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)
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. deneaculeatum 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.

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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 dunalium* 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. ornans* Witasek, Rechinger 1777, Upolu, Samoa.
- *S. peekelii* Bitter, Peekel 523, Burgamata bei Namatanai.
- *S. balanidium* Bitter, Ledermann 11332, Hunsteinspitze.
- *S. kaernbachii* Lauter. & Schum., Kaeernbach 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. iorvum* 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 Pajimans (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. moszkowski*, *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 *Chalophaps 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.


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
2. Flowers not obviously tubular, rotate or bell shaped, or deeply divided ........................................ 7
3. Flowers 10-25 cm long, white, salmon or purplish ................................. 4
3. 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
5. 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
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
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.


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.


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: Heny NGF 49170, 27.v.1971, Aionura near Kainantu, 6° 15' 145° 55', 615 m alt., (LAE)

2. BRUGMANSIA Pers.


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.


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 NGF1478*, 15.i.1962, Nondugl, 5° 50', 144° 45', 1585 m alt., (LAE); *Hide 267*, 25.xi.1972, Vi 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).


### 3. CAPSICUM L.


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**

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


*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.


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

4. CESTRUM L.


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.


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, sparingly 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.


*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.


*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-loveate, 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.

6. DATURA L.


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 ellipsoidal, basifixied, dehiscing longitudinally. Ovary superior, 2-loccular or 4-loccular 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, placenta 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 Australasia. All species are toxic containing alkaloids and a number are agricultural weeds.


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. tuberculatns 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).

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7. **LYCOPERSICON** Mill.


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*.


*Type material*: not seen.

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 petiolar 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**


8. NICANDRA Adans.


*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 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 subglobose, 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.

9. NICOTIANA L.


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.


**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.

10. PHYSALIS L.


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


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, calycies, 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**


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


**Type citation:** "Habitat Lima. 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 purplish-brown blotches towards the base, swollen into shallow nectary pouches between the filaments and densely pubescent with pale yellowish dendritic hairs below the blottches 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* capitated, 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 4.5-mm, 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 Mtns, 5° 48', 146° 05', 1585 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', 146° 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. Tambitantis 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); Henty Laravita 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', 146° 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. Tambitantis nr. 5° 08', 142° 21', 220 m alt., (BFC, LAE). Eastern Highlands: Mowe 509, 13.vi.1975, Upper Komori, 6° 12', 146° 50', 1320 m alt., (BFC, LAE); Symon 13834, 1.vi.1984, Upper Salamaua track, 7° 00', 146° 00', (ADW); Womersley & van Royen NGF 5893, 30.vi.1954, Edie Creek, 7° 19', 146° 41', 1920 m alt., (BFC, BRI, L, LAE). Central: Carr 16504, 5.v.1936, Kokoda, 1200' alt., (L); Cheeseman 55, 5.v.1936, 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 spreading shallow roots. Leaves very variable, usually alternate, petiolate, simple and entire, or lobed, pinnatisect or impariplinuate. 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 opposite, 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 exerted; 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

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

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

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. infuscaturn*

   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

9. Leaves elliptic to ovate, never deeply divided ........................................ 12

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

11. Leaves entire or pinnatisect, plant not tuberbearing ........................................ 10

12. 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*

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. notense
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
Solanaceae of New Guinea

27. S. mammosum
- 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

29. S. lasiocarpum
- 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

30. S. grandiflorum
- Ovary and fruit densely pubescent, flowers stellate, white

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

32. S. atheniae
- Upper leaf hairs with long central ray; aspect leaf purple below, fruit solitary

33. S. atheniae
- Upper leaf hairs without long central ray, aspect leaf rusty or drab; fruits several

34. S. atheniae
- Leaves broad ovate; aspect drab, somewhat discolorous; ripe fruit yellowish green to overripe brown; weedy

35. S. atheniae
- Leaves broad lanceolate, aspect rusty or drab, scarcely discolorous, ripe fruits orange-red; not weedy

36. S. dammerianum
- Dried fruits wrinkled, 1-1.5 cm diam.

37. S. dammerianum
- Dried fruits smooth, 1 cm diam.

38. S. dammerianum
- Tomentum obvious at least below

39. S. dammerianum
- Tomentum sparse and confined to young tips, buds

40. S. dammerianum
- Stem prickles hooked or curved

41. S. dammerianum
- Stem prickles straight

42. S. dammerianum
- Inflorescence branched, subpaniculate when well developed; berry ovoid; relatively large scrambler

43. S. dammerianum
- Inflorescence simple, cymose; berry globular; shrubs

44. S. dammerianum
- Prickles abundant on most parts

45. S. dammerianum
- Prickles sparse, hooked on stem, straight on leaves

46. S. dammerianum
- Tomentum of mostly glandular hairs, stellate hairs not conspicuous, minute and confined to young leaf tips

47. S. dammerianum
- Stellate hairs abundant or sparse, glandular hairs not conspicuous

48. S. dammerianum
- Densely pubescent with glandular hairs; leaves often paired or ternate

49. S. dammerianum
- Scattered glandular hairs; stems densely prickly; leaves abundantly prickly above and below

50. S. dammerianum
- Tomentum abundant above and below

51. S. dammerianum
- Tomentum sparse on one or both sides of leaf

52. S. dammerianum
- Peduncle generally less than 1 cm long; inflorescence 5-25 flowered

53. S. dammerianum
- Peduncle generally present and >1 cm long; aspect drab, not usually intensely rusty, tomentum often sparse above

54. S. dammerianum
- Flowers white; pedicel of lower fruit 6-8 cm long

55. S. dammerianum
- Flowers purple

56. S. dammerianum
- Tomentum abundant above and below

57. S. dammerianum
- Tomentum sparse on one or both sides of leaf

58. S. dammerianum
- Peduncle generally present and >1 cm long; aspect drab, not usually intensely rusty, tomentum often sparse above

59. S. dammerianum
- Tomentum intensely rusty

60. S. dammerianum
- Tomentum pale yellowish green

61. S. dammerianum
- Tomentum dense below, sparse above

62. S. dammerianum
- Tomentum sparse above and below

63. S. dammerianum
- Inflorescence from upper internodal position

64. S. dammerianum
- Inflorescence from sub-axillary or mid-internodal position

65. S. dammerianum
- Adult leaves >5 cm long, lobes developed; prickles mostly >1 cm long

66. S. dammerianum
- Adult leaves <5 cm long, entire or lobes obscure; prickles to 5 mm long

67. S. dammerianum
- Stem densely prickly

68. S. dammerianum
- Stem sparsely prickly

69. S. dammerianum
- Leaves often paired

70. S. dammerianum
- Leaves solitary
55. Inflorescence congested with numerous (>30) flowers; leaves somewhat rugose above .......................... 50. S. manikiense
   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. iturraeaefolium

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. pekelei
   Leaves broad lanceolate or elliptic, mostly >3 cm wide ........................................ 63

63. Peduncle and fruiting pedicel relatively long c. 3 cm ....................................... 34. S. dallmanianum
   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. incanoalabasstrum

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. hiflorum
   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. cladotrichosum

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. mosekowskii
   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


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.


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.


Type citation: not seen.

Type material: BM!, photo ADW.

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


Type citation: “Nordöstl. Neu-Guinea: Auf frisch gebrannten Flächen unweit Kehl, etwa 180 m ü.M. (R. Schlechter n. 16407!—blühend und fruch tend 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 spreading, 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 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 3.6 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 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)


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


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


**Type citation:** "Nordöstl. Neu Guinea: Ssgaun 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.

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

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.


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 c. 1 mm long. Inflorescence a condensed simple cyme of 10-12 flowers opposite the leafy node; peduncle 0-5 mm long, floral rachis 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 rachis 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.

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


Type species: Solanum biflorum Lour.

Herbs or soft woody 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.


Solanum decernentatum 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 & Cairo (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: *Schum BW* 10645, 24 ii 1962, Wondiwoi mountains, 3° 00′, 134° 40′, 300 m alt., (ADW, BISH, L); *Schum BW* 10744, 28 ii.1962, Wondiwoi mountains, 3° 00′, 134° 40′, 300 m alt., (ADW, L, LAE); *Aastrop* 24 s.n., s.d., North New Guinea, (L).

PAPUA NEW GUINEA: West Sepik: *Wisakabu & 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, Djamun, 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 vii.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, BFC, BO, BRI, CANB, K, L, LAE); *Kairo & Symon 10652, 1 vii.1977, Stoney Creek, base of Mt Missim, (ADW, BRI, K, LAE); *Miliar NGF* 11795, 3 ii.1960, Oomsis Creek, 6° 45′, 146° 45′, 300 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, BRI, CANB, K, L, LAE); *Symon 10634, 29 vi.1977, Bulolo 7° 11′, 146° 39′, (ADW); *Symon 10664 & Katik, 16 vi.1977, Upper Sankwept, 6° 30′, 147° 00′, (ADW); *Wells* 7569, 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); *Foreman & Vinas LAE* 33899, 16 ix.1973, NE Nanumu village, 9° 05′, 147° 34′, 450 m alt., (BRI, CANB, K, L, LAE); *Stevens & Lelean NGE 36868, 9 vii.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 unduique. *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 0.5-1.5 mm longis sub margine. *Corolla* circa 1.5 cm diam. late stellata alba aut violacea glabra; *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. *Semina* 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, vermiciform, 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. 6. Holotype of *S. hitterianum* Symon (Symon 10651, ADW).

Fig. 7. Holotype of *S. dendrophiloscum* Symon (Hoogland & Schodde 7231, CANB).

_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 vermiciform axis, rarely cauliflorous. _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.


_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.


(_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. cladoirichotum_ 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.

**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).


**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.

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

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.


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 pulvinus 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.


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Fig. 10. *S. cladotrichotum* Bitter. Redrawn from original figure, Bitter (1917) 97, Fig. 3.
Solanum dendropilosum Symon sp. nov.

Frutex effusus aut scandens, internodiis circa 1.5 cm longis. Innermis, pilis densis dendriticis. Folia geminata inaequalia; major 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.


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.


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 vermiciform 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


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); Henry & 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).


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.


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 Pl, photo ADW.

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


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. impur* Warburg. Drawn from herbarium specimen, Streimann & Kautik 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', 30m alt., (BISH, BO, CANB, K, LAE); Kairo & Streimann NGF 30943, 30.xi.1967, Sankwep logging area, 6° 30', 147° 10', 30 m alt., (BISH, BO, CANB, K, 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).


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).


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.


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

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Fig. 13. *S. kaernbachii* Schum. & Lauterb. Drawn from herbarium specimen *Kairo & Streimann NGF 30943* (BRI), fruits from *Kairo & Emos NGF 30983* (CANB).
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Type collection: Holotype ?B (destroyed), no duplicates traced.

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


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 abundant. 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


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

*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.


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

*Type material:* Holotype BM! and photo ADW.


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


*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 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’,

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

*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 acumen. *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.
Fig. 16. *S. multifolium* Merrill & Perry. Drawn from herbarium specimen, *Kalkman BW 3479* (LAE).
**Rodatz & Klink 158, Ramufluss am 30 Juni 1899.**

Type collections: B (destroyed), isotypes Hollrung 776, K!, PI, L!, MEL!; Lauterbach 2861, WRS!, 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.


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).


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 vermiciform 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, Hatoemet 73° 50', 129° 00', sea level, (BO, K).

**IRIAN JAYA**: Vogelkop: *Koster BW 11054*, 25.ii.1961, Masi 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*, 20.viii.1948, Sorong near Klamono 1° 08', 131° 28', (A, BO, K, L); *van Royen & Sleumer 7621*, 20.viii.1961, Bamfot village, 850 m alt., (A, BO, CANB, L, LAE); *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° 08', 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).

Solanaceae of New Guinea


**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; major ad 7 x 3 cm ellipticum conacese acuminatum, petiolo 5-10 mm longo; minus ovatum ad 5 x 3 mm subseissile. **Flos** solitarius axillaris (rarium duo) forasse dioecius; pedicellus ad 2.5 cm longus; **calyx** 3-5 mm longus, cupulatus integer; **corolla** stellata lobi 9-10 mm longis purpureis; **fructus** circa 1 mm longa; antherae 6-7 mm longae linearlanceolatea; **ovarium** 3-4 mm longum ovatum; **stylus** 7 mm longus erectus; stigma 1 mm longum bilobum; **fructus** ovoideus, stylo, stigmatem vestigiobus. **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 3.3-3.5 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.

Fig. 19. *S. pustulatum* Symon. Drawn from herbarium specimen, *Womersley 4883* (CANB), fruit from *Carr 13738* (CANB).
Fig. 2. Holotype of S. umbonatum Symon (van Royen NGF 18229, BR1).

Fig. 20. Holotype of S. pseudolugum Symon (van Royen NGF 18229, BR1).

**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, deciduous on style, apically 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.


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. **Inflorescencia** fasciculata 5-10 floribus. **Flores** 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 ellipticas crassis; filamenta circa 1 mm; antherae 3.5-4 mm longae oblongae; ovarium stylus stigma vestigialia. **Flores** 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, papilllose hairs (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, interascal 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.


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.


*Type citation:* “Savaii : Ueber Aopo, Sept. 1894 (n. 58 a 3). Upolu : Wald am Samea-Berg, Sept. 1893 (no. 58 9); Mulifanua-Ur-Wald, Oct. 1893 (no. 78 9).”

*Type material:* Holotype ?B (destroyed), isotypes at K two sheets, one with the label “Flora Samoënsis / No. 58 / Brachistus pacificus Reinecke / Upolu 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* Witsak, 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, pales 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.


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).


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

Short lived, soft-woodyed *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 scorpoid 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.


*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-woodyed *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 scorpoid 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 rachis 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 ellipsoidal, 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 faceted, 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*, Keglsulg 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. *Archaeosolanum*, *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**


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 dubius, alia 10-14 x 1.5-2.5 cm lanceola acumina, petiolo 1.5-2.5 cm longo. *Inflorescentia* cymosa brevis, interdum flos solitarius; pedunculus c. 15 cm; pedicellus 1.5-3 cm; *calyx* tubus c. 3 mm longus lobis 2 mm rotundatis, acuminis 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 ellipiticis, 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 subglobose. 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 globose, 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.

Fig. 27. *S. multivenosum* Symon. Drawn from live plant ex *Symon 10697* (ADW).
Fig. 28. Holotype of *S. multidendron* Symon (Symon 10697 & Kurz, ADW).

Fig. 29. Holotype of *S. wheniae* Symon (Symon 10653 & Kurz, ADW).


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.


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 rachis 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 rachis. 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.

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

*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 seafortianum* 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., globose, 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).

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


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

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


*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.


*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*


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

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

Type species: S. lasiocarpum Duna!


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 hermaphroditis infra et floribus masculis supra (usque 6-8 flores). Flos hermaphroditus:pedicellus 5-6 mm, calyx tubus brevis aculeatissimus acuminis 20 mm longo; corolla stellata lobis 20 x 4 mm extra hirsuta; filamenti 0.5 mm; antherae 7-7.5 mm angustatae supra, subaggitatae infra; ovarium 3 mm longum supra pubescens; stylus 7 mm longus. Bacca non visa. Flos masculinus: pedicellus 2-3 mm, calyx tubus circa 3 mm lobis late triangularibus acuminis lineari 4 mm. Corolla stellata lobis 11 x 2.5 mm extra hirsuta purpurea, filamenti circa 1 mm, antherae 7 mm attenuatae. 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.


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


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 multiserrate-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 capitulate, 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.x.1944, Biak, 0° 10', 136° 05', 10 m alt., (F); Versteegh & Vink BW 8330, s.d. Biak 1° 10', 136° 05', (CANB, L, LAE). Jayapura: Gijlerup 651, 30.viii.1911, Arso 2° 40', 139° 33', (BO, L); Lam 636, 16.vii.1920, Mamberamo, 1° 32', 137° 53', (A, BO, L); Snow Mountains: Luewen 10586, x.1926, Nassau mountains, 4° 30', 138°, (BO, L); Kloss i.1913, Camp i, Otakwa river to Sukarno (Mt Carstensz) mountain 4° 05', 137° 09', (BM). Mimika: Act 581, 27.vii.1941, Tarera near Oeta 4° 33', 136° 03', (BO, K, L).


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.


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 multisierate-stalked or sessile porrect stellate hairs with well developed central cell) upper leaf surface with long simple hairs

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Fig. 36. S. repandum 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.


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 Vaccinioidea.
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, margin minime repando; petiolus 1-2 cm longus. *Inflorescentia* flō solitarius subaxillaris et pedicellaris; pedicellus 1.5-2 cm tenuis, erectus; *calycis* lobi 2 mm longi, triangulares acuminé 1-2 mm longo. *Corolla* stellata lobis 1.1 cm longis lanceolatis purpurea; filamenta 1 mm longa glabra; antheræ 5-6 mm longæ lanceolæae; *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; antheræ 5-7.5 mm longæ 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* Synon. 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 1.5 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, smallernate 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, stigma globose. Fruit: 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

Twenty-six 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


Fig. 40. Holotype of *S. anfracum* Symon (Kantis 1416, CANB).

Fig. 41. Holotype of *S. horgmanii* Symon (Borgmann 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 minuis brevisibus, ad spectu generali discolori. Folia alterna, petiolata; lamina ad 10 x 7 cm, ovata-acuminata, in utroque margine duoibus lobis triangularibus acutis; apex folii acuminatus; petiolus circa 3 cm longus. Inflorescentia cymosa conferta 3-4 floribus, ex internodio superiore oriebat; 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, extrinseca 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 2:3 (L).
**Type Citation:** Borgmann 213, 29.ix.1960, Komanemambino, ca. 3000 m [=Komani-mambulo, 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 c. 3 cm diam., broadly pubescent outside where exposed in bud. *Stamens*: filaments 2 mm long, anthers 3.5 mm long, broadly stellate divided halfway into broadly elliptic lobes, interacuminal tissue well developed, densely pubescent outside where exposed in bud. *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 its 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.


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

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

**Derivation:** not traced.


**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.


**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).
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. cremastoicarpum* was recognised as a synonym by Bitter, but he then proceeded to name *S. dolichopodium* 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. dolichopodium* applies to my own new species *S. incananolabastrum*, 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 Gawan, 6° 36', 147° 02', (ADW, L, LAE, MO). Southern Highlands: Conn 497 & 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 rara 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, 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 bacis 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, *Stamen*: 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 (BR1).
Notes

Two collections have been recognised. The species is related to *S. turraeaeolium* S. Moore and is similar in the sub-axillary origin of the inflorescence, the shallow lobing of the leaves (scarcey 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.


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* juventia ad 12 x 6 cm, vetustiora ad 2-3 x 1 cm elliptica ad ovato-lanceolata. *Inflorescentia* cymosa 2-6 floribus, ex internodio superiore exoriens; pedunculus plerumque absens rhachidi valde diminuta; pedicellus 1.7-2 cm longus; *calycis* tubus 2 mm longus, lobis circa 3 mm longis triangularibus cum acumen lineari 2-3 mm longo; *corolla* stellata partita 4-5 lobis circa 8 mm longis albis aut violaceis aut lilacinis; filamenta circa 1.5 mm; antherae 5-6 mm longae; *ovarium* circa 1 mm diam.; stylos 7-8.5 mm longus erectus paucis pilis glandularibus ad basam; 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, rachis 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 capitatem, 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

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

Type citation: "Arfak Mts. Angi Lakes, edge of forest by Q 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.


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 discolored. 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 pilini stellati. Folia circa 6 x 3.5 cm ovata 2-3 lobis late triangulares, interdum geminata. Inflorescentia conferta cymosa circa 6 floribus ex internodio superiore exorniens; 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 demin 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 rachis 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 (1-1.5) 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.


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 unarmored 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. infrascutatum* 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, Dieni, 8° 40', 147° 15' 500 m alt., (BO, L, NY); Brown s.n., vii.1898, Astrolabe Range, 9° 27', 147° 22', (NSW); Carr 11657, 11.iii.1935, Veia, 9° 03', 147° 01', sea level, (BM, K, L, NY); Carr 11680, 12.iii.1935, Veia, 9° 03', 147° 01', sea level, (BM, CANB, K, L); Carr 13172, 15.iii.1935, Boridi, 9° 05', 147° 38', 1432 m alt., (BM, CANB, K, L, NY); Foreman & Vinas LAE 60090, 28.x.1973, above Boridi village, 9° 05', 147° 38', 1280 m alt., (BRI, L, LAE); Wiakeu & 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.

*A. Fruits* 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 pilis minutis stellati. *Folia* magnitudine varia; folium juvene ad 18 x 11 cm ellipticum 3-4 lobis triangularibus acuminatis; folium maturum solitarium aut geminatum aut terratum, 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, floris primus saepe basalis, ceteri plerumque terminales; pedicellus 2.5-4 cm longus inermis; *calyx* lobis 2 mm longi late triangularibus 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; *indumentium* 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 11 cm, 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 acumen 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.

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Specimens seen

IRIAN JAYA: None seen.


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 7 mm 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; petioli 1-2 cm longi. Inflorescentia subsessilis cymosa fasciculata; pedunculus absens aut brevissimus, rhachis condensata 6-20 floribus; pedicellus 7-15 mm longus; calyx tubus circa 2 mm, lobis 1-3 mm longis breviter triangularibus, acuminato; 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 rugosa denim nigrig.

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 stellata, 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 capitulate, carried 2-3 mm beyond
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.


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 acuminete minute; *corolla* stellata purpurea lobis 7-10 mm longis anguste lanceolatis; *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 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

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 epicem foliorum juvenum et corollae pilis stellatis redactis; adspexit generali atrivirens, infra purpurose. Folia circa 9 x 6 cm ovata-elliptica, lobis late triangularibus, apice acuto vel acuminate; petiolus 1.3-2 cm longus armatus. Inflorescentia cymosta paucis floribus; pedicellus 4.5 cm longus; calyx tubus 3-4 mm longus lobus truncatus vel late triangularis, acuminis lineairis 1-2 mm longo; corolla circa 12 mm longa late stellata purpurea. Bacca ignota.

Type citation: van Royen NGF 16142, 24.i1.1963. Papua New Guinea, along slope of Zaran Creek, SW slope of Mt Enggom, Sarawaketi 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 16/38 & Kairo, ADW).

Fig. 61. Holotype of *S. saruwagedensis* Symon (van Royen M27, 16/42).
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.


*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, 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: *Palle* 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).

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 pairable 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., globose, 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.

Fig. 64. *S. turraeaefolium* S. Moore. Drawn from herbarium specimen, *Pullen 6872 (CANB).*
Sect. 12 (subgen. *Leptostemonum* (Dunal) Bitter) **Dunaliana** (Bitter) Symon stat. nov.


*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.


*Type citation*: “M. Teysmann découvrit cette espéce 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 material*: Holotype W (n.v.), photo ADW.

*Derivation*: The name refers to the lanceolate shape of the leaves.


*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).


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 germinate, 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 rachis 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 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. Inflorescence 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).
PAPUA NEW GUINEA: East Sepik: Herre 333, 26.v.1929, Sepik River, 4° 00', 144° 15', (F, NY). Madang: Pullen 1118, 6.iv.1958, Attitu lower Ramu, 4° 46', 145° 20', 76 m alt., (CANB, LAE); Weinland 133, iii.1890, Kalibobo, 5°
Solanaceae of New Guinea

Solanum incanoalabastrum Symon, sp. nov.

Frutex 2-5 m altus aut arbor parvus. Aculei 1-2 mm longi, in ramis solum. Omnes partes glabrae praecox corollam pilis minutis confertis stellatis. Folia circa 9 x 3.5 cm altemata 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, pedicells 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. incanaedentatum Symon (Symon 10703, ADW).

Fig. 68. Holotype of S. manakense Symon (Symon 10587, ADW).
secondary forest, gully in 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


50. **Solanum mankiense** Symon, sp. nov.

Fruit 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; leaf 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, unarmured, 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


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 side 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 \textit{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 pubescence leaf margin and berry size.

Fig. 70. \textit{S. peekelii} Bitter. Drawn from herbarium specimen \textit{Womersley NGF 8678} (LAE), fruit from \textit{Brass 25460} (LAE)

**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', y2", lectotype, Symon (1981), today Island y' is called Cottons Island and y2 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: None seen.


Fig. 71. *S. tetrandrum* R. Br. Drawn from live plant ex *Symon 7774* (ADW).

**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 fruch tend 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 8 cm 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).


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.xi.1979, Parama Island (mouth of Fly River, 9° 01', 143° 24', sea level, (LAE); Heny & Foreman NGF 49372, 11.xi.1972, Bula plains 9° 00', 141° 15', 9 m alt., (A, CANB, K, L, LAE, NSW); Heny NGF 49646, 11.vi.1972, Sabi lower Wasi 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).


Type species: S. micracanthos Lamk.


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. llanooides Elmer. It is possible all may be early introductions from the Americas (they tend to be weedy), but to date have not been identified 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.


   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 rachis with branches to 5 cm long; pedicel 1 cm long; **male flower:** calyx: tube 2 mm long; calyx lobes 2 mm, truncate with short acumens; 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)*.

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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**


**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.


**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.


**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 multisierate-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; pediole to 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
SULAWESI: Johansson et al. 419, 17.iii.1981, c. Sulawesi, near river S of Tongoa, 1° 10', 120° 10', 650 m alt., (L).

*Type citation:* “British New Guinea: Central Division, 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!, BM!, 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 unarm ed; 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 capitulate, 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., globose, 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


*S58. 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, grimy, 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.


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.**


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 eggplant.


**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 acumen 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**


Large *shrubs* to tall *trees*; armed especially in juvenile phases less at maturity; *indumentum* of stellate hairs with coarse multiserial 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).

*Type citation:* "Hab. in Brasilia (v.s.h. mus. Par.)"

*Type material:* Not seen.

*Derivation:* The name refers to the large showy flowers.


*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); Henly 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', (LAE); Wiakabu & Umbo 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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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.

The University of Adelaide assisted in granting a period of Study Leave in New Guinea in 1977 and the Waite Agricultural Research Institute Research Fund assisted me in field work during my second visit in 1984. The Reserve Bank, through its Rural Credits Grants, enabled Mrs. M. Szent-Ivany to draw the illustrations. Publication has been supported by a grant from the Waite Agricultural Research Institute.

To all of these, I am indebted.

References


Map 1
- S. americanum
- S. belense
- S. multifolium
- S. peekeli
- S. seaforthianum

Map 2
- S. aviculare
- S. rostellatum
- S. saruwagedensis
- S. schefferi

Map 3
- S. oliverianum
- S. cladotrichotum
- S. atheniae
- S. gibbsiae
Map 15
- S. torvoideum
- S. vitense

Map 16
- S. umbonatum
- S. torricellense
- S. repandum

Map 17
- S. dunalianum
- S. impar
- S. biflorum
- S. dendropilosum
- S. kaernbachii

D. E. Symon
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 sheet number. The first name only of multiple collectors is given and institutional numbers are given as collectors number.

S. abortivum abor americanum amer anfractum anfr antillarum ant athenea athen aviculare avic bambusarum bam belense bel biflorum bif biterianum bitt borromeau borg cladotrichoclad clad dallmannianum dall dammerianum dam dendropilosum dend denseaculeatedens dens dunianium dun erianthium erian expedunculatum exp gb gibsiae gibs S. grandiflorum gran granuleus griseus griseus S. peckelii peek anfractum anfr antillarum ant athenea athen aviculare avic bambusarum bam belense bel biflorum bif biterianum bitt borromeau borg cladotrichoclad clad dallmannianum dall dammerianum dam dendropilosum dend denseaculeatedens dens dunianium dun erianthium erian expedunculatum exp gb gibsiae gibs S. grandiflorum gran anfractum anfr antillarum ant athenea athen aviculare avic bambusarum bam belense bel biflorum bif biterianum bitt borromeau borg cladotrichoclad clad dallmannianum dall dammerianum dam dendropilosum dend denseaculeatedens dens dunianium dun erianthium erian expedunculatum exp gb gibsiae gibs S. grandiflorum gran
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.


Index to Scientific Names

New names and combinations are in **bold**. Synonyms, missapplied, misspelt, illegitimate or invalid names are in *italics*. Page numbers in **bold** refer to the main taxonomic treatment. Page numbers asterisked (*) refer to figures and maps.

- *Atropa physalodes* L. 15
- *Brachystus feddei* Reinecke 67
- *—pacificus* Reinecke 67
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