*/lept, *7601*/rivi, *8428*/rivi, *8678*/peek, *8786*/torv, *8787*/erian, *9002*/indet, *11021*/las, *13346*/amer, *13459*/torv, *13992*/pap, *15368*/multiv, *24678*/amer, *37073*/pust, *37098*/dun, *37289*/mem, *37340*/torvoid, *46444*/pap; *C.T. White 1921*/amer.

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