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A REVISION OF SERICOLEA SCHLECHTER (ELAEOCARPACEAE)

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SUMMARY

Sericolea is a genus endemic to New Guinea. The relevant literature is surveyed. Descriptions are given of all species and keys provided to the 15 species and all infraspecific taxa accepted. Two species are described as new: *S. coodei* and *S. microphylla*. A new subspecies of *S. brassii* A. C. Sm. is recognized: ssp. *carrii*. *S. arfakensis* Gibbs, *S. gracilis* (Laut.) Schltr., and *S. novoguineensis* Gibbs reduced by Coode in a recent paper are reinstated and *S. glabra* Schltr., also reduced by Coode, is recognized as a variety of *S. micans* Schltr. Three new varieties are distinguished in *S. gaultheria* (F. v. M.) Schltr. and one in *S. novoguineensis* Gibbs.

INTRODUCTION

The genus *Sericolea* has recently been subject of a revision by Coode (1978). However, he treated only the Papua-New Guinean species in detail, since it was 'not possible to undertake at Lae a thorough study of the genus for the task appears too difficult and time-consuming for the Handbook project'. Coode and I have independently come to nearly identical conclusions regarding the delimitation of most taxa. It has been a great advantage for me to have his paper as basis.

HISTORICAL SURVEY

The first species of *Sericolea* was described by F. von Mueller (1891) in the genus *Aristotelia*, *A. gaultheria*, based on an unnumbered collection made by the Royal Geographical Society expedition to Mt. Yule (Papua). Earlier v. Mueller (1881, 1885) had mentioned *A. papuana* which Schlechter (1916: 155) suggested to be the same as *A. gaultheria*. However, the former is based on a different collection, *Chalmer s.n.*, from the Astrolabe range and was never formally described (see Excluded species).

The genus *Sericolea* was described by Schlechter (*l.c.*, pp. 95–100) to accommodate six species of which five new: *S. chrysotricha, S. elegans, S. glabra, S. micans* and *S. salicina*. The sixth species was *S. gaultheria* which was transferred from *Aristotelia* as mentioned before.

At about the same time Wernham (1916a and b) described a new genus, *Mischopleura*, in the *Ericaceae* with two species: *M. ovalifolia* and *M. ridleyana*. Ridley (1916) described a new genus *Pyrsonota* in the *Saxifragaceae* with a single species: *P. calophylla*. Miss Gibbs (1917) recognized these two genera as synonyms of *Sericolea*, but made the combination in *Sericolea* only for *M. ovalifolia*. In the same paper she described two more new species: *S. arfakensis* and *S. novoguineensis*.

Schlechter (1918) made the new combination in *Sericolea* for *Pyrsonota calophylla*.

Lauterbach (1919) described a new genus *Hormopetalum* in the *Rutaceae* with three species of which only *H. werneri* was actually described, the descriptions of the other two species, *H. gracile* and *H. pullei*, were said to follow later. Lauterbach's new genus was, however, recognized as another synonym of *Sericolea* by Schlechter (1919) who made the necessary combinations in *Sericolea*. Lauterbach (1924: 146) agreed to this and left it to Schmidt (1924) to validate the descriptions of his two remaining species. In the same paper Schmidt described two more new species in *Sericolea*: *S. gjellerupii* and *S. lamii*.

Van Steenis (1927) gave an account of *Sericolea* specimens collected in Dutch New Guinea and later gave a survey (v. Steenis, 1934) of the 17 names in *Sericolea* so far committed to paper.

Kanehira and Hatusima (1942) described another new species, *S. leptophylla*. They suggested that *S. gjellerupii* is a synonym of *S. novoguineensis*.

Smith (1944), in an account of the *Elaeocarpaceae* of New Guinea collected by Brass, described five more new species: *S. brassii, S. decandra, S. floribunda, S. lanata*, and *S. venusta*.

In a paper on the distinction between the opposite-leaved genera of the *Elaeocarpaceae* (van Balgooy, 1963) I concluded that *Sericolea* is a distinct genus. Supplementary notes on the history of the genus can be found in that paper.

The latest taxonomic paper dealing with *Sericolea* is by Coode (1978). In it several species are sunk into synonymy; two species, *S. collinsii* and *S. pachyphylla*, and one subspecies, *S. calophylla* ssp. *grossiserrata*, are described for the first time.

CHARACTERS USED FOR SPECIFIC DELIMITATION

Apart from Coode none of the authors describing new species of *Sericolea* have critically compared their material with that of previously described species. In most cases the descriptions are too generalized to get a good idea of the species without studying the original specimens upon which it is based. Smith, who gave full and generally accurate descriptions, unfortunately had access only to the collections present in the U.S. Moreover, some of the characters he used have proved unreliable. He was certainly too optimistic when he stated: '... from the descriptions it seems that most, if not all, of these (previously described species) are maintainable'. (Smith, l.c., p. 105).

Distinction between the species is mostly difficult and is based predominantly on a combination of vegetative characters. Some of the species are rather distinct but one wonders if this is not partly due to insufficient material. Some of the common species, such as *S. gaultheria* and *S. pullei*, are amenable to a treatment introduced for the genus *Drimys* (Winteraceae) by Vink (1970) who distinguished a great number of informal taxa: 'entities'.

H a b i t. The growth form may be of some help in the identification of species. Unfortunately, as a rule the labels do not provide enough information in this regard. *S. micans* seems generally to be a tree or treelet with spreading, distally drooping branches, whereas others as *S. calophylla* and *S. ovalifolia* seem to have the branches erect. *S. pachyphylla* and *S. novoguineensis* are apparently ericoid shrubs, a candelabrous growth form is indicated for *S. collinsii*.

T w i g s. The ultimate unbranched twigs are usually compressed, especially towards the nodes, but in some species, such as *S. pullei*, they are more or less terete. The indument on the twigs varies from closely appressed to erecto-patent and hirsute.

P h y l l o t a x y. The leaves are normally decussately arranged, but may be partly subopposite. In some species the leaves are partly triverticillate, as in *S. ovalifolia*. The degree of crowding of the leaves, expressed in the length of the internodes, is of some help in recognizing species. In most species the leaves are upwardly patent or perpendicular to the twig but in *S. calophylla* they seem always to be pointing downward.

S t i p u l e s. The petioles are flanked on either side by small caducous needle-like, straight or curved stipules. They are relatively long in *S. micans*, but they are otherwise of little help in species recognition.

P e t i o l e. In cross section the petiole is round below and grooved or, more rarely, nearly flat above. The length of the petiole is of some help in identification. It is relatively long (3–8 mm) in some species such as *S. brassii* and short (less than 2 mm) in *S. ridleyana*, *S. leptophylla* and others.

L a m i n a. In shape the lamina varies from broad ovate to linear-lanceolate and is usually broadest below the middle, except in *S. collinsii*. Leaves from sucker shoots are generally much larger than normal leaves, but since they are rarely collected their measurements are not taken into account in the species descriptions. The first pair of leaves of a new flush is smaller than the succeeding pairs and is not taken into account either. The length of the leaf is the distance from the base of the lamina to the tip, including the driptip or acumen when present, but excluding the petiole; the width is measured at the broadest part of the lamina. The leafindex is obtained by dividing lamina length by width. This figure ranges from just over 1 to *c.* 7 and is fairly constant in most species, but very variable in, for instance, *S. pullei*.

The texture varies from thin chartaceous as in *S. micans* to thick coriaceous as in *S. pachyphylla* and most specimens of *S. gaultheria*. The upper leafsurface of dried leaves may be concave as in *S. leptophylla* and *S. pullei*, flat as in *S. micans* and *S. brassii*, or convex as in *S. novoguineensis* and *S. pachyphylla*.

The form of the base of the lamina is usually fairly constant for each species but in some it is variable, notably in *S. gaultheria*. The apex may be obtuse or variously acute, acuminate or caudate (driptip) and terminates in a mucro which may be short and blunt as in *S. novoguineensis* or *S. ovalifolia*, or flagellate as in *S. micans*.

The leafmargin is in some species strongly reflexed, e.g. in *S. pachyphylla* and *S. ridleyana*, in others the margin is strongly reflexed at the base only, e.g. in *S. micans* and *S. calophylla*, in others the margin is not reflexed, e.g. in *S. pullei*. Teeth are always present except occasionally in *S. ovalifolia*, they are usually minute but conspicuously long in *S. calophylla*. In the description the number of teeth on one side of the lamina is given.

The upper surface of the mature lamina is always glabrous, except usually the midrib. Young leaves may or may not be hairy above, but when they are the hairs are very soon dropped. In some species the underside of the lamina is covered with a more or less appressed shining or dull indument. Very short closely appressed hairs are found in *S. brassii*, rather long and less appressed shaggy hairs in *S. pullei*; most specimens of *S. gaultheria* have a thick woolly matted indument. Some species are all but glabrous, even

when young, e.g. *S. ovalifolia* and *S. gracilis*. In the descriptions 'sericeous' is used for glossy appressed hairs, otherwise the hairs are described as 'appressed'. Often the underside of the leaves is glaucous due to minute epidermal papillae.

The venation provides useful key characters. The midrib may be sunken above, as is the rule in *S. gaultheria*, or may be raised as in *S. brassii*. The lateral nerves are very prominent below in *S. gaultheria* and *S. brassii*, whereas in *S. coodei* they are not or scarcely raised. In this species the venation network is very fine and raised above, by which it can easily be recognized. The angle between the lateral nerves and the midrib is fairly constant for each species, e.g. in *S. gaultheria* they normally ascend at an angle of *c.* 80° whereas in *S. brassii* ssp. *carrii* the angle is acute: 35–50°. The lateral nerves not reaching the leaf margin are not counted, neither those of the driptip (acumen), if present. The number of lateral nerves is a useful key character, the number mentioned in the descriptions refers to the number of lateral nerves on each side of the midrib.

I n f l o r e s c e n c e. In most species the inflorescence consists of a simple axillary raceme with 2–3 pairs of decussately arranged flowers, but there may be as few as one or as many as eight flowers in a raceme. Occasionally there may be two superposed racemes in one leafaxil. In some species the inflorescence may occasionally be paniculate and bear up to 20 flowers; in that case the first, and sometimes also the second, pair of flowers is replaced by branches of the peduncle each bearing 1–3 pairs of decussately arranged flowers. *S. floribunda* (= *S. micans* var. *glabra*) was based on such a many flowered specimen. Each flower is subtended by a small bract caducous and often missing in herbarium specimens. The bracts are flanked by two, more or less persistent, teeth. Length of the pedicels has been used as a distinguishing character but often appears to be unreliable as such. The pedicels appear to elongate in fruit. Peduncle, rhachis and pedicels are usually variously hairy, but are consistently glabrous in some species: *S. arfakensis*, *S. collinsii* and *S. pachyphylla*.

F l o w e r s. The flowers are as a rule 5-merous. Some species have 4- and 5-merous flowers on the same specimen in about equal numbers: *S. arfakensis* and *S. collinsii*. *S. pachyphylla* is the only species so far known to have exclusively 4-merous flowers. Also 6-merous flowers may occasionally be encountered.

Size of sepals and size and shape of petals have been used as diagnostic characters, but I have found these generally unreliable, the more so since the flower parts enlarge with age of the flower and are, moreover, sometimes variable within one specimen. Indention of the petal top is likewise not a useful key character. Often a tuft of hairs is present inside at the base of the petals. This tuft appears to be consistently absent in some species, e.g. in *S. coodei* and *S. brassii*.

The disc bears lobes opposite the sepals. The lobes may be weakly or strongly developed and may themselves be lobed; small lobes may be present between the larger lobes. I have not found disc properties useful as key characters.

The stamens are basically arranged in two ways: a) there are three stamens inserted inside each disc lobe, the central one of these is larger than the outer two; b) there is one stamen inside each disc lobe and a smaller one between the lobes. Arrangement a) is the most common one, but some of the stamens may be abortive (staminodial) or missing. Very rarely extra stamens may be present. See also the discussion in van Heel (1966: 371, fig. 326). In some species both arrangements are found, e.g. in *S. pullei*; in *S. calophylla*

arrangement b) is the rule. The flowers in some specimens of Sericolea were found to have small anthers lacking pollen which are thus non-functional. This may point to a tendency towards dioeciousness in the genus.

The ovary is normally bilocular with two anatropous, pendent ovules attached to the septum; occasionally the number of cells may be three and the number of ovules per cell may be one or three but never four as stated by some authors. No useful key character is provided by the ovary.

F r u i t. The fruit has been described in some detail by Coode (l.c., p. 247). No characters in fruit or seed have been found to be useful for specific delimitation. Nothing at all is known about germination and seedling development in *Sericolea*.

ECOLOGICAL NOTES

Sericolea is a strictly montane genus. The lowest recorded locality is 850 m (*S. micans* in the Sepik). Paijmans (1976: 86) mentions *Sericolea* as one of the common components of the lower storey in the lower montane zone between 1000 and 3000 m.

Only in few places has sampling been sufficient to warrant conclusions on local relationships between taxa and local variability within taxa. These are: Arfak Mts, Star Mts, Doma Peaks, and Mt. Wilhelm. Further ecological notes are given after each species description.

A r f a k M t s. Miss Gibbs (1917) has given a description of the vegetation on Mt. Koebre, further data were obtained from Dr. W. Vink.

Of the four species so far known from the Arfak, *S. arfakensis* is the only one confined to the forest. The only two collections seen come from 1900 and 2400 m and are described as epiphytes or scramblers.

S. leptophylla and *S. novoguineensis* are both members of low shrubbery often subject to fire and have been found together at the same altitude: 2200-2500 m. *S. novoguineensis* var. *vinkii* has been found in the same vegetation but is apparently confined to Mt. Sensenemes and has been collected twice at 2600 and 2680 m above the highest recorded altitude of var. *novoguineensis*.

The single collection of *S. calophylla* also comes from Mt. Sensenemes and is reported to be common at 2550 m and like *S. novoguineensis* and *S. leptophylla* is a member of the low summit scrub subject to occasional fires.

It is peculiar that *S. brassii* and *S. micans* have never been collected in the Arfak Mts, in view of the fact that both have been found on the Nettoti to the West.

S t a r M t s. Information on the Star Mts was provided by Dr. J. F. Veldkamp. In this area the soils are partly derived from granite and partly from limestone.

S. calophylla ssp. *grossiserrata* is apparently confined to high altitudes: 3200–3500 m, as a member of low scrub on scree and ridges. The material is homogeneous although it has been collected on both soil types. *S. brassii* ssp. *brassii* has been found somewhat lower down at 2800–3100 m and seems to be confined to forest. Again the material has been collected on both soil types yet shows little variability.

The specimen of *S. pullei* from forest on granite at 1900 m has relatively large leaves; two other specimens likewise from forest on granite at resp. 2250 and 2700 m are rather

typical for the species whereas a specimen collected at 3000 m on limestone in *Podocarpus-Phyllocladus* woodland, has rather small more or less coriaceous leaves.

S. micans has been collected only once at 2100 m in forest, the usual habitat for this species.

The presence of *S. novoguineensis* var. *vinkii*, once collected at 3000 m, is unexpected, since its nearest locality is at the Wissel Lakes in West New Guinea.

D o m a P e a k s. Reports on the vegetation of the Doma Peaks have been provided by Gillison (1976) and Kalkman & Vink (1976). They distinguish three taxa in *Sericolea*, denoted as sp. a, b, and c.

S. pullei (*Sericolea b*) has been found between 2000 and 2950 m. The collections were mostly from specimens in the upper layers of the forest. There is a reasonable variability with a tendency in plants in the more exposed habitats to have smaller and more coriaceous leaves than those in the closed forest.

The two forms distinguished in the field, sp. a and c, have to be referred to *S. gaultheria* var. *gaultheria*. Two of the collections (sp. c) have been found at 2500 and 2950 m in forest. They are rather typical with relatively large leaves and thick matted indument. Five collections were called sp. a and have been collected in shrubbery partly subject to burning, between 3040 and 3380 m. They have leaves rather small for the species and shaggy-woolly, rather than matted, indument. The collection from 3300 m is intermediate between the two forms.

M t . W i l h e l m. Wade & McVean (1969) made a very detailed study of the vegetation of this mountain above 3100 m; and I spent three months collecting on Mt. Wilhelm in 1965.

S. micans is not mentioned by Wade & McVean since, on Mt. Wilhelm, it is confined to forest at *c.* 2700 m.

S. gaultheria var. *muelleri*, the only variety of the species on Mt. Wilhelm, is mentioned as a member of the cloud forest from 3100–3300 m. From available collections it appears that the taxon occurs as low as 2600 m, always in the forest.

S. calophylla ssp. *grossiserrata* (*S. sp. ANU 7069*) is mentioned as a member of the lower subalpine forest between 3300 and 3470 m. From my own notes and from available collections it appears that the species is found to an altitude of 3600 m. Moreover, contrary to the previous species, *S. calophylla* is rarely found in the forest proper but in the margin.

From the above it appears that some species are confined to a certain habitat within a rather limited altitudinal range: *S. calophylla*, edge of forest at high altitude, *S. brassii* and *S. micans* at medium and relatively low altitudes always as members of the closed forest (both are less variable). Species with a wider tolerance for habitat and altitude as *S. gaultheria* and *S. pullei* are, as expected, more variable, with a tendency for smaller leafsize in the more exposed specimens.

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A: Arnold Arboretum, Cambridge Mass. U.S.A.; BM: British Museum, London, England; BO: Herbarium Bogoriense, Bogor, Indonesia; BRI: Botanic Museum and Herbarium, Brisbane, Australia; CANB: National Herbarium, Canberra, Australia; E: Royal Botanic Gardens, Edinburgh, Scotland; K: Royal Botanic Gardens, Kew, England; L: Rijksherbarium, Leiden, The Netherlands; LAE: Herbarium of the Botany Division, Lae, Papua/New Guinea; SING: Herbarium of the Botanic Gardens, Singapore; U: Instituut voor Systematische Plantkunde, Utrecht, The Netherlands; WRSL: Herbarium Instituti Botanici, Wroclaw, Poland.

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SERICOLEA

Sericolea, Schlechter, Bot. Jahrb. 54 (April, 1916) 95; Gibbs, Arfak (1917) 147; Schlechter, Bot. Jahrb. 55 (1918) 194; Fedde, Rep. 16 (1919) 29; Schmidt, Nova Guinea Bot. 14 (1924) 151; van Steenis, Nova Guinea Bot. 14 (1927) 304; Bull. Jard. Bot. Btzg III, 13 (1934) 202; Kanehira & Hatusima, Bot. Mag. Tokyo 56 (1942) 320; Smith, J. Arn. Arb. 25 (1944) 104; van Balgooy, Blumea 12 (1963) 79; Coode, Brunonia 1 (1978) 246 — L e c t o t y p e s p e c i e s: *S. micans* Schltr. (for arguments see v. Balgooy, l.c., p. 87).

Mischopleura (Ericac.), Wernham in Ridley, Hook, Ic. 31 (June, 1916) t. 3059; Trans. Linn. Soc. II Bot. 9 (August, 1916) 99 — L e c t o t y p e s p e c i e s: *M. ridleyana* Wernh.

Pyrsonota (Saxifr.), Ridley, Trans. Linn. Soc. II Bot. 9 (August, 1916) 40 — Type species: *P. calophylla* Ridl.
Hormopetalum (Rutac.), Lauterbach, Bot. Jahrb. 55 (1919) 257 — Lectotype species: *H. pullei* Laut.

Shrubs, scramblers, treelets, or trees, sometimes epiphytic, usually strongly branched; branches erect, spreading, or pendent. *Twigs* compressed towards the nodes, often grooved, rarely terete; appressed to patently brown, yellow, or grey hairy, later terete, glabrescent with small longitudinal cracks, flaky or smooth. *Leaves* simple, as a rule decussately arranged, also partly sub-opposite or rarely triverticillate, upwardly patent, perpendicular to the axis, or pointing downward. Stipules needle-like, nearly straight to strongly curved, appressed hairy, caducous. Petioles grooved or nearly flat above, rounded below, appressed or patently hairy, sometimes glabrescent or glabrous. Lamina ovate to linear ovate, rarely elliptic or obovate, coriaceous to chartaceous; base acute, obtuse, or cordate; margin dentate or serrate-dentate, often revolute; apex obtuse, acute or acuminate to caudate, ending in a mucro or flagella; penninerved, lateral nerves often conspicuous; densely, less often sparsely, appressed hairy, at least when young, sometimes almost completely glabrous, indument often glossy silky, but also dull. *Inflorescence* as a rule an axillary few-flowered raceme with the flowers decussately arranged, sometimes two superposed racemes per leafaxil, or exceptionally a terminal raceme on a short leafbearing short branch; occasionally a few-flowered panicle with up to 20 flowers or a one-flowered peduncle. Pedicels nodding or straight, appressed pilose or glabrous, gradually somewhat thickened apically, often elongating in fruit. Peduncle and rhachis variously hairy, rarely glabrescent or glabrous; bracts ovate to linear-ovate, appressed hairy, rarely glabrous, caducous, flanked by two semipersistent small teeth. *Flowers* 5-merous, also 4-merous and exceptionally 6-merous, bisexual. Sepals ovate to oblong ovate, valvate in bud, later spreading, outside appressed hairy or glabrous, inside with a median crest, minutely puberulous especially towards the margins and top. Petals broad to narrow obovate, conduplicate-valvate in bud, later quincunciate, base acute or cuneate, thickened, apex truncate or rounded, weakly to distinctly 2–5-lobed, irregularly crenulate or entire, often bearing a tuft of patent hairs inside at base. Disc weakly to distinctly lobed, lobes as many as sepals and opposite these, often grooved or with smaller lobes in between the larger ones, sometimes disc nearly continuous, glabrous, persistent in fruit. Stamens (8–) 10–15 (–18), inserted inside the disc, puberulous to nearly glabrous, either three stamens inside each disclobe of which the central stamen larger, or a larger stamen inside the disclobe and a smaller one alternating with it, occasionally one or some stamens abortive or staminodial; filaments straight or flexuous; anthers oblong, as long as or shorter than the filaments, 2-celled, opening with an apical confluent slit. Ovary globose to ovoid, weakly 2-(or 3-) lobed, glabrous, 2 (or 3) locular, with 2 (rarely 1 or 3) anatropous ovules per cell pendent from the central axis of the septum; style subulate, glabrous, stigma slightly 2-(3-) fid, persistent in fruit. *Fruit* ovoid to globose, red to black at maturity, consisting of a thin smooth outer skin, a fleshy mesocarp of elongated radial cells, and a hyaline, more or less lignified endocarp enclosing one to four seeds. *Seeds* reniform or corniculate with an obtuse (chalaza) and an acute (micropyle) end, outer coat thin fleshy, inner layer bony to woody and thicker towards the chalazal end; embryo curved, with flat cotyledons, embedded in white endosperm.

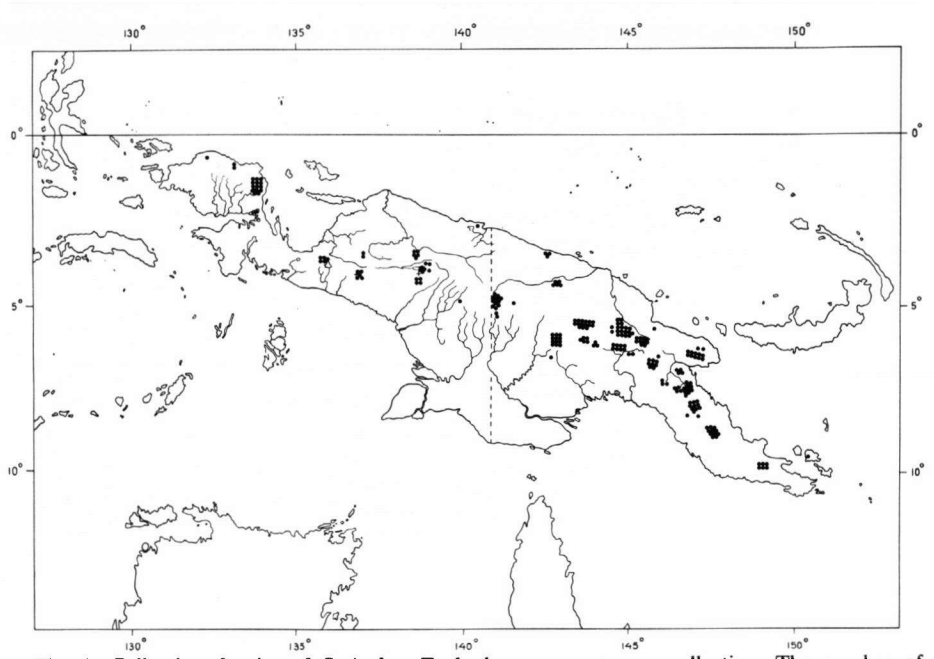

Fig. 1. Collecting density of *Sericolea*. Each dot represents one collection. The number of collections from Papua New Guinea is about 3½ times that from Irian Jaya.

Table 1.

species	Vogelkop	Wissel Lakes	Carstensz Mts	Doorman, Bernhard C.	Lake Habbema, Hellwig	Cyclop Mts	Star Mts	Sepik	Doma + Bosavi Mts	Wabag/Hagen	Giluwe/Talibu	Mt. Wilhelm	Kubor Ra	Mt. Otto	Mt. Piora	Huon Penn.	Edie Creek	Wharton Ra	Milne Bay	Ferguson I.	
S. arfakensis	x																				
S. brassii	x	x		x			x			x					x		x	x		x	
S. calophylla	x		x		x		x					x			x						
S. collinsii													x		x						
S. coodei																	x	x			
S. gaultheria				x					x	x	x	x	x	x	x	x	x	x	x		
S. gracilis					x																
S. leptophylla	x	x																			
S. micans	x	x	x	x			x	x		x		x	x	x		x			x		
S. microphylla															x						
S. novo-guineensis	x	x	x				x														
S. ovalifolia			x	x																	
S. pachyphylla																	x				
S. pullei				x	x		x		x	x	x		x								
S. ridleyana			x																		
S. sp. 1.						x															

DISTRIBUTION

Apart from a single collection from Fergusson I. no species of *Sericolea* has been found outside the mainland of New Guinea. The species are more or less evenly distributed over the West and East parts of the island (table 1). It must be borne in mind that the collecting density of *Sericolea* in the East part is about 3½ times as high as in the West (Fig. 1), so that new species, if any, are to be expected in Irian Jaya rather than in Papua New Guinea. On the other hand increased collecting may obviate the differences now believed to exist between some of the taxa.

KEY TO THE SPECIES

1a. Lamina less than 4 mm wide, sparsely hairy, margins strongly revolute **15. S. ridleyana**
b. Lamina at least 4 mm wide, if less, then densely hairy or margins not strongly revolute 2
2a. Pedicels and outside of sepals glabrous or nearly so 3
b. Pedicels and outside of sepals densely hairy, at least when young 8
3a. Lamina broadest above the middle, small (13–18 × 4–7 mm); base acute or cuneate **4. S. collinsii**
b. Lamina without this combination of characters 4
4a. Lamina linear, leafindex 4.5–6.5; underside of lamina glabrous . . . . **7. S. gracilis**
b. Lamina ovate- to elliptic-oblong, leafindex less than 3, underside of lamina glabrous or hairy 5
5a. Underside of lamina densely hairy. 6
b. Underside of lamina glabrous or sparsely hairy 7
6a. Leaves densely crowded, internodes c. 5 mm; leafbase obtuse; indument on underside of lamina reddish brown, thickly matted . . . . . **13. S. pachyphylla**
b. Leaves not crowded, internodes more than 10 mm; leafbase cordate; indument not matted . . . . . **1. S. arfakensis**
7a. Leaves chartaceous to subcoriaceous, sparsely hairy and glaucous below, never triverticillate . . . . . **8. S. leptophylla**
b. Leaves coriaceous, glabrous and green below, often triverticillate. . **12. S. ovalifolia**
8a. Leafmargin conspicuously serrate-dentate, teeth at least 1 mm long; leaves pointing downward, linear to lanceolate, coriaceous, with dense silky indument below. **3. S. calophylla**
b. Leafmargin not conspicuously serrate-dentate, teeth less than 1 mm long; leaves without the above mentioned combination of characters 9
9a. Lateral nerves invisible above, hardly raised below; upper surface of lamina with fine, regular, areolate, raised venation . . . . . **5. S. coodei**
b. Lateral nerves distinct above, weakly or strongly raised below, upper surface of lamina with irregular reticulate venation 10
10a. Leafbase cuneate 11
b. Leafbase obtuse to cordate 13

11a. Lamina lanceolate to linear, chartaceous, margin strongly reflexed at base, lateral nerves weakly raised below; indument silky yellow or white, rarely almost glabrous **9. S. micans**

b. Lamina ovate to lanceolate, coriaceous, margin not strongly reflexed at base, lateral nerves strongly raised below; indument various 12

12a. Indument on underside of lamina dense, often matted and obscurring the venation, midrib sunken above, lateral nerves at an angle of *c.* 80° to midrib; petals hairy inside at base . . . . . **6. S. gaultheria**

b. Indument on underside of lamina more or less dense, of short closely appressed hairs, not obscuring the venation, midrib raised above, lateral nerves at an angle much less than 80° to midrib; petals glabrous . . . . . **.2. S. brassii**

13a. Underside of lamina sparsely hairy to glabrous 14

b. Underside of lamina densely hairy. 15

14a. Leaves crowded, internodes less than 7 mm, lamina less than 2 cm, sparsely pubescent below. . . . . **10. S. microphylla**

b. Leaves more spaced, internodes more than 7 mm, lamina longer than 2 cm, below very glaucous, with hairs on midrib and along margin . . . . . **16. S. sp. 1**

15a. Lamina chartaceous or subcoriaceous, margins not reflexed, apex gradually tapering, very top truncate, abruptly ending in a sharp mucro or flagella, often flanked by two teeth . . . . . **14. S. pullei**

b. Lamina coriaceous, margins reflexed, very top not truncate. 16

16a. Lamina ovate, usually not more than 2 cm long, base cordate, apex obtuse, margin strongly reflexed, making the leaf bullate above; indument of soft red brown patent hairs; stamens 10–15. . . . . **.11. S. novoguineensis**

b. Lamina of various shape, usually much longer than 2 cm, if base cordate and apex obtuse then margin not strongly reflexed, leaf not bullate above; indument yellow-brown or grey, appressed, often matted; stamens 15. . . . . **6. S. gaultheria.**

SYNOPTICAL KEY:

(Numbers are printed in italics if the character mentioned is absolute)
Internodes over 2 cm: 1, 2, 3, 5, 6, 7, 9
Leaves pointing downward: *3*, 5, 11
Leaves 3-verticillate: 11, 12
Petiole less than 2 mm long: 4, *8*, *10*, 11, *12*, 14, *15*
Petiole over 5 mm long: 2, 5, 6, 9
Lamina chartaceous: 8, 9, 14
Underside of lamina glabrous: 7, 8, 9, 12, 15
Lamina especially reflexed at base: 3, 4, 9
Teeth less than 5 each side of lamina: 4, 6, 7, *8*, 10, 11, 12, *13*, *15*
Teeth 1 mm long or more: 1, 2, *3*
Midrib raised or level with surface of lamina above: *2*, *3*, *4*, 8, *9*, 14
Lamina less than 20 mm long: 1, *4*, 6, *8*, *10*, 11, *12*, *13*, 14, *15*
Lamina more than 25 mm long: 1, *2*, 3, 5, 6, *7*, *9*, 14

Lateral nerves at an angle of less than 50° to midrib: 2
Leafindex less than 2: *1*, 6, 11, 12, *13*, 14
Leafindex 4 or more: 2, *3*, 6, *7*, *9*, 10, 14, *15*
Inflorescence paniculate: 3, 5, 9, 14
Pedicels glabrous: *1*, *4*, 7, 12, *13*, 15
Four-merous flowers common: 1, 4, 7, *13*
Sepals glabrous outside: *1*, *4*, 7, 8, 12, *13*, 15
Petals glabrous inside: *2*, *4*, *5*, *7*, 12, *13*
Stamens twice the number of petals: 3, *4*, 6, 7, 11, 12, 14, *15*
Filaments longer than anthers: 3, *4*, 5, 6, *7*, *8*, 10, *12*, *15*
Occurring above 3000 m: 2, 3, *4*, 5, 6, *12*, *13*
Occurring below 1500 m: 2, 9

1. Sericolea arfakensis Gibbs

Sericolea arfakensis Gibbs, Arfak (1917) 148; Schltr., Fedde, Rep. 16 (1919) 31; van Steenis, Bull. Jard. Bot. Btzg. III, 13 (1934) 202; Kanehira & Hatusima, Bot. Mag. Tokyo 56 (1942) 322; Coode, Brunonia 1 (1978) 253 (as a sonynym of *S. gaultheria* Schltr.) — T y p e: *Gibbs 6009* (BM), Arfak.

Scrambler up to 1.5 m, terrestrial or epiphytic, sparsely branched, branches pendent. *Twigs* compressed towards the nodes, 0.7–1.2 mm Ø, densely patently ferrugineously hairy, later terete and nearly glabrous, smooth, brown; leaf pairs rather spaced, internodes 1–5 cm; stipules subulate, 1–1.5 mm long, sericeous. *Leaves* (sub-)opposite, patent; petiole 2–3 mm, 0.7–1 mm Ø, grooved above, yellowish brown to ferrugineously tomentose; lamina ovate, 15–45 × 10–22 mm (leafindex 1.2–1.8), coriaceous, above glossy and glabrous except the sericeous midrib, below covered with whitish to ferrugineous appressed hairs, upper surface convex; base rounded to cordate; margin slightly revolute, with 6–13 black glabrous 0.5–1 mm long teeth; apex acute to slightly acuminate, ending in a tooth or needle up to 5 mm long; midrib slightly sunken above, prominent below, lateral nerves 10–20, raised on both sides at an angle of 80°–90° to midrib, gradually arching towards the margin, venation reticulate, raised above and below. *Inflorescence* an axillary raceme up to 3 cm long, bearing 2–4 flowers; peduncle and rhachis up to 1.5 cm, densely to sparsely appressed hairy; pedicels 8–10 mm, 0.2–0.3 mm Ø, slightly curved, glabrous; bracts linear, 1–2 × 0.1–0.2 mm, sericeous, basal teeth 0.3–0.5 mm. *Flowers* 4- or 5-merous; sepals ovate, 2–3 × 0.8–1 mm, acute, glabrous or with some hairs on midrib, inside puberulous at apex; petals oblong obovate, 2.5–4 × 1–2 mm, base cuneate, apex truncate, weakly 3-lobed, glabrous except for a small tuft of hairs inside at base, pink or red in vivo; disc 4- or 5-lobed, 0.2 mm thick; stamens 12 or 15, minutely puberulous, filaments straight; 0.4–1 mm, anthers 0.4 × 0.8 mm; ovary globose, 1–1.5 mm Ø, bilocular with two ovules per cell, style 1–2 mm. *Fruit* (unripe) 5 mm Ø, containing 2 or 3 horn-shaped seeds 4 mm long, 2 mm Ø.

D i s t r i b u t i o n: Irian Jaya: Vogelkop, Arfak Mts. (2.)*)

E c o l o g y: Forest on ridges and secondary forest on steep slopes, alt. 1900-2450 m. Flowering in December and January, young fruits in January; apparently a rare species.

N o t e s: Coode (1978, 253) reduced this species to *S. gaultheria* (F. v. M.) Schltr., but I prefer to keep it separate on account of its glabrous pedicels and sepals which are unknown in *S. gaultheria*. It is of interest for collectors to note if the species is always a scrambler or epiphyte with pendent branches, a feature not displayed by *S. gaultheria*. In the two collections I have seen, the petals are said to be pink or purple red. If this feature is constant it is another distinguishing character.

Kanehira & Hatisuma (l.c. 322) mention a sterile specimen *(Kanehira & Hatusima 13632)* from Mt. Koebré which they believe to belong to *S. arfakensis*. I have not seen the specimen.

2. S. brassii A. C. Smith

S. brassii A. C. Smith, J. Arn. Arb. 25 (1944) 108; Coode, Brunonia 1 (1978) 248. — T y p e: *Brass 12709* (holo: A; iso: BO, BRI, L). Bernhard Camp.

Shrub or small tree up to 8 (–16) m, branches erect. *Twigs* compressed, especially towards the nodes, 0.5–1.5 mm, yellow to brown sericeous, soon glabrous, later terete, whitish to dark brown, smooth or pustular by lenticels; internodes 0.5–3.5 cm; stipules 0.5–1.5 mm, curved, sometimes more or less broadened at base, sericeous to nearly glabrous. *Leaves* (sub-)opposite, patent; petiole 3–8 mm, 0.7 mm ∅, grooved above, nearly glabrous, often red in vivo; lamina ovate to elliptic lanceolate (20–) 25–75 (–90) × (7–) 9–20 (–27) mm (leafindex 2–4.5), (sub) coriaceous, grey to yellow lanate both sides when young, above soon glabrous except the midrib, below short appressed white to yellowish hairy, sometimes sparsely hairy, greenish to glaucous, upper surface flat or slightly wavy; base cuneate; margin weakly revolute, with 8–20 brown to black glabrous 0.5–1 mm long teeth; apex acuminate, acumen up to 20 mm long, often oblique or slightly curved, ending in a subulate tooth up to 2 mm long; midrib weakly raised above, prominent below, lateral nerves 5–25 ascending at an angle of 35°–60° (75°) to midrib, raised both sides, more so below, venation reticulate, raised both sides. *Inflorescence* an axillary raceme up to 3 cm long with 2–8 flowers, sometimes two superposed racemes in one leafaxil; peduncle and rhachis up to 1.5 cm, sparsely to densely yellow sericeous; pedicels 5–15 mm, 0.3–0.5 mm ∅, straight or curved, sparsely to densely sericeous; bracts lanceolate, 1.5–3 × 0.4–0.8 mm, sericeous, basal teeth *c.* 0.3 mm. *Flowers* 5-merous; sepals ovate-oblong to -lanceolate, 3–3.5 × 0.7–1.5 mm, outside densely to sparsely sericeous, inside minutely puberulous; petals obovate, 2.5–4 × 1–1.8 mm, glabrous, yellow to cream in vivo, base cuneate, apex truncate, weakly to distinctly 3-(4-)lobed; disc weakly to distinctly 5-lobed, 0.3–0.5 mm thick; stamens 15, puberulous, occasionally some abortive, filaments sinuous to straight 0.3–1.5 mm, anthers 0.5–1 × 0.2–0.4 mm; ovary ovoid to globose, *c.* 1.5 × 1 mm, bilocular, with two ovules per cell; style subulate, *c.* 1 mm, slightly curved. *Fruit* ovoid to globose 4 mm long, 3 mm ∅; in vivo red purple or black at maturity; seed one, rarely two, 3 mm long, 2.5 mm ∅, curved.

*) The number of collections seen from each locality is given in brackets.

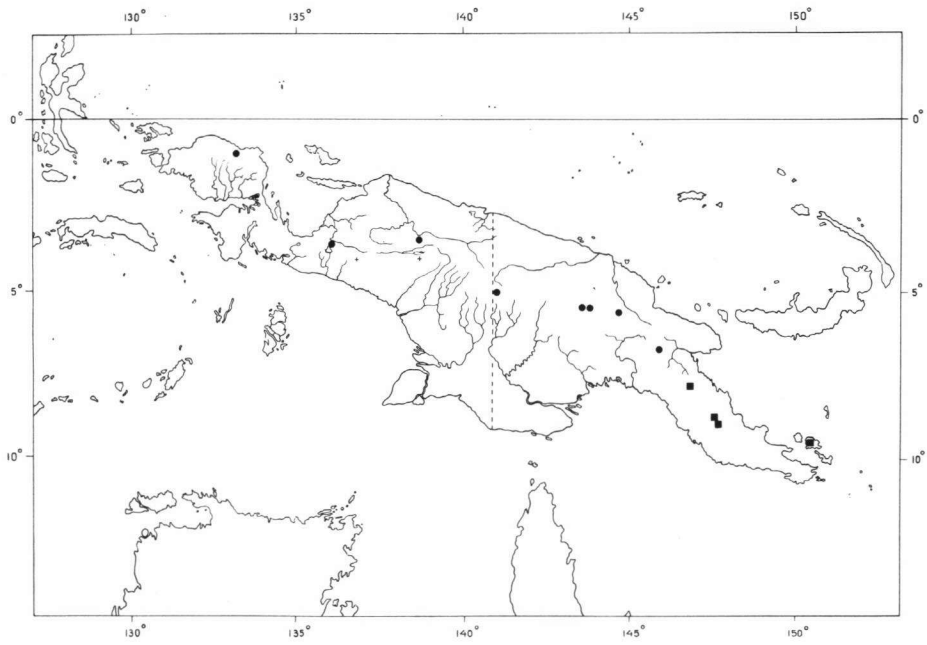

Fig. 2. The distribution of *Sericolea brassii* A. C. Sm. • ssp. *brassi*, ■ ssp. *carrii* v. Balg.

D i s t r i b u t i o n: see under the subspecies (**Fig. 2**).

E c o l o g y: Montane 'mossy' forest, more rarely in forest edges, between 1700-3100 m, apparently flowering and fruiting all year round.

N o t e s o n b a r k: Outer bark brown, smooth, peeling off in tiny scales; under bark light brown to green; inner bark yellow or creamy white; wood white.

KEY TO THE SUBSPECIES

1a. Pedicels and sepals of the mature flowers sparsely hairy, number of lateral nerves more than 12 . . . . . **2a. ssp. brassii**

b. Pedicels and sepals of the mature flowers densely sericeous, number of lateral nerves less than 11 . . . . . **2b. ssp. carrii**

2a. S. brassii A. C. Sm. ssp. **brassii**

D i s t r i b u t i o n: Vogelkop to Eastern Highlands. Irian Jaya: Nettoti Ra (1), Wissel Lakes (1), Bernhard Camp (1); Papua/New Guinea: Star Mts. (3), Wabag/Wahgi (4), Mt. Piora (1).

N o t e: It is with considerable hesitation that I have placed in this species *Eyma 5379* from the Wissel Lakes. Its strongly raised lateral nerves, ascending at an angle of 75°, are more typical for *S. gaultheria*, but the glabrous petals are typical for *S. brassii*, not for *S. gaultheria*. *NGF 46280* is also placed here with some doubt. It looks intermediate

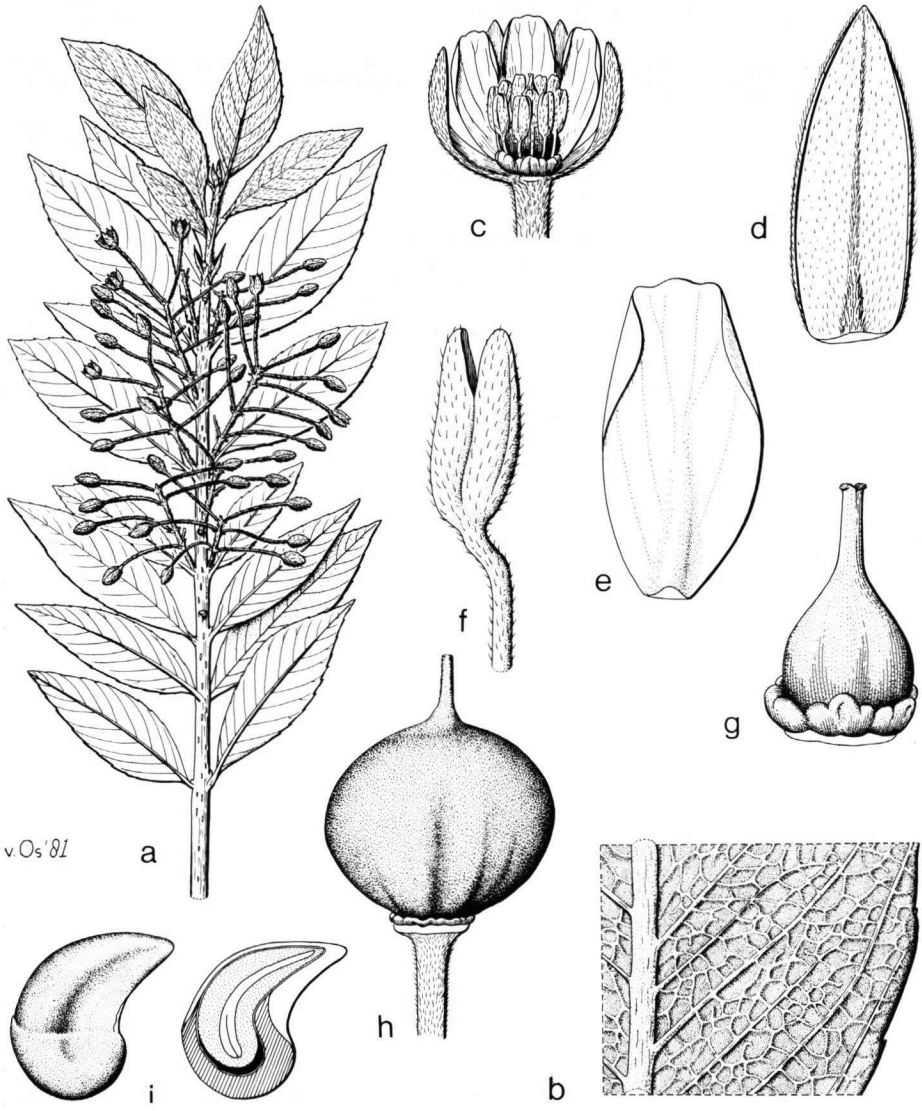

Fig. 3. *Sericolea brassii* ssp. *carrii* — a. habit, × 1; b. leaf from above, × 6; c. flower, × 6; d. sepal from inside, × 12; petal from inside, × 12; f. stamen, × 25; g. pistil, × 12; h. fruit, × 6; i. seed, left from outside, right in longitudinal section, × 6. (*Brass 4504*).

between *S. brassii* and certain forms of *S. gaultheria* and may well be a hybrid, although only the latter of the two putative parents is known from Mt. Piora. The idea of hybrid origin of the specimen is supported by the fact that the anthers appear to be non-functional. See also note under *S. micans*.

2b. S. brassii ssp. **carrii** van Balgooy, ssp. nov. — **Fig. 3**

A subspecies typica pedicellis longioribus, pedicellis calibusque dense sericeis, nervis lateralibus minoribus differt. — T y p u s: *Brass 4504* (holo, L. iso: A, BO, BRI, K) Wharton Ra.

This subspecies differs from ssp. *brassii* in the generally smaller leaves, less than 5 cm in ssp. *carrii* and up to 9.5 cm in ssp. *brassii*. The new subspecies also has less lateral nerves, usually less than 11 and ascending at an angle of 35°–50° to the midrib, whereas in ssp. *brassii* there are usually more than 12 lateral nerves ascending at an angle of 40°–75° to the midrib. The pedicels in ssp. *carrii* are longer: 8–18 mm against 6–10 mm in ssp. *brassii*. Pedicels and sepals are always densely sericeous in ssp. *carrii*, sparsely so in ssp. *brassii*.

D i s t r i b u t i o n: Papua New Guinea, Central and Milne Bay Districts: Mt. Strong (2); Wharton Ra (3), Mt. Kilkerran, Ferguson I. (1).

N o t e: Originally I considered this taxon to represent a separate species and named it after the wellknown collector C. E. Carr. Coode independently concluded it to represent a distinct taxon (his Sp. B). However, I found the differences with S. *brassii* too small and partly overlapping. The taxa are well separated geographically. *Coode & Stevens 3911* from Mt. Strong has the large leaves of spp. *brassii* but the venation of ssp. *carrii*. The specimen is sterile and probably represents a juvenile stage. It grew next to another sterile specimen more typical of the eastern subspecies. A. C. Smith (1944, 110) considered *Brass 4504* and *4665* as *S. gaultheria* the type of which he had not seen and of which he stated that 'the original description is too generalized to permit absolute identification'. *LAE 68960* is the only specimen of *Sericolea* so far collected outside the main land of New Guinea. Unfortunately the specimen is sterile. It is sparsely hairy like some specimens of ssp. *brassii*, but the number of lateral nerves is 9–12, which made me decide to place it in ssp. *carrii*. It may prove to be a separate subspecies.

3. S. calophylla (Ridl.) Schltr.

S. calophylla (Ridl.) Schltr., Bot. Jahrb. 55 (1918) 194; Fedde, Rep. 16 (1919) 31; Coode, Brunonia 1 (1978) 245, fig. 14, p. 252. — *Pyrsonota calophylla* Ridl., Trans. Linn. Soc. Bot. 9 (1916) 40, pl. 3 — T y p e: *Boden Kloss s.n.* (BM), Carstensz Mts.
S. decandra A. C. Smith, J. Arn. Arb. 25 (1944) 105. — T y p e: *Brass 9267* (holo: A, iso: BO, BRI, K, L, LAE), Lake Habbema.

Shrub or small tree up to 5 (–10) m, branches erect. *Twigs* compressed especially towards the nodes, 0.5–2 mm ∅, densely brown to silvery sericeous, later terete, glabrous, with longitudinal cracks, brown; internodes 4–35 mm; stipules linear, 1–2 mm, curved, appressed brown hairy. *Leaves* (sub)-opposite, strongly pointing downward, petiole 2–5 mm, 0.4–0.7 mm ∅, flat or weakly grooved above, brown strigose or appressed silvery hairy; lamina ovate, oblong to linear, 20–75 × 4–21 mm, leafindex (3–) 4–6 (–8), coriaceous, upper surface flat to slightly convex, lamina below densely appressed golden to silvery sericeous, above glabrous, except the sericeous midrib, base obtuse, margin revolute especially at base, serrate-dentate, teeth 6–21, 1–2.5 mm long, black tipped, bearded at base; apex caudate, acumen 5–25 mm, ending in a subulate tip, 1–2

mm long; midrib weakly elevated above, strongly elevated below, lateral nerves 8–25, ascending at an angle of 60°–80° to midrib, arching and irregularly joined near margin, raised, somewhat obscured by the indument beneath, venation network slightly raised above, invisible below. *Inflorescence* an axillary raceme (rarely a panicle), up to 1.5 cm long, bearing (2–) 4 (–8) flowers; peduncle up to 10 mm, densely sericeous to hirsute, often glabrescent; pedicels 3–7 mm, 0.3–0.4 mm ∅, curved, densely sericeous at least when young, often glabrescent; bracts ovate to linear ovate, 1.5–3 × 0.3–0.9 mm, sericeous, basal teeth 0.3–0.4 mm. *Flowers* (4-)5-merous; sepals ovate to oblong-ovate, 1.8–2.5 × 0.6–1.2 mm, acute, densely sericeous outside, often glabrescent, inside puberulous, hairs longer towards apex and margins; petals obovate, cuneate, 2–2.5 × 0.8–1.2 mm, apex usually two-lobed, sometimes each lobe indented, also three-lobed or irregularly crenulate, glabrous, except for a small tuft of hairs inside at base; in vivo white or cream; disc 5-lobed 0.4 mm thick, each lobe indented; stamens (8–) 10 (–15), puberulous; filaments 0.3–1 mm, straight, slightly longer than the anthers which are 0.4–0.8 × 0.2–0.4 mm, somewhat setulose at apex. *Ovary* subglobose, *c.* 1 mm ∅, 2-(3-) locular, (1–) 2 ovules per cell; style subulate 0.5–1 mm. *Fruit* ovoid to globose, 2.5–5 mm long, 2–3.5 mm ∅, in vivo fleshy black at maturity, containing 1 or 2 seeds; seed kidney shaped, 1–3.5 mm long, 0.5–2.5 mm ∅.

Distribution: see under the subspecies.

Ecology: on ridge crests and slopes, in alpine shrubbery and subalpine forest mostly along boundary with grassland, between (3000–) 3600 m: Flowering and fruiting specimens have been collected throughout the year.

Notes on bark: Outer bark dark brown or white, underbark midgreen, inner-bark yellow green, wood cream or white.

Vernacular name: *jamine* (Chimbu).

KEY TO THE SUBSPECIES

1a. Internodes rather long (2–2.5 cm), leaves relatively larger and broader (40–75 × 10–25 mm, leafindex normally less than 4, lateral nerves more spaced (*c.* 4/cm), stamens 10–15 . . . . . **3a.** ssp. **calophylla**

b. Internodes shorter (0.5–1.5 cm), leaves relatively small and narrow (20–65 × 4–12 mm), leafindex normally more than 4, lateral nerves less spaced (*c.* 6/cm), stamens 10, rarely more . . . . . **3b.** ssp. **grossiserrata**

3a. S. calophylla (Ridl.) Schltr. ssp. **calophylla**

Distribution: Irian Jaya: Carstensz Mts. (2). Altitude: 3400–3500 m.

Note: This subspecies seems to be confined to the Carstensz Mts., where it has been collected only twice. In his original description Ridley mentions the ovary to be hairy in the genus descriptions and glabrous in the species description, which latter is correct. The number of stamens is said to be 15 but I also found flowers with 10 stamens on the same specimen. *ANU 16084* is just past anthesis; all flowers appear to have 10 stamens. *BW 14226* from the Arfak Mts probably also belongs here. The specimen agrees most with the eastern subspecies in vegetative characters but the teeth are rather short (0.5–1 mm). There are no flowers, only young fruits.

3b. S. calophylla ssp. **grossiserrata** Coode (*emend.* v. Balgooy)

S. calophylla (Ridl.) Schltr. ssp. *grossiserrata* Coode, Brunonia 1 (1978): 249 fig. 14, p. 250. — T y p e: *v. Balgooy 998* (holo: LAE, iso: CANB, K, L, SING) Mt. Wilhelm. — *S. decandra* A. C. Sm.

D i s t r i b u t i o n: Snow Mts. to Eastern Highlands. I r i a n J a y a: Lake Habbema (1), Hellwig Ra (1), Mt. Goliath (1); P a p u a N e w G u i n e a: Star Mts. (4), Mt. Wilhelm (16), Kerigomna (1), Mt. Piora (1).

N o t e: My concept of ssp. *grossiserrata* is slightly different from that of Coode. His main distinguishing character is hairy (ssp. *calophylla*) versus subglabrous (ssp. *grossiserrata*) pedicels and sepals. Specimens from Mt. Wilhelm indeed often have glabrescent pedicels and sepals, but young flowers are invariably densely hairy; on the other hand some specimens from the Star Mts were also found to have glabrescent pedicels and sepals. I found the characters in the leaf as mentioned in the key to be more constant and regard all specimens occurring from Lake Habbema eastward as ssp. *grossiserrata*. This includes the type specimen of *S. decandra* which is somewhat intermediate in leaf size between the two subspecies, but is included in ssp. *grossiserrata* on the basis of its venation.

4. S. collinsii Coode

S. collinsii Coode, Brunonia 1 (1978) 251, fig. 15. — T y p e: *Brass & Collins 31257* (holo: Lae, iso A, CANB, K, L, LAE), Mt. Michael.

Shrub, 1–4.5 m tall, strongly branched, branches erect. *Twigs* slightly compressed when young, 0.7–1.2 mm ∅, densely appressed grey hairy, later terete, glabrous brown, leafless parts flaking; internodes 3–10 mm. *Leaves* (sub-) opposite, pointing upward; stipules linear, *c.* 1 mm, curved, sericeous; petiole 1–3 mm, 0.5–0.9 mm ∅, slightly compressed, grooved above. Lamina obovate to oblong-lanceolate, more rarely elliptic, (10–) 13–18 (–22) × 4–7 mm, leafindex (2.2–) 2.5–3 (–3.8), coriaceous, somewhat convex above, above glabrous, except the densely white sericeous midrib, below densely white to grey sericeous, becoming puberulous in old leaves, base cuneate, margin reflexed, especially the lower half, 3–8 teeth on either side, teeth 0.2 mm, black, apex acute, mostly ending in a mucro up to 1.5 mm; midrib slightly raised above, very prominent below; lateral nerves 10–17, ascending at an angle of 65°–75° to midrib, weakly raised above with a shallow groove in the middle, below weakly raised, venation network indistinct. *Inflorescence* an axillary raceme, up to 15 mm long, bearing 2–6 flowers; peduncle and rhachis 3–8 mm, sericeous; pedicels 3–7 mm, 0.5 mm ∅, slightly nodding at apex, glabrous; bracts ovate-lanceolate up to 2–2.5 × 0.5–0.8 mm, sericeous; basal teeth 0.4–0.6 mm. *Flowers* 4- or 5-merous; sepals ovate, 2–2.5 × 0.8–1.5 mm, acute, glabrous outside, puberulous inside, especially towards margins and apex; petals obovate 2.2–2.5 (–3.1) × 1.2–1.5 (–1.9) mm, base acute, apex truncate or rounded (2–) 3 (–4)-lobed, lobes often unequal, glabrous; cream to white in vivo; disc consisting of 4 or 5 separate lobes, 0.5 mm thick; stamens (6–) 8–10 (–15), filaments slightly flexuous, 0.7–1.1 mm, glabrous, longer than the anthers which are 0.5–0.7 × 0.4 mm, minutely puberulous; ovary ovoid 1–1.5 mm ∅, bilocular, 2

(rarely 1) ovules per cell; style subulate, 1 mm. *Fruit* subglobose 5 mm long, 4.5 ∅, fleshy, in vivo pink turning black, containing one seed; seed curved, 4.5 mm long, 3 mm ∅.

D i s t r i b u t i o n: Papua New Guinea, W. and E. Highlands, Kubor Ra (3), Mt. Michael (2).

E c o l o g y: Alpine shrubbery on ridge crests, 3200–3600 m. Flowering and fruiting specimens have been collected between July and October.

N o t e: The species is quite characteristic with its small obovate leaves.

5. S. coodei van Balgooy, *spec. nov.* – **Fig. 4.**

Frutex vel arbor parva usque ad 5 m alta; ramuli compressi; petiolis 3–6 mm longus; lamina ovate-oblonga vel-lanceolata, 20–40 × 7–15 mm, coriacea, basi obtusa, marginibus utrisque ad 12 (20) dentibus, apice acuto ad acuminato, supra glabra costa mediali excepta, subtus glauca, dense ad sparse brevissime pilosa, nervis lateralibus 7–14, supra indistinctibus, subtus vix elevatis, reticulo supra valde elevato. *Racemus* floribus 2–10, pedunculo cum rhachide 5–15 mm longo, sericeo, pedicellis 4–7 mm longis, sericeis. *Flos* 5-merus, sepala ovata 2–3.7 × 0.9–1.8 mm, petala obovate cuneata 2.5–3 × 1.2–2.2 mm trilobata, glabra; stamina 15; ovarium ovoideum, c. 1 mm in diametro loculis 2, utrisque 2-ovulatis; stylus 0.5 mm longus. *Fructus* ad 6 mm longus et 4 mm in diametro. — T y p u s: *van Royen NGF 30099* (holo: L, iso: A, BO, CANB, LAE, SING) Mt. Albert Edward.

Shrubs or small trees, up to 5 m tall, strongly branched. Twigs compressed 0.4–1 mm ∅, brown sericeous, glabrescent, later terete, glabrous, dark purplish brown, with fine longitudinal cracks; internodes 10–25 mm; stipules 1–1.5 mm, curved, sericeous. *Leaves* (sub-)opposite, spreading or reclined, petioles 3–6 mm, 0.7 mm ∅, grooved above, sericeous, glabrescent. Lamina ovate, oblong to lanceolate, (10–) 20–40 (–56) × (5) 7–15 (–21) mm, leafindex (1.5) 2.6–3.6 (–4.6), coriaceous, convex above, above glabrous, except the sericeous midrib, below glacous, with dense to rather sparse short appressed yellow brown hairs, base obtuse, margin weakly reflexed, dentate, teeth (2–) 5–12 (–20), up to 0.5 mm, glabrous, black, apex acute to acuminate, ending in a short tooth, 0.5 mm long; midrib hardly raised to sunken above, prominent below, lateral nerves (5–) 8–12 (–15) at an angle of 65°–70° to midrib, indiscernible above, slightly raised and indistinct below, venation network very fine and raised above giving the leaf surface an areolate appearance, invisible below. *Inflorescence* an axillary raceme up to 2.5 cm, with 2–10 flowers, sometimes a simple pedicle with up to 17 flowers; peduncle and rhachis 5–15 mm, brown sericeous; pedicles 4–10 mm, 0.4–0.5 mm ∅, slightly to strongly curved, brown sericeous; bracts 2–3 × 0.5–0.8 mm, sericeous, teeth *c.* 0.5 mm. *Flowers* (4-) 5-merous; sepals ovate, (2–) 2.5–2.8 (–3.7) × (0.9–) 1.1–1.8 mm, acute, actual tip often obtuse, outside sericeous, inside pubescent, hairs longer at base; petals obovate, 2.5–3 (–4.5) × (1.2–) 1.5–2.2 mm, base cuneate, apex rounded, weakly (2–) 3, (4–)-lobed, glabrous, white, rarely red in vivo; disc nearly continuous, weakly 5-lobed or indistinctly 10-lobed, 0.3 mm thick, stamens (12) 15, puberulous, filaments straight to sigmoid, 0.6–0.8 mm, slightly longer than the anthers: 0.5–0.6 × 0.2 mm; ovary subglobose, *c.* 1 mm ∅, bilocular (rarely 3-loc.), 2 ovules per cell; style *c.* 0.5 mm. *Fruit* ovoid 6 mm long, 4 mm ∅, in vivo fleshy black at maturity, containing 1–2 seeds; seed short corniculate, 3.5 mm long, 2.5 mm ∅.

D i s t r i b u t i o n: Papua New Guinea, Morobe and Central Districts, Garaina (1), Mt. Strong (2), Mt. Dickson (1), Wharton Ra (9).

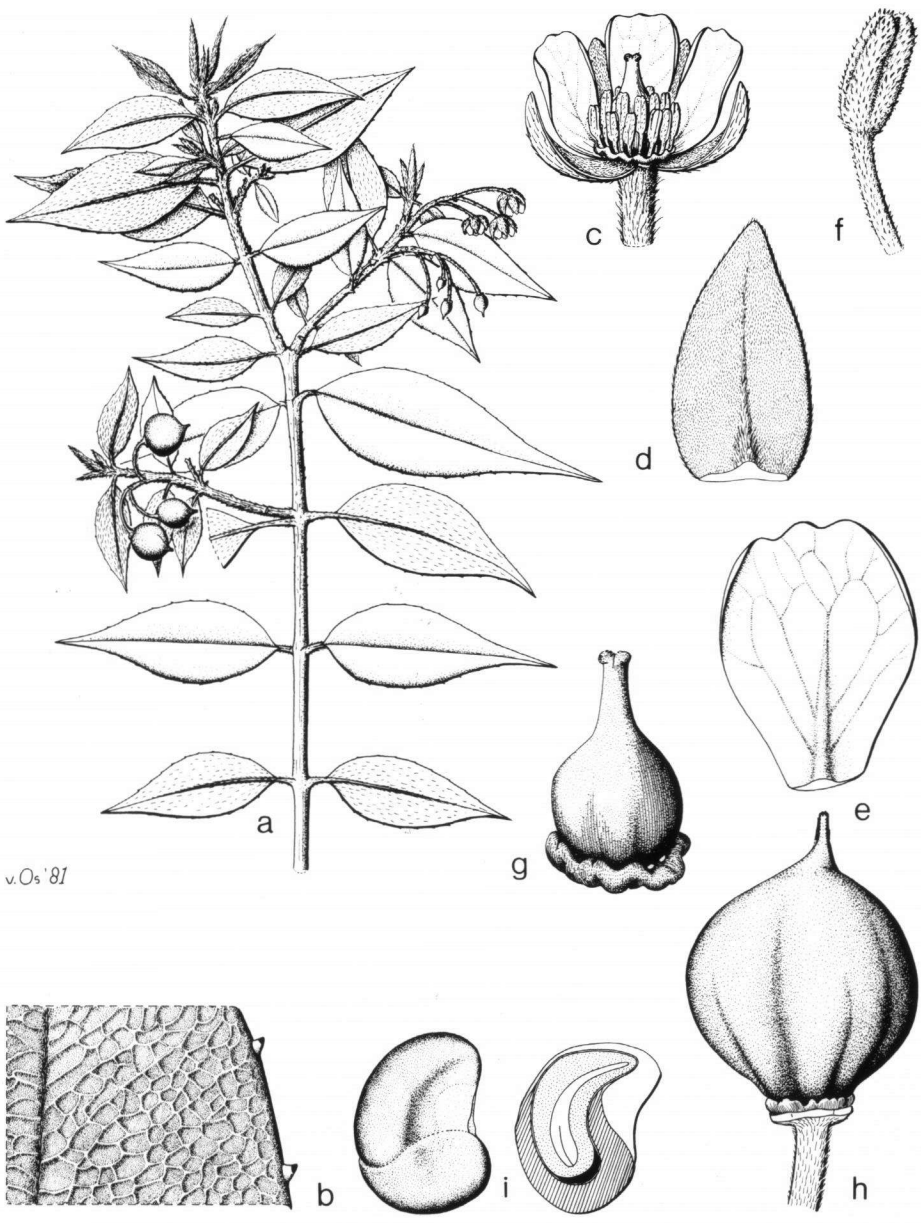

Fig. 4. *Sericolea coodei*. — a. habit, × 1; b. leaf dorsal view, × 6; c. flower, × 6; d. sepal from inside, × 12; e. petal from inside, × 12; f. stamen, × 25; g. pistil, × 12; h. fruit, × 6; i. seed, left from outside, right in longitudinal section, × 6. (*Royen, NGF 30099*).

N o t e s o n b a r k: Bark brown, smooth, peeling in tiny scales, wood white.

N o t e: Coode (1978, 260) had also recognized this taxon and called it *S.* sp. *A*. He was hesitant to describe it as a new species, because he had not seen enough material. Although the new species is undoubtedly closely allied to both *S. gaultheria* and *S. brassii* its leaf characters are so obviously different from both that I regard it as a genuine species. It is a pleasure to name it after Mark Coode who has done so much for the taxonomy of *Elaeocarpaceae* in New Guinea.

6. S. gaultheria (F. v. M.) Schltr.

S. gaultheria (F. v. M.) Schltr., Bot. Jahrb. 54 (1916) 100; Fedde, Rep. 16 (1979) 31; v. Steenis, Bull. Jard. Bot. Btzg. III, 13 (1934) 203; A. C. Sm., J. Arn. Arb. 25 (1944) 110; Coode, Brunonia 1 (1978) 252. — *Aristotelia gaultheria* F. v. M., J. Bot. London 29 (1891) 176. — T y p e: *Roy. Geogr. Soc. of Australia exp. 1891, s.n.* (holo: MEL, iso: BM, K, L) Mt. Yule.

S. lanata A. C. Sm. J. Arn. Arb. 25 (1944) 109. — T y p e *Brass 12676* (holo: A, iso: BO, BRI, K, L, LAE) Bernhard Camp.

Shrubs, treelets or trees up to 10 m tall, strongly branched. *Twigs* angular, compressed towards the nodes, or more or less terete, 0.4–3 mm ∅, appressed brown to yellow woolly or tomentose, later terete, glabrous, grey to purplish brown, with irregular longitudinal cracks; internodes 4–35 mm; stipules 0.5–3 mm, nearly straight to curved, appressed hairy. *Leaves* (sub-)opposite spreading to patent; petiole 2–8 mm, 0.4–1 mm ∅, grooved above, sericeous or tomentose, sometimes glabrescent. Lamina ovate, sometimes elliptic, rarely obovate, oblong to ovate lanceolate, 10–70 × 5–33 mm (leafindex 1.4–4), coriaceous to subcoriaceous, above glabrous except the sparsely hairy midrib, below densely long to short woolly, often matted, old leaves often glabrescent, glaucous, upper surface flat to slightly convex, base obtuse, also. rounded, cordate or acute, margin often somewhat reflexed, dentate, teeth 2–30, up to 0.6 mm long, apex caudate, also acute or obtuse. Midrib sunken above, strongly prominent below, lateral nerves 7–35 slightly sunken to raised above, very prominent below, ascending at (60–°) 70°–80° (–85°) to midrib nearly straight, arching just below margin and joined, venation network usually obscured by indument below. *Inflorescence* an axillary raceme up to 3 cm long, with 1–8 flowers, rarely two superposed racemes in one leafaxil; peduncle and rhachis up to 2 cm, brown to yellow sericeous or tomentose; pedicels 5–10 (up to 15 mm in fruit) × 0.3–0.6 mm, sericeous, slightly nodding; bracts 1.2–2.5 × 0.4–0.6 mm sericeous/tomentose. *Flower* (4-) 5-merous; sepals ovate, oblong ovate to narrow triangular, 2–4.5 × 0.6–1.5 mm, acute, outside sericeous to woolly, inside puberulous, more or less woolly at apex; petals broad to narrow obovate 2–4.5 × 1.3–2.8 mm, hairy at base inside, cream in vivo, base cuneate to short spatulate, apex truncate to rounded, weakly to distinctly 3-lobed, also irregularly crenulate and, more rarely, weakly 2-lobed or entire; disc (4-) 5-lobed 0.3–0.4 mm thick; lobes often grooved; stamens (10) 15, sometimes one or more abortive, puberulous; filaments straight, curved or sigmoid 0.3–1 mm, as long as or longer than the anthers which are 0.3–0.9 × 0.15–0.4 mm; ovary subglobose to ovoid 0.5–1.5 mm ∅, 2-(3-) locular, with (1) 2 ovules per cell; style 1–1.5 mm. *Fruit* ovoid 4–9 mm long, 3.5–6 mm ∅, with 1–3 seeds; seeds short corniculate 2–5 mm long, 1–3 mm ∅.

D i s t r i b u t i o n: see under the varieties (Fig. 5).

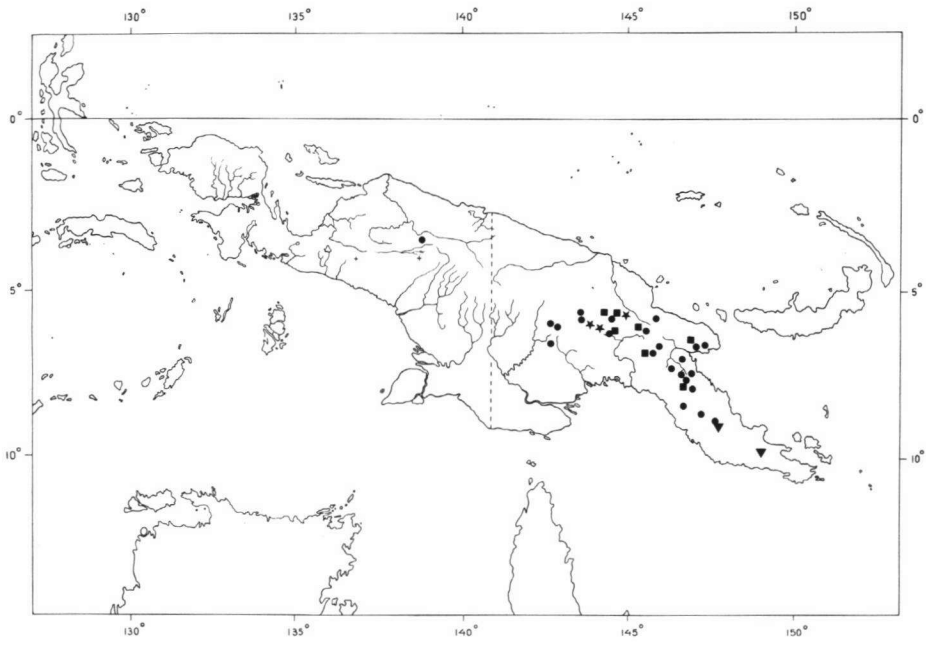

Fig. 5. The distribution of *Sericolea gaultheria* (F. v. M.) Schltr. • var. *gaultheria*, ▼ var. *cuneata*, ■ var. *muelleri*, ★ var. *schoddei*.

E c o l o g y: Montane to subalpine forest, mostly in the undergrowth, also along forest edges and in secondary forest and fire-induced grassland, from 1800 to 3400 m a.s.l. Flowering and fruiting specimens have been collected in all months of the year.

V e r n a c u l a r n a m e s: *tonk* (Mendi), *golina* (Hagen), *mindja* (Minj), *yagm-banatainde* (Chimbu, Keglsugl), *kalaleh* (Chimbu, Masul), *kibuirehmongeh* (Mairi, Mondo).

N o t e s o n b a r k: Outer bark white, grey or yellow brown, rather rough, pustular or thin flaky; inner bark yellow brown or straw; sapwood white or straw, sweet smelling; heartwood light brown, fairly hard.

N o t e: *S. gaultheria* is the most variable species of the genus, Coode (1978, 252) distinguished two species groups for which the following key was given:

1. Leafhairs soft woolly beneath, usually not obscuring the main veins, main veins prominent beneath but not strikingly so; leafblade always acuminate, not very tough and thick . . . . . Infraspecific group 2
1. Leafhairs densely appressed matted, rarely ± appressed-shining or pubescent, often obscuring the veins in younger leaves; main veins very prominent beneath, leaves obtuse acute or rarely acuminate, tough and thick . . . . . Infraspecific group 1

Within each of his groups a finer distinction can be made, but I have refrained from following the example of Vink (1970) for *Drimys* in distinguishing informal taxa, entities.

My var. *muelleri* agrees by and large with Coode's infraspecific group 2 and var. *gaultheria* with his infraspecific group 1. The two other varieties distinguished accommodate some of the specimens that did not really fit into either of his infra-specific groups. One specimen, *Brass 12676* from Bernhard Camp, is geographically isolated from the main area. It is the type of *S. lanata* A.C.Sm., but apart from the unusual number of 10 stamens, the specimen matches some of the large-leaved specimens of *S. gaultheria* var. *gaultheria* very well. A number of specimens from the southern part of Morobe Dist. (Mt. Shungol, Mt. Kaindi) are unusual in having broad ovate to elliptic leaves with an obtuse apex, otherwise they show no difference with typical var. *gaultheria*.

KEY TO THE VARIETIES:

1a. Leaves subcoriaceous; base of lamina obtuse, apex acuminate, never rounded; lateral nerves not very prominent; indument on underside of leaves woolly, not completely obscuring the venation . . . . . **6b.** var. **muelleri**
b. Leaves coriaceous; lateral nerves very prominent below, in var. *gaultheria* often obscured by dense, matted indument; base of lamina acute to subcordate, apex acute, obtuse or acuminate 2
2a. Indument on underside of leaves dense, often matted, base of lamina obtuse to subcordate . . . . . **6a.** var. **gaultheria**
2b. Indument on underside of leaves, when dense, not matted; base of lamina cuneate 3
3a. Lamina oblong to lanceolate, over 3 cm long; leafindex more than 3; indument sparse to dense woolly, yellow or brown . . . . . **6c.** var. **schoddei**
b. Lamina ovate, less than 2 cm long; leafindex less than 3; indument rather sparse, pale **6b.** var. **cuneata**

6a. S. gaultheria (F. v. M.) Schltr. var. **gaultheria**

S. lanata A. C. Sm.

Characterized by thick leathery leaves with below dense, mostly matted indument, obscuring the venation; lateral nerves very close, prominent and ascending steeply.

Distribution: From the Snow Mts. to Milne Bay Distr. Irian Jaya: 18 KM SW of Bernhard Camp (1); Papua New Guinea: Doma Peaks (7), Mt. Bosavi (1), Ambum Marimuni Divide (1), Sugarloaf (1), Mt. Kigum (1), Wahgi Jimmi Divide (1), Kubor Ra (2), Mt. Otto (7), Mt. Piora (3), Mt. Elandora (1), Finisterre Ra (1), Huon Penn. (2), Mt. Shungol (4), Spreader Divide (1), Edie Creek (1), Mt. Kaindi (2), Mt. Amungwiwa (1), SE of Garaina (1), Mt. Yule (1), above the Gap (1). The altitudinal range is between 1800–3400 m but most collections are from over 3000 m. This variety has been found together with var. *muelleri* on the Kubor Ra, Mt. Otto, Mt. Piora, Sarawaket Ra and Mt. Strong, with var. *cuneata* above the Gap (Wharton Ra).

6b. S. gaultheria var. **muelleri** van Balgooy, *var. nov.*

Lamina folii ovato-oblonga subcoriacea, basi obtusa, apice acuminato nunquam rotundato, nervi laterales nonnihil prominentes, subtus indumento brunnescenti lanato nec venationem omnino obscuranti. — Typus: *van Balgooy 601*, (holo: L, iso: A, CANB, K, LAE, SING) Mt. Wilhelm.

This variety is characterized by its subcoriaceous leaves, with rather shaggy woolly soft hairs, not obscuring the venation, the lateral nerves less prominent than in the other varieties. Named after F. von Mueller, who described the first species of *Sericolea*.

D i s t r i b u t i o n: Papua New Guinea, Western Highlands to Central Distr. Kubor Ra (1), Mt. Wilhelm (7), Mt. Otto (2), Mt. Piora (2), Sarawaket Ra (2), Mt. Strong (4). In all localities it occurs together with var. *gaultheria*, except on Mt. Wilhelm where it is the only variety of *S. gaultheria*. The altitudinal range is between 2400–3350 m.

6c. S. gaultheria var. **schoddei** van Balgooy, *var. nov.*

Lamina folii coriacea, ovato-oblonga ad-lanceolata, 3 cm longior, indice 3 maireo, basi cuneata, apice acuto ad acuminato, nervi laterales subtus prominentes, subtus indumento sparse ad dense stramineo ad brunno lanato haud implexo venationem nunquam obscuranti. — T y p u s: *Schodde 1793* (holo: L, iso: A, BRI, K, LAE) Mt. Giluwe.

This variety is distinguished by its narrow leaves and acute leafbase. Named after Dr. R. Schodde, who collected the specimen chosen as the type of this new taxon. It is more or less intermediate between var. *muelleri* and var. *cuneata*.

D i s t r i b u t i o n: Papua New Guinea: Southern and Eastern Highlands; limited to Mt. Giluwe (1), Mt. Ialibu (2) and Mt. Kerigomna (2). Altitudinal range: 2950–3360 m. Not found together with any of the other varieties of *S. gaultheria*.

6d. S. gaultheria var. **cuneata** van Balgooy, *var. nov.*

Lamina folii ovata, 2 cm minor, indice 2 minore, coriacea, basi cuneata, apice subacuto, nervi laterales prominentes, subtus indumento paulo sparso pallido pubescenti haud implexo venationem nunquam obscuranti. — T y p u s: *Stevens & Veldkamp LAE 54323* (holo: L, iso: E, LAE) Mt. Suckling.

This variety is characterized by its small ovate leaves with cuneate base and rather sparse, pale indument.

D i s t r i b u t i o n: Papua New Guinea (Central and Milne Bay Distr.), Mt. Amorwange (1), above the Gap (2), Mt. Sucking (1). Altudinal range: 2400–2800. Together with var. *gaultheria* above the Gap.

7. S. gracilis (Laut.) Schltr.

S. gracilis (Laut.) Schltr., Fedde, Rep. 16 (1919) 31; van Steenis, Bull. Jard. Bot. Btzg. III, 13 (1934) 203; Coode, Brunonia 1 (1978) 255 (as a synonym of *S. micans* Schltr.) — *Hormopetalum gracile* Laut., Bot. Jahrb. 55 (1918) 257 — T y p e: *Pulle 882* (holo: U, iso: BO, L, WRSL).

Shrub 2 m, branches erect. *Twigs* terete, compressed at the nodes 0.5–1 mm ∅, appressed pale brown pubescent, later terete, glabrous, grey brown almost black; leafpairs rather spaced, internodes 1–3 cm; stipules 1–1.5 mm, ± curved, sericeous. *Leaves* opposite to slightly subopposite, spreading; petiole 2–4 × 0.5–1 mm, terete, grooved above; brown sericeous. Lamina ovate, lanceolate to linear, 25–65 × 4–10 mm

(leafindex 4.5–6.5), coriaceous, above glossy, glabrous, a few appressed hairs on midrib, beneath green with scattered appressed hairs along margin and midrib; upper surface convex; base acute, margin reflexed, dentate, teeth 1–8, 0.3 mm, black; apex very gradually tapering, ending in a sharp tooth 0.5 mm; midrib sunken aboven, prominent below; lateral nerves 14–25 ascending at an angle of 65°–70° to midrib, archingly joined near the margin; venation network finely reticulate, raised above and below. *Inflorescence* an axillary raceme up to 3 cm long, bearing 2–4 flowers; peduncle and rhachis up to 1.8 cm, brown sericeous; pedicels slender, 9–12 × 0.2 mm, curved, sparsely appressed hairy to glabrous; bracts 2 × 0.2 mm, brown appressed hairy. *Flowers* 4 or 5 merous; sepals ovate to oblong lanceolate, 2–2.4 × 0.5–0.7 mm, sparsely appressed hairy outside, minutely puberulous inside, ± woolly at apex; petals obovate to oblong lanceolate, 2.2–2.7 × 0.7–0.9 mm, bilobed, glabrous; disc 4- or 5-lobed, 0.4 mm thick, each lobe with a median ridge; stamens 9–12, minutely puberulous, 2–3 inside each disc lobe, filaments 0.5–0.8 mm, slightly curved, longer than the anthers which are 0.4 × 0.15 mm; ovary ovoid to subglobose c. 1 mm ∅, 2-locular, 2 ovules per cell; style 1 mm. *Fruit* (unripe?) globose 3.5 mm ∅, containing 2 curved seeds (void) 3 mm long, 2 mm ∅.

D i s t r i b u t i o n: Irian Jaya, Snow Mts., Summit of Mt. Hellwig (2).

E c o l o g y: The labels contain no ecological data, flowers were collected in January, fruits in November. Altitude: 2600 m.

N o t e. The finely reticulate raised venation of the leaves resembles that of *S. coodei* which is, however, an obviously different species. This species, known only from two collections from Mt. Hellwig, has been reduced to *S. micans* Schltr. by Coode (1978, 255), but can be distinguished from that species on a number of features summarized in the following table:

	S. gracilis	*S. micans*
leaftexture	coriaceous	chartaceous/subcoriaceous
leafmargin	revolute; few teeth up to 8 each side	revolute only at base; teeth many, usually well over 10 each side
venation	midrib sunken above; lateral nerves strongly raised below	midrib slightly raised or level with surface; lateral nerves weakly raised below
indument	underside of leaf with a few hairs along margin and midrib	underside of leaf densely sericeous, nearly glabrous in var. *glabra*
flower	sepals and pedicels nearly glabrous; sepals and petals narrow 0.5–0.7 and 0.7–0.9 mm; petals 2-lobed, glabrous; stamens 9–12	sepals and pedicels densely hairy; sepals and petals broader 0.6–1 and 0.8–1.8 mm; petals 3-5 lobed or irregularly crenulate, with a tuft of hairs inside; stamens 15, occasionally less by abortion.

8. S. leptophylla Kanehira & Hatusima

S. leptophylla Kanehira & Hatusima., Bot. Mag. Tokyo 56 (1942) 320, fig. 13; Coode, Brunonia 1 (1978) 262 — T y p e: *Kanehira & Hatusima 13990* (holo: FU, n.v., iso: A) Arfak Mts., Koebré.

Shrub 1.5 m tall, strongly branched, branches erect. *Twigs* ± terete, slightly compressed at the nodes, 0.5–0.7 mm ∅, sparsely patently whitish pubescent, later terete, glabrous, grey, irregularly flaky; internodes 3–5 mm; stipules 0.5–1 mm, slightly curved to nearly straight, sparsely sericeous. *Leaves* (sub-) opposite, spreading; petiole 1–1.5 × 0.2–0.3 mm, terete, grooved above, sparsely sericeous. Lamina oblong ovate to elliptic, 6–17 (–21) × (2–) 3–5 (–8) mm (leafindex 2–3), subcoriaceous to chartaceous, above glabrous, except the sparsely sericeous midrib, below glaucous with scattered appressed white to brown hairs; uppersurface slightly convex; base acute; margin slightly reflexed, crenulate dentate, teeth 3–5 (–9), minute, 0.1 mm; apex acute, but very top obtuse, abruptly ending in a mucro 0.2 mm long; midrib level to surface above, raised below; lateral nerves 6–10 at an angle of 55°–65° to midrib, nerves and venation network hardly raised and almost invisible without maceration. *Inflorescence* an axillary raceme up to 1 cm long with 2–6 flowers; peduncle and rhachis up to 6 mm; sparsely sericeous; bracts 1 × 0.2 mm; sericeous. *Flowers* (4-) 5-merous; sepals ovate 2–3 × 0.6–0.9 mm, outside sparsely sericeous, inside minutely puberulous at base and along margin, especially apically; petals obovate, 1.9–2.8 × 1–1.5 mm, cuneate, weakly 3-lobed, sparsely puberulous inside at base, white in vivo; disc 5-lobed, 0.3 mm thick; stamens 15, minutely puberulous, filaments 0.7–1.1 mm, slightly flexuous, longer than the anthers which are 0.5–0.6 × 0.3 mm; ovary subglobose 0.7 mm ∅, 2-(3)-locular, (1) 2 ovules per cell, style 0.5–1.3 mm. *Fruit* ovid to globose 4–4.5 mm long, 4 mm ∅, pink to purple at maturity, containing 2 seeds. Seeds hornshaped 3 mm long, 2 mm ∅.

D i s t r i b u t i o n. Irian Jaya: Vogelkop, Tamrau Mts. (1), Arfak Mts. (6); Wissel Lakes Mt. Barara (1).

E c o l o g y: In shrubbery and low forest on plateaus and ridges, also in vegetation affected by fire on clayey soils, alt. 2000–2550 m.

N o t e: Apparently a very common species in the Arfak Mountains where the population is very homogeneous. *Van Royen & Sleumer 7195* from the Tamrau Mts. is somewhat aberrant in its relatively large leaves, up to 21 × 8 mm, and more or less prominent venation, but otherwise it agrees with typical *S. leptophylla*. The specimen was assigned with some doubt to *S. lamii* (here considered a variety of *S. ovalifolia*) by Coode (1978, 254, 262).

9. S. micans Schltr.

S. micans Schltr., Bot. Jahrb. 54 (1916) 98, fig. 1; Fedde, Rep. 16 (1919) 31; v. Steenis, Bull. Jard. Bot. Btzg. III, 13 (1934) 203; Coode, Brunonia 1 (1978) 254. — T y p e: *Ledermann 11328* (B, lost, no duplicates), L e c t o t y p e (chosen here): *Ledermann 8494* (holo: K, iso: BM, SING), Sepik, Hunsteinspitze.

S. chrysotricha Schltr. Bot. Jahrb. 54 (1916) 96, fig. 1; van Steenis, Bull. Jard. Bot. Btzg. III, 13 (1934) 202. — T y p e: *Ledermann 12910* (B, lost, no duplicates). Sepik, Felsspitze.

S. elegans Schltr. Bot. Jahrb. 54 (1916) 98; Fedde, Rep. 16 (1919) 31, 32; van Steenis, Nova Guinea Bot. 14 (1927) 305; Bull. Jard. Bot. Btzg. III, 13 (1934) 203; Smith, J. Arn. Arb. 25 (1944) 105. — T y p e: *Schlechter 19756* (B, lost, iso: UC *n.v.*, Fragment in A). Govidjoa, Waria R.

S. floribunda A. C. Smith, J. Arn. Arb. 25 (1944) 107. — T y p e: *Brass 12862* (holo: A, iso: BO, BRI, K, L, LAE) Bernhard Camp.

S. glabra Schltr. Bot. Jahrb. 54 (1916) 99; Fedde, Rep. 16 (1919) 31; van Steenis, Nova Guinea Bot. 14 (1927) 304: Bull. Jard. Bot. Btzg. III, 13 (1934) 203. — T y p e: *Ledermann 8941* (B, lost, iso: K, E, SING). Sepik, Etappenberg.

S. salicina Schltr. Bot. Jahrb. 54 (1916) 99; Fedde, Rep. 16 (1919) 32; van Steenis, Bull. Jard. Bot. Btzg. III, 13 (1934) 203. — T y p e: *Ledermann 9947* (B, lost, iso: K, L). Sepik Ordberg.

S. werneri (Laut.) Schltr. Fedde Rep. 16 (1919) 32; van Steenis Nova Guinea Bot. 14 (1927) 304; Smith, J. Arn. Arb. 25 (1944) 105. *Hormopetalum werneri* Laut., Bot. Jahrb. 55 (1918) 257. — T y p e: *Werner 95* (holo: B, lost, iso: WRSL). Finisterre Ra, Gelugipfel.

Trees up to 15 (–25) m tall with bole up to 22.5 cm d.b.h., treelets or shrubs, rarely lianas; branches spreading and drooping. *Twigs* compressed especially towards the nodes, 0.5–1.5 mm ∅, densely yellow to brown sericeous, later terete, glabrous, smooth, or with longitudinal cracks, brown; internodes 1–3 cm; stipules 1–4 mm, curved to nearly straight, sericeous. *Leaves* (sub-) opposite, spreading; petiole 2–6 mm, 0.5–0.9 mm ∅, grooved above, sericeous. Lamina lanceolate to linear- ovate, (27–) 40–60 (–98) × (4–) 6–12 (–22) mm, leafindex (3–) 4.5–5.5 (–7.5), papyraceous or chartaceous, rarely subcoriaceous, upper surface flat, above glabrous, except the densely sericeous midrib, beneath densely, mostly glossy, yellow to brown sericeous, also dull grey appressed pubescent, or nearly entirely glabrous, base acute, margin strongly folded inward at base, finely dentate, teeth (8–) 12–28 (–36), 0.2–0.4 mm, apex caudate, somewhat oblique, gradually tapering into a needle or flagella 1–4 mm long; midrib weakly raised above, stronger below, lateral nerves (12–) 16–20 (–30) ascending at an angle of 60°–70° to midrib, hardly raised on either side, below in addition mostly obscured by the indument. *Inflorescence* an axillary raceme, up to 3.5 cm with 2–12 flowers, sometimes 2 superposed racemes in one leaf axil, occasionally a simple panicle with up to 20 flowers and, rarely, a terminal raceme on a short leafbearing branch; peduncle and rhachis up to 2.5 cm, sericeous; pedicels 2–14 mm, 0.3 mm ∅, curved to nearly straight, sericeous; bracts 1.5–3 × 0.3–0.7 mm, acute, densely sericeous, basal teeth 0.3 mm. *Flowers* 5-merous (very rarely 4-merous); sepals ovate, 1.5–3 × 0.6–1 mm, acute, densely sericeous outside, minutely puberulous inside; petals narrow to broad cuneate, whitish or yellowish in vivo, 1.2–3.1 × 0.8–1.8 mm, apex truncate, crenulate or weakly 3-5-lobed, glabrous except for a hair tuft inside at base; disc 5-lobed, 0.3–0.4 mm thick; stamens 15 (occasionally some abortive), minutely puberulous, filaments 0.3–1 mm, straight or ± curved, about as long as the anthers which are 0.5–0.7 × 0.2–0.3 mm; ovary globose *c.* 1 mm ∅, 2-(3-) locular, (1) 2 (3) ovules per cell; style 0.5–1 mm. *Fruit* ovoid, 4 mm long, 3 mm ∅, in vivo fleshy red to black at maturity, containing 1 or 2 seeds; seed curved, 3 mm long, 2 m ∅.

D i s t r i b u t i o n: see under the varieties.

E c o l o g y: Montane forest, often a common member of the undergrowth, also in secondary regrowth of clearings, and along streams, not rarely epiphytic; normally at altitudes between 1300–2100 m, but recorded as low as 850 m and as high as 2850 m: Flowering and fruiting specimens have been collected the year round.

N o t e s o n t h e b a r k: Bark pale to dark brown, nearly smooth to rough, with

longitudinal fissures or pustular by lenticels, underbark green to pale brown, inner bark straw or pale yellow, wood white to straw.

Vernacular names: *maniewe* (Kapauku), *pupuhuk* (Jali), *atiko* (Wagu), *erkeya* (Wapi), *Nelarg* (Melpa), *kwul inga* (Minj).

Notes: This is probably the most common and most widely spread species of the genus. Yet the variability is considerably less than that of *S. gaultheria* and *S. pullei*, both also often collected. Some of the species here included in *S. micans* and described as separate species in the past were distinguished on details of flowers and leaves that proved very variable.

S. chrysotricha Schltr., the type of which was lost in the war, seems to differ only in the golden colour of its indument, said by Schlechter to be dull in *S. micans*.

S. werneri (Laut.) Schltr. is said to differ from *S. micans* in the larger leaves and the needle like leaftip, both found to be variable features. In the original description the number of stamens is said to be 10. A duplicate of the type specimen (*Werner 95)* in WRSL, however, is accompanied by a drawing by the author (Lauterbach) showing 15 stamens, 10 short, 5 long, the usual arrangement in *S. micans*. Hence his published description of the species stating that it has 10 stamens must be a slip of the pen.

S. elegans Schltr. could perhaps be considered as a separate entity in which the leafbase is often more or less obtuse and not strongly infolded, and with whitish to grey indument. The petals were said by Schlechter to be 4-5-lobed in *S. elegans* and 3-lobed in *S. micans* but this is not a reliable character either. This is also true for the length of the pedicels which according to Smith is longer in *S. elegans* than in *S. micans*.

Coode already reduced all these species to *S. micans*. In addition he also considered all the forms with glabrous lanceolate leaves, *S. glabra, S. gracilis, S. floribunda,* and *S. salicina* as synonyms of *S. micans*. Earlier in this paper I have shown *S. gracilis* to be distinct. I consider the other three as a variety of *S. micans*: var. *glabra*. The type specimen of *S. floribunda (Brass 12862)* exactly matches the type specimen of *S. salicina* (*Ledermann 9947*). The type specimen of *S. glabra* (*Ledermann 8941*) differs from these two in having leaves with a whitish undersurface and more prominent venation.

Two specimens, *ANU 10908* from the Carstensz and *LAE 65800* from the Star Mts., have rather abruptly caudate, relatively broad subcoriaceous leaves and rather distinct lateral nerves. These could be hybrids with *S. calophylla*.

Certain forms of *S. pullei* and *S. coodei* may show a deceptive resemblance in leafshape to *S. micans*. They can be distinguished as follows:

	S. coodei	*S. micans*	*S. pullei*
leaftexture	coriaceous	chartaceous	subcoriaceous to chartaceous
base	obtuse	acute	obtuse
margin	reflexed	inrolled at base	not or hardly reflexed
apex	caudate, ending in a mucro of 1 mm	caudate, gradually tapering into a flagella of 1–4 mm	gradually tapering, very tip obtuse, ending in a mucro or flagella of 1–4 mm, often flanked by two teeth
venation	fine and strongly raised above	indistinct	indistinct
indument	sparse to dense, whitish, short not very appressed	densely silky, often glossy, strongly appressed, rarely ± glabrous	dense, rather long, not appressed brown hairs, sometimes glossy
petals	glabrous	hairtuft inside	hairtuft inside
stamens	15	15 (occas. less by abortion)	10–15

KEY TO THE VARIETIES:

1a. Leaf chartaceous, underside densely silky, often glossy. Inflorescence a raceme, rarely a panicle with up to 12 flowers, usually much less . . . . . **9a.** var. **micans**

b. Leaf subcoriaceous, underside glabrous or very sparsely covered with appressed hairs. Inflorescence a raceme or a panicle with up to 20 flowers . . . **9b.** var. **glabra**

9a. S. micans Schltr. var. **micans**

S. chrysotricha Schltr. — *S. elegans* Schltr. — *S. werneri* (Laut.) Schltr. — Lectotype *Ledermann: 8994* (BM, K, SING).

One of the most easily recognized taxa with lanceolate to linear thin leaves, folded inward at base and with silky usually golden indument on the underside of the leaves. The material is rather homogeneous. However, there are some specimens with dull indument and relatively broad leaves and less distinctly reflexed leafbase which could be considered a separate taxon but in my opinion do not deserve formal rank. It is the group of specimens conforming to Schlechter's *S. elegans* and still considered a distinct species by Smith. The petals are said to be 5-lobed in *S. elegans* and 3-lobed in *S. micans*, but this could not be confirmed. The specimens resemble *S. brassii* and may be hybrids between it and *S. micans*.

Distribution: From Vogelkop to Milne Bay. Irian Jaya: Vogelkop, Nettoti (1), Wissel Lakes (2), Nassau Mts. (1), Carstensz Mts. (1), Bernhard Camp and

Baliem (2), Hellwig Mts. (2); Papua New Guinea: Star Mts. (1), Torricelli Mts. (2), Mt. Sumset (Hunstein) (3), Felsspitze (1), Mt. Hagen (2), Nondugl (1), Kubor Ra (3), Mt. Wilhelm (3), Marafunga (7), Finisterre Ra (1), Edie Creek/Wau (4), Mt. Kaindi (6), Aseki (2), Waria R. (1), Mt. Dayman/Agaun/Mt. Mon (5). Altitudinal range: 1000–2800 m.

9b. S. micans Schltr. var. **glabra** (Schltr.) *comb. nov.*

S. floribunda A. C. Sm. — *S. glabra* Schltr. — *S. salicina* Schltr. — Type: *Ledermann 8941* (E, K, SING).

Distribution: Irian Jaya: Bernhard Camp (1). Papua New Guinea, W. Sepik (1), E. Sepik: Etappenberg (1) and Lordberg (1). Altitudinal range: 850–1200 m.

10. S. microphylla van Balgooy, *spec. nov.* — **Fig. 6**

Frutex c. 1.2. m altus, dense ramosus, ramuli tereti; petiolus 1–2 mm longus; lamina ovato-oblonga ad-lanceolata, 7–17 × 2–5.5 mm, subcoriacea, basi subacuta ad obtusa, marginibus paulo recurvata utrinque dentibus 2–6, apice acuto, supra glabra costa mediali excepta, subtus tomentosa mox glabrescenti, nervis lateralibus 9–20 utrinque leniter elevatis. *Racemus* floribus 2 vel 3, pedunculo rachidicum 5 mm longo appresso pubescenti. *Flos* 5-merus; sepala ovata, ca. 2 × 0.7 mm; petala obovata, ca. 2.5 × 1.3 mm, erosa, interiora basis fascicula pilorum; stamina 15 (1–3 abortiva inclusa); ovarium subglobosum, ca. 0.8. mm in diametro, loculis 2 utrisque 2-ovulatis; stylus ca. 0.5 mm longus. *Fructus* ignotus. — Typus: *Coode NGF 46279* (holo: L, iso: n.v.).

Shrub 1.2 m, strongly branched, bushy foliage. *Twigs* 0.4–0.6 mm ∅, more or less compressed towards the nodes, densely appressed to patently brown pubescent, later terete, glabrous, somewhat flaky, blackish brown; internodes 2–7 mm; stipules curved, 0.5–1 mm, sericeous. *Leaves* opposite, spreading, petiole 1–2 mm, 0.4–0.5 mm ∅, grooved above, appressed brown pubescent; lamina oblong-ovate to ovate-lanceolate, 7–17 × 2–5.5 mm (leafindex 2.7–4), subcoriaceous, upper surface somewhat concave, base subacute to obtuse, margin slightly reflexed at very edge, teeth 2–6, c. 0.2 mm, black, glabrous, apex acute, ending in a black tooth 0.5 mm long; young leaves above densely brown tomentose, later glabrous except the sericeous midrib, below brown tomentose, soon glabrescent, glaucous; midrib weakly sunken above, raised below, rest of venation weakly raised, lateral nerves 9–20 at 70°–80° to midrib. *Inflorescence* an axillary raceme, 1 cm long, with 2 or 3 flowers; peduncle and rhachis c. 5 mm, appressed pubescent; pedicels 6–7 mm, 0.3–0.4 mm ∅, brown tomentose; bract not seen. *Flower* 5-merous; sepals ovate, *c.* 2 × 0.7 mm, acute, outside appressed pubescent, inside minutely puberulous; petals obovate, cuneate, *c.* 2.5 × 1.3 mm, truncate, irregularly crenulate, with a small tuft of hairs inside at base; cream in vivo; disc 5-lobed, 0.3 mm thick; each lobe ridged; stamens 15, puberulous, some with a tendency for abortion; filaments sigmoid, 0.5–0.8 mm, slightly longer than the anthers which are 0.4–0.5 × 0.3 mm; ovary subglobose *c.* 0.8 mm ∅, bilocular, 2 ovules per cell; style *c.* 0.5 mm. *Fruit* not seen.

Distribution: Papua New Guinea, Eastern Highlands, Mt. Piora (1)

Ecology: Low mossy ridge forest at 2700 m.

Note: Coode (1978, 259) tentatively referred this specimen to *S. ridleyana* known only from the type specimen collected in the Carstensz Mts. This species, however, has

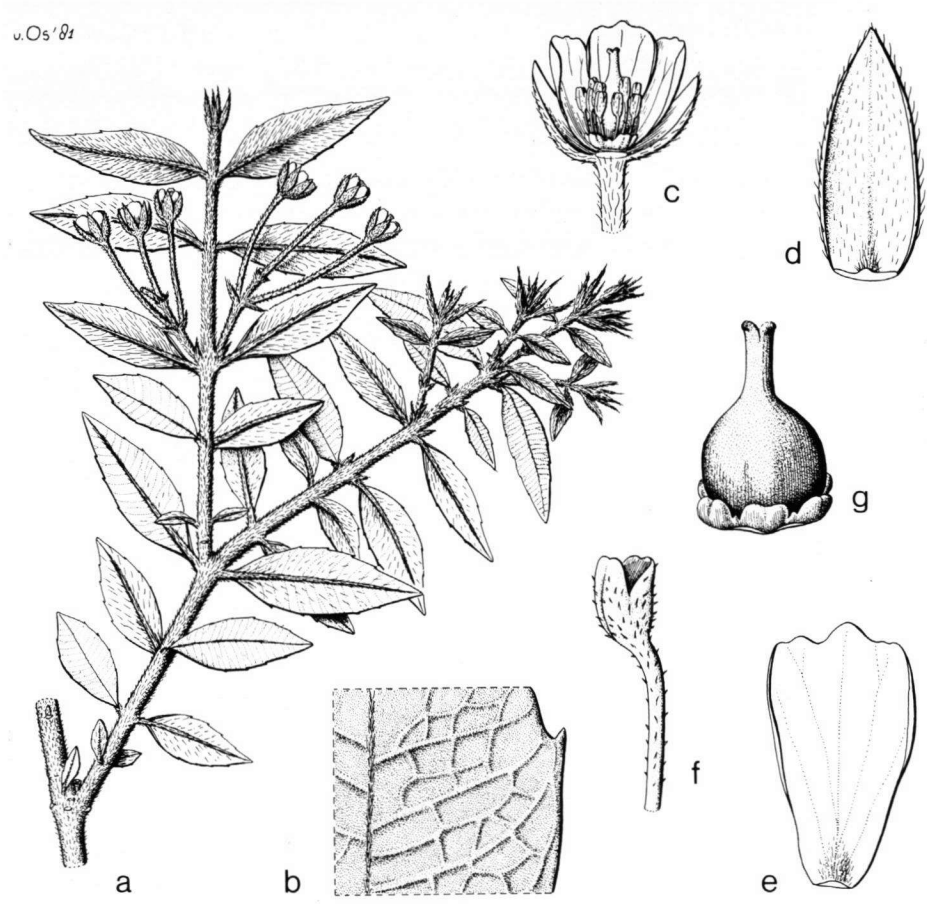

Fig. 6. *Sericolea microphylla*. — a. habit, × 2; b. leaf dorsal view, × 6; c. flower, × 6; d. sepal from inside, × 12; e. petal from inside, × 12; f. stamen, × 25, g. pistil, × 12. *(Coode NGF 46279)*.

coriaceous leaves with strongly inrolled margins and glabrous pedicels and sepals. In my opinion *S. microphylla* can best be considered a dwarf *S. gaultheria*, but since no intermediate specimens are known, I prefer to describe it as a species in its own right.

11. S. novoguineensis Gibbs

S. novoguineensis Gibbs, Arfak (1917) 147; Schlechter, Fedde, Rep. 16 (1979) 31; v. Steenis, Bull. Jard. Bot. Btzg. III, 13 (1934) 203; Kanehira & Hatusima, Bot. Mag. Tokyo 56 (1942) 322, fig. 14; Coode, Brunonia 1 (1978) 253 (as a synonym of *S. pullei*). — T y p e: *Gibbs 5613* (BM, L) Arfak, Koebre.

S. gjellerupii O. C. Schmidt, Nova Guinea Bot. 14 (1924) 151; v. Steenis, Bull. Jard. Bot. Btzg. III, 13 (1934) 302 — T y p e: *Gjellerup 1194* (BO, L) Arfak, Koebre.

Shrub to 2 m tall, strongly branched, branches erect. *Twigs* ± angular, ± compressed towards the nodes, 0.5–1.2 mm ∅, densely brown tomentose to hirsute, later terete,

glabrous, smooth or with irregular cracks, blackish brown; internodes 3–12(–20) mm; stipules 0.5–1.5 mm, slightly curved, sericeous. *Leaves* opposite, rarely triverticillate, spreading, rarely pointing downward; petiole 1–3.5 mm, 0.4–0.8 mm ∅, terete, shallowly grooved or flat above, densely brown sericeous or hirsute; lamina broad ovate, rarely ovate-lanceolate, 6–23 × 4–12 mm [leafindex 1.1–2.3(–4)], coriaceous, upper surface convex, glabrous except the appressed hairy midrib, below very densely brown tomentose; base obtuse to cordate, rarely part of the leaves with acute base; margin reflexed, dentate, teeth 4–13, 0.1–0.5 mm, glabrous, black; apex obtuse or acute, mucronate, mucro 0.5–1 mm; midrib ± sunken above, prominent below; lateral nerves 6–14, ascending at an angle of 60°–70° (–85°) to midrib, hardly raised above, prominent below. *Inflorescence* an axillary raceme, up to 2.5 cm long, bearing 2–6 flowers; peduncle and rhachis 0.5–1.5 cm, brown sericeous to hirsute; pedicels 5–10 mm, 0.3–0.4 mm ∅, curved, densely to sparsely hairy; bracts 1.5–3.5 × 0.4–0.8 mm, sericeous, basal teeth 0.3–0.6 mm. *Flowers* (4-) 5-merous; sepals ovate-oblong to -lanceolate, 1.8–3.6 × 0.5–1.2 mm, outside brown hirsute, rarely sparsely sericeous, inside minutely puberulous with somewhat longer hairs towards the apex; petals narrow to broad cuneate, 2–3.5 × 0.8–1.3 mm, apex rounded or truncate, weakly 2 or 3 lobed or irregularly crenulate, pubescent at base inside, white in vivo; disc (4-) 5-lobed, 0.3 mm thick; each lobe ridged; stamens 15, often some abortive or missing, minutely puberulous, filaments 0.5–0.9 mm, slightly curved, anthers 0.5–1 × 0.15–0.3 mm; ovary subglobose 0.7–1 mm ∅, bilocular, (1) 2 ovules per cell; style 0.7–1.5 mm. *Fruit* subglobose to globular, up to 6 mm ∅, in vivo red at maturity, containing 1–3 seeds; seed kidney shaped, 4 mm long, 2 mm ∅.

Distribution: see under the varieties.

Ecology: In the Arfak Mts. reported to be common on ridges and plateaus, on clayey soils, in low shrubbery, partly subject to burning. Altitudinal range: 1800–3000 m.

Notes on bark: Outer bark grey brown; inner bark yellow; wood white.

Vernacular name: *piepa* (Kapauku).

Note: The material is rather heterogeneous, but I am convinced that not more than one species is involved. *S. gjellerupii* was believed to differ from *S. novoguineensis* in having smaller flower parts, whereas the foliage characters were essentially similar. By studying the rather scrappy type specimen of *S. novoguineensis* (*Gibbs 5613*) it appeared that the measurements of the flower parts given by Gibbs were exaggerated. Kanehira and Hatusima (1942, 322) had already suggested that the two were synonymous. Some specimens have more coriaceous leaves with more distinct lateral nerves, longer indument and acute apex and are described as a new variety.

KEY TO THE VARIETIES:

1a. Leaves broad ovate to elliptic, base obtuse to cordate, apex obtuse, lateral nerves moderately raised below; indument on underside of leaves short, appressed . . . . . **11a. var. novoguineensis**

b. Leaves ovate to lanceolate, base acute to obtuse, apex acute, lateral nerves strongly raised below; indument longer and less appressed . . . . . **11b. var. vinkii**

11a. var. novoguineensis

S. gjellerupii O. C. Smith.

D i s t r i b u t i o n. Irian Jaya: Vogelkop, Arfak Mts. (5), Nassau Mts. (1). Altitudinal range: 2200–2500 m:

11b. var. **vinkii** van Balgooy, *var. nov.*

A varietate typica in foliis apicibus acutis, subtus nervis lateralibus arcte elevatis et indumento longior minus appresso munito differt. — T y p u s: *Sleumer & Vink BW 14212* (holo: L, iso: not yet distributed), Arfak, Mt. Sensenemes.

Named after my colleague Dr. W. Vink, who collected many critical specimens of *Sericolea* in New Guinea.

D i s t r i b u t i o n: From the Vogelkop to the Star Mts., I r i a n Y a j a: Vogelkop, Arfak Mts. (2), Wissel Lakes (2). — P a p u a N e w G u i n e a: W. Sepik, Star Mts. (1). Altitudinal range: 1800–3000 m.

12. S. ovalifolia (Wernh.) Gibbs

S. ovalifolia (Wernh.) Gibbs, Arfak (1917) 148; Schlechter, Fedde, Rep. 16 (1920) 31; van Steenis, Bull. Jard. Bot. Btzg. III, 13 (1934) 203: Coode, Brunonia 1 (1978) 262. — *Mischopleura ovalifolia* Wernhan in Ridley, Hook, Ic. Pl. 31 (June, 1916) t. 3059 B; Wernham, Trans. Linn. Soc. Bot. 9 (Aug. 1916) 99. — T y p e: *Boden Kloss s.n.* (BM) Mt. Carstensz, Camp XI–XII.
S. lamii O. C. Schmidt, Nova Guinea Bot. 14 (1924) 152; van Steenis, Bull. Jard. Bot. Btzg. III, 13 (1934) 203; Coode, Brunonia 1 (1978) 254. — T y p e: *Lam 1799*, (holo: U, iso: BO, L) Doormantop.

Shrub *c.* 1 m, strongly branched, branches erect. *Twigs* more or less angular, 1–1.5 mm ∅, finely brown pilose, soon glabrescent, later glabrous, with fine longitudinal cracks, purplish black; internodes 3–10 mm; stipules nearly straight, 0.5 mm, glabrous, black. *Leaves* in whorls of three or opposite, spreading or upwardly patent; petiole 1–2 mm, 0.4–0.6 mm ∅, grooved above, glabrous or with few scattered hairs; lamina ovate to oblong ovate or elliptic, 8–16 (–28) × (4–) 6–8 (–14) mm, leafindex 1.5–2.5, coriaceous, upper surface somewhat convex, glossy, glabrous, undersurface with a few scattered appressed hairs, base subacute to rounded, cordate in the largest leaves, margin reflexed, with up to 10 black teeth, 0.1–0.2 mm long, apex acute to rounded ending in a black mucro 0.3 mm; midrib sunken above, prominent below; lateral nerves 5–8, at an angle of 60°–75° to midrib, lateral nerves and venation network prominent above and below. *Inflorescence* an axillary raceme, up to 2 cm long, bearing 2–5 flowers; peduncle and rhachis up to 1 cm long, minutely puberulous; pedicels 5–10 mm, 0.3 mm ∅, slightly curved, minutely puberulous; bracts ovate, 0.5 × 0.2 mm, nearly glabrous. *Flowers* 5-merous; sepals ovate, 2–2.5 × 0.7–1 mm, sparsely pubescent outside, minutely puberulous inside especially at base, woolly towards apex; petals obovate cuneate 2.2–2.8 × 0.8–1.2 mm, apex truncate, weakly 2-3-lobed to nearly entire, glabrous or with a few hairs inside at base; disc 5-lobed, 0.3–0.4 mm thick, each lobe with longitudinal grooves; stamens 10–15, puberulous, filaments more or less flexuous, 0.7–1.5 mm, distinctly longer

than the anthers which are 0.5 × 0.2–0.4 mm; ovary globose, *c.* 1 mm ∅, bilocular, two ovules per cell; style 0.5–1 mm. *Fruit* (unripe) ellipsoid to globose *c.* 5 mm ∅, containing 2 seeds; seed weakly curved, 4 mm long, 2 mm ∅.

D i s t r i b u t i o n: see under the varieties.

E c o l o g y: Apparently a rare species of rather open mossy forest around 3200–3300 m.

N o t e: I think the differences between *S. ovalifolia* and *S. lamii* are too small to justify maintaining the latter as a distinct species. With more collecting it may even prove impossible to recognize two varieties as proposed now.

KET TO THE VARIETIES:

1a. Leafmargin with 0–2 teeth, petals with some hairs inside at base . **12a.** var. **ovalifolia**
b. Leafmargin with 4–8 teeth, petals glabrous . . . . . **12b.** var. **lamii**

12a. var. **ovalifolia**

Mischopleura ovalifolia Wernham.

D i s t r i b u t i o n: Irian Jaya: only known from the type collection.

12b. var. **lamii** (O. C. Schmidt) van Balgooy, *comb. nov.*

Sericolea lamii O. C. Schmidt. — T y p e: *Lam 1799* (holo: U, iso: BO, L) Doormantop.

D i s t r i b u t i o n: Irian Jaya: Mt. Doorman (2), altitude 3200–3260 m.

13. S. pachyphylla Coode

S. pachyphylla, M. E. J. Coode, Brunonia 1 (1978). — T y p e: *Womersley NGF 17953* (CANB, L) Mt. Amungwiwa.

Compact, strongly branched shrub, densely foliaged, (height ?). *Twigs* terete slightly angular and compressed towards the nodes, 1 mm ∅, densely patently dark brown velutinous-hirsute, later glabrescent, flaky, dark brown; internodes (3–) 4–6 (–24) mm. Stipules 1–1.5 mm, curved, brown villose. *Leaves* (sub-)opposite, spreading; petiole (1.5–) 2 (–3.5) mm, 0.5–0.7 mm ∅, slightly grooved above, brown hirsute; lamina ovate to elliptic, 5–13 × 3–7 mm, leafindex 1.5–2, thickly coriaceous, upper surface strongly convex, bullate, finely white pilose, soon glabrous except the midrib, undersurface densely brown woolly-tomentose, hairs on midrib in centre appressed, at the sides spreading at right angles to midrib, base obtuse, margin revolute, with 2–4 teeth, *c.* 0.2 mm, black, apex subacute to rounded, terminating in a dark brown mucro, 0.5 mm long; midrib and lateral nerves sunken above, very prominent below, lateral nerves 5–7 at an angle of 70°–85° to midrib, venation network prominent above and below. *Inflorescence* an axillary raceme up to 1.5 cm long, with 1–4 flowers; peduncle and rhachis 0.2–0.8 cm,

hirsute; pedicels 2–4 mm, 0.3 mm ∅, strongly nodding, glabrous or with a few scattered hairs; bracts minute, triangular, 0.5 mm long. *Flowers* 4-merous; sepals ovate, 1.5–2 × 0.7–1.2 mm, outside glabrous, inside densely minutely puberulous, especially apically; petals obdeltoid, 1.8 × 1.5–1.8 mm, weakly three-lobed, glabrous, white in vivo; disc 4-lobed 0.1 mm thick; stamens 12, occasionally one or two missing, filaments straight 0.4–0.5 mm, glabrous, anthers 0.4–0.5 × 0.2 mm, nearly glabrous, setulose at apex; ovary subglobose, 0.7–1 mm, bilocular, 2 ovules per cell; style 0.7 mm. *Fruit* ovoid, 5 mm long, 3 mm ∅, purple in vivo at maturity, containing one seed; seed short corniculate, 4 mm long, 3 mm ∅.

D i s t r i b u t i o n: Papua/New Guinea. Morobe Dist., Mt. Amungwiwa (3)

E c o l o g y: Alpine shrubbery, 3300–3500 m.

N o t e s: A very distinct small-leaved species; the only species with consistently 4-merous flowers. Other species of which the flowers are often 4-merous are: *S. arfakensis*, *S. collinsii* and *S. gracilis*, but these are obviously different species.

14. S. pullei (Laut.) Schltr.

S. pullei (Laut.) Schltr., Fedde, Rep. 16 (1919) 32; O. C. Schmidt, Nova Guinea Bot. 14 (1924) 153; van Steenis, Bull. Jard. Bot. Btzg. III, 13 (1934) 203; Coode, Brunonia 1 (1978) 258. — *Hormopetalum pullei*, Lauterbach, Bot. Jahrb. 55 (1918) 258. — T y p e: *Pulle 942* (holo: U, lost?, iso: L, WRSL), Hellwig Mts.

S. venusta A. C. Smith, J. Arn. Arb. 25 (1944) 107. — T y p e: *Brass 11056* (holo: A, iso: BO, BRI, L, LAE), Lake Habbema.

Trees up to 18 m tall, or shrubs, strongly branched. *Twigs* terete, slightly compressed towards the nodes, 0.5–1 mm ∅, densely brown hirsute to sericeous, later glabrescent, with small longitudinal cracks, purplish brown; internodes 5–7 mm; stipules curved to nearly straight, 1–5 mm, sericeous, often persistent. *Leaves* (sub-)opposite, spreading or slightly patent; petiole 0.5–3 mm, 0.6–0.7 mm ∅, more or less grooved above, densely sericeous; lamina ovate to linear-ovate, 10–62 × 6–16 mm, leafindex 1.5–7.7, chartaceous to subcoriaceous, upper surface wavy or concave, rarely more or less flat, glabrous except the sericeous midrib, undersurface densely dull brown soft woolly to glossy golden sericeous, base rounded, margin denticulate, teeth 5–33, up to 0.6 mm long, brown to black, sparsely hairy, apex acute, short acuminate or gradually tapering, very top truncate, ending in a tooth or flagella 1–4 mm long, usually flanked by two teeth; midrib raised below, hardly so above; lateral nerves 6–32; ascending at 65°–80° to the midrib, weakly raised above and below, venation network weakly raised, obscured by indument below. *Inflorescence* an axillary raceme up to 2 cm long bearing 2–6 flowers (very rarely a panicle with up to 20 flowers); peduncle and rhachis 0.2–12 (–2) cm, densely brown hirsute to sericeous; pedicels curved, 3–9 mm, 0.2 mm ∅, appressed to patently pubescent; bract ovate-lanceolate, 1–2.5 × 0.3–1 mm, with two basal teeth 0.2–0.4 mm. *Flowers* 5-merous (rarely 4- or 6-merous); sepals ovate-oblong, 2–3 × 0.6–1.1 mm, acute, sericeous outside, puberulous inside; petals obovate to narrow deltoid, 2–3.2 × 1–1.9 mm, apex truncate 2–4 lobed or irregularly dentate, with a tuft of hairs inside at base, in vivo white; disc 5-lobed, 0.2–0.3 mm thick; stamens 10–15 (when 15, often some staminodial), puberulous, filaments 0.3–0.8 mm, anthers 0.3–0.6 × 0.1–0.2 mm, more or

less setiferous apically; ovary subglobose 0.7–1 m ∅, bilocular, 2 ovules per cell; style 0.5–0.7 mm. *Fruit* ellipsoid, 4 mm long, 3 mm ∅, containing 1 or 2 seeds; seed short corniculate, 3–3.5 mm long, 1.5–2 mm ∅.

Distribution. Irian Jaya: Lake Habbema/Mt. Hellwig (6). — Papua New Guinea: W. Sepik Dist., Star Mts., Hindenburg Ra. (5); West. Dist., Hongkong Hill (2); South. Highl., Doma Peaks (8), Mt. Giluwe/Ialibu (6); West. Highl., Wabag/Hagen (9), Kubor Ra. (2).

Ecology: Mixed montane forest, also at boundary with grassland, low shrub on peat, secondary forest on limestone. Altitudinal range 1900–3000 m. Flowering and fruiting specimens have been collected in nearly all months of the year.

Vernacular names: *tigili, kugili, un* (Mendi), *iyshi digil* (Wola, Was R.), *kaingun, kubin* (Wabag), *kaintaka* (Enga, Pomogos) *targar* (Enga, Poio), *milach* (Hagen), *yombi unu* (Hagen, Kaugl), *erndagernts* (Hagen, Wankl); *kwul mingna* (Minj).

Notes: With *S. gaultheria* this is the most variable species as to leaf morphology. Coode (1978, 258) suggested two infraspecific groups based on relative leaf length and indument:

Leaves lanceolate or indumentum silky glossy or both . . . . . **group 2**
Leaves ovate to ovate-lanceolate and indumentum woolly, dull to slightly lustrous . . . . **group 1.**

In view of the many intermediate specimens and the fact that the same plant sometimes shows characteristics of both groups I prefer not to distinguish infraspecific taxa. There appears to be a correlation between exposure and leaf morphology. Trees in the edges of forest and more or less open places generally have more coriaceous and smaller leaves than those in the closed forest. Some specimens, especially when sterile, may be mistaken for other species. Broadleaved juvenile specimens resemble *S. gaultheria* var. *muelleri*, but these never have the abrupt leafapex with the relatively long flagella. Specimens with small ovate leaves may resemble *S. novoguineensis* (var. *novoguineensis*), a species reduced by Coode to *S. pullei*. This species always has coriaceous leaves and never the characteristic apex of *S. pullei*. The resemblance between long-leaved forms of *S. pullei* with *S. micans* is even more deceptive. The differences between the two have been contrasted under the description of *S. micans*.

S. pullei is the only species, as far as I know, that is often infested by a gall that causes the leaves or parts thereof two grow into ovoid red hairy structures sometimes mistaken for fruits by the collectors. About half of the specimens of *S. pullei* have these galls.

15. S. ridleyana (Wernh.) Schltr.

S. ridleyana (Wernh.) Schltr., Fedde, Rep. 16 (1919) 32; van Steenis, Bull. Jard. Bot. Btzg. III, 13 (1934) 203; Coode, Brunonia 1 (1978) 259. — *Mischopleura ridleyana* Wernham in Ridley, Hook. Ic. 31 (June, 1916) t. 3059 A; Wernham, Trans. Linn. Soc. Bot. 9 (August, 1916) 99. — Type: *C. Boden Kloss s.n.* (BM), Camp Pundok Padang, Mt. Carstensz.

Shrub (?). *Twigs* terete, 0.5–1 mm ∅, sparsely brown pilose; internodes 2–6 mm; stipules not seen. *Leaves* (sub-)opposite, spreading; petiole 1 mm, 0.5 mm ∅, grooved above.

sparsely appressed brown pubescent; lamina ovate linear-lanceolate, 10–20 × 2–3.5 mm, leafindex 5–6, coriaceous, upper surface convex, glossy glabrous except the sericeous midrib, undersurface glaucous, glabrous except the midrib and margins which are densely, later sparsely, appressed brown pubescent, base acute, margins strongly revolute, with 1–3, 0.2 mm long teeth, apex acute, abruptly ending in a darkbrown 1–1.5 mm long needle; midrib sunken above, strongly prominent below; lateral nerves 18–22 at 65°–80° to midrib, slightly raised above and below, venation network hardly visible. *Inflorescence* an axillary raceme up to 0.8 cm long, with 2 or 3 flowers; peduncle and rhachis 4–6 mm, nearly glabrous; pedicels 5–6 mm, 0.5 mm ∅, nodding, nearly glabrous; bracts ovate-lanceolate, *c.* 1 × 0.2 mm, sparsely sericeous. *Flowers* 5-merous, sepals ovate-lanceolate, 1.9–2 × 0.5–0.6 mm, acute, very sparsely sericeous outside, puberulous inside, tomentose towards the apex; petals oblong obovate, 1.9–2 × 0.8 mm, apex truncate, weakly 2- or 3-lobed, with a small tuft of hairs inside at base; disc 5-lobed, 0.5 mm thick; stamens 10, glabrous, filaments flexuous 0.5–0.7 mm, longer than the anthers which are 0.3 × 0.25 mm; ovary ovoid 0.7 × 0.5 mm, bilocular, 2 ovules per cell; style 0.6 mm. *Fruit* and seed unknown.

D i s t r i b u t i o n: Irian Jaya, Mt. Carstensz, only known from the type collection.
E c o l o g y: unknown.
N o t e: A very distinct species with its tiny, narrow leaves. Coode (1978, 259) tentatively identified *NGF 46279* from Mt. Piora as *S. ridleyana*. This specimen is the type of my new species *S. microphylla*, which I think is closely allied to *S. gaultheria*. In my opinion *S. ridleyana* is more closely linked with *S. leptophylla* from the Arfak Mts.

16. Sericolea sp. 1

One nearly sterile specimen, *Dumas 6*, from the Cyclop Mts. in NE Irian Jaya, can not be matched with any of the described species. It could be an unusual specimen of *S. micans* var. *glabra*. The material is scrappy; more ample material is needed to decide about its identity.

Shrub (?), twigs terete somewhat compressed at the nodes, 0.5–1 mm ∅, densely covered with reddish appressed hairs, later terete glabrous, with minute longitudinal cracks, dark purplish brown to black; internodes 10–15 mm; stipules curved, 0.8–1.5 mm, appressed pubescent. *Leaves* (sub-)opposite, patent; petiole 1.5–2 mm, 0.5 mm ∅, grooved above, brown tomentose; lamina oblong-ovate to ovate-lanceolate, 19–53 x 7–15 mm, leafindex 2.7–3.5, thin coriaceous, upper surface slightly convex, glabrous except the midrib, undersurface very glaucous sparsely more or less appressed pubescent on midrib and along the margins, base broadly obtuse, margin reflexed, serrate dentate, teeth 5–9, 0.1–0.2 mm, black, apex acute, gradually tapering and ending in a black mucro, 0.4 mm; midrib flat above, prominent below; lateral nerves 10–20 at 70°–80° to midrib, slightly raised above and below; venation network slightly raised above and below. *Inflorescence* incomplete (one immature flower); pedicel 8 mm, appressed brown pubescent; flower 5-merous; sepals ovate, 1.8 × 0.7 mm, densely sericeous to hirsute outside, puberulous inside especially along margin; petals obovate 1.5 × 0.8 mm, apex truncate, 3-lobed, with a small tuft of hairs inside at base; disc 5-lobed, 0.2 mm thick; stamens 15, two staminodial, puberulous, filaments slightly curved, 0.3 mm, anthers 0.4 × 0.15 mm; ovary subglobose *c.* 0.7 mm ∅; style *c.* 0.7 mm. *Fruit* unknown.

Distribution: Irian Jaya, Humboldt Bay, Mt. Cyclops, 1550 m (1).

EXCLUDED SPECIES

S. papuana (F. v. M.) Steen., Bull. Jard. Bot. Btzg. III, 13 (1934) 203. — *Aristotelia papuana* F. v. M., South. Sc. Rec. 1 (1881) 150.

Von Mueller mentions the nomen *Aristotelia papuana* and refers to *Chalmers s.n.* from the Astrolabe Ra. Schlechter, Bot. Jahrb. 54 (1916) 155 suggested that it is identical with the later published *Aristotelia gaultheria* F. v. M. (*Sericolea gaultheria*), based on *R.G.S.A. exp. 1891 s.n.* from Mt. Yule. Thus the two names are based on different specimens although it may be true that von Mueller had in mind the same taxon. Upon my request Dr. J. H. Willis in 1975 made an unsuccessful search for the Chalmers collection in the Melbourne Herbarium, where it should be expected.

INDEX OF TAXA

1. S. arfakensis Gibbs
2a. S. brassii A. C. Sm. ssp. brassii
b. S. brassii ssp. carrii v. Balgooy
3a. S. calophylla (Ridl.) Schltr. ssp. calophylla
b. S. calophylla ssp. grossiserrata Coode
4. S. collinsii Coode
5. S. coodei v. Balgooy
6a. S. gaultheria (F. v. M.) Schltr. var. gaultheria
b. S. gaultheria var. muelleri v. Balgooy
c. S. gaultheria var. schoddei v. Balgooy
d. S. gaultheria var. cuneata v. Balgooy
7. S. gracilis (Laut.) Schltr.
8. S. leptophylla Kaneh. & Hatus.
9a. S. micans Schltr. var. micans
b. S. micans var. glabra (Schltr.) v. Balgooy
10. S. microphylla v. Balgooy
11a. S. novoguineensis Gibbs var. novoguineensis
b. S. novoguineensis var. vinkii v. Balgooy
12a. S. ovalifolia (Wernh.) Gibbs var. ovalifolia
b. S. ovalifolia var. lamii (O. C.-Schm.) v. Balgooy
13. S. pachyphylla Coode
14. S. pullei (Laut.) Schltr.
15. S. ridleyana (Wernh.) Schltr.
16. S. sp. 1

IDENTIFICATION LIST

Van Balgooy 20 (3 b), *581* (3 b), *601* (6 b), *605* (6 b), *614* (3 b), *953* (6 b), *973* (9 a), *998* (3 b); *Barker & Wiakabu LAE 66912* (2 a), *Barker & Umba LAE 67244* (2 a), *Barker LAE 67260* (3 b); *Barker & Wiakabu LAE 67574* (14); *Boden Kloss s.n.* (3 a), *Boden Kloss s.n.* (12 a), *Boden Kloss s.n.* (15); *Borgmann 42 a* (3 b), *360* (9 a), *360A* (3 b); *Bowers* 692 (14); *Branderhorst 154* (3 b); *Brass 4501* (5), *4504* (2 b), *4665* (2 b), *9267* (3 b), *Brass & Versteegh 10473* (14), *Brass 11056* (14), *12418* (9 a), *12637* (9 a), *12676* (6 a), *12709* (2 a), *12862* (9 b), *22305* (9 a), *22959* (9 a), *29677* (9 a), *30004* (3 b), *30202* (6 b), 30691 (6 b), *30951* (6 a), *30973* (6 a), *Brass & Collins 31257* (4), *32150* (6 a).
Carr 13724 (6 a), *13756* (6 d), *13863* (2 b), *13866* (6 d), *15110* (5); *Clemens 5518* (9 a), *6277* (6 a), *6799* (9 a), *7533* (9 a), *7555* (6 b), *7608* (9 a), *8923* (9 a), *9342* (9 a), *9342A* (9 a), *11212* (9 a); *Coode 3901* (6 a), *Coode & Stevens 3902* (6 b), *3903* (6 b), *3904* (6 b), *3905* (6 b), *Coode 3906* (6 b), *Coode & Stevens 3910* (2 b), *3911* (2 b), *Coode 3912* (6 b), *Coode & Katik NGF 32872* (9 a), *NGF 32886* (9 a), *Coode, Johns, Argent NGF 46002* (6 a), *Coode & Stevens NGF 46231* (5), *NGF 46235* (5),

Coode NGF 46279 (10), *NGF 46280* (2 a); *Craig 109* (3 b), *Craven 2918* (5); *Croft et al. LAE 60935* (14), *Croft & Lelean LAE 65800* (9 a), *LAE 65839* (14), *Croft, Lelean, Hope LAE 65989* (3 b), *Croft et al. LAE 68960* (2 b).

Darbyshire 323 (9 a); *Docters v. Leeuwen 10859* (9 a), *10871* (11 a); *Dumas 6* (16).

Eyma 5144 (8), 5269 (11 b), *5379* (2 a).

Flenley ANU 2349 (14), *ANU 2677* (2 a); *Foreman & Lelean NGF 48371 A* (2 b), *NGF 48371 B* (5); *Frodin NGF 26969* (14), *NGF 28124* (14), *NGF 28342* (6 a), *NGF 32056* (14), *UPNG 4232* (9 a).

Gibbs 5613 (11 a), *6009* (1); *Gillison NGF 25118* (14), *NGF 25211* (14); *Giulianetti & English s.n.* (5); *Gjellerup 1194* (11 a); *Gressitt 6471* (6 a); *Grubb & Edwards 36* (9 a).

Hartley 11208 (6 b), *12744* (5), *12768* (6 a), *12916* (5), *13267* (9 a), *Henty & Carlquist NGF 16554* (6 a), *NGF 16565* (3 b), *Henty NGF 27006* (9 a), *Henty, Foreman, Galore NGF 42728* (14), *NGF 42844* (14); *Hoogland & Pullen 5538* (6 c), *5548* (6 c), *5638* (3 b), *5914* (9 a), *Hoogland & Schodde 6952* (14), *7230* (6 a), *Hoogland 9393* (9 a), *9596* (6 a), *Hoogland & Craven 10874* (9 a), *10893* (9 a); *Hoover 560* (9 b), *Hope ANU 10908* (9 a), *ANU 16084* (3 a).

Jacobs 8883 (6 a); *Johns & Searle s.n.* (2 a), *Johns & Noble NGF 47019* (6 b), *NGF 47020* (6 b), *NGF 47070* (6 a), *NGF 47122* (6 a), *NGF 47131* (6 a), *NGF 47142* (6 a), *NGF 47143* (6 a), *Johns NGF 47362* (3 b), *NGF 47386* (3 b).

Kalkman 4741 (14), *4814* (6 a), *4993* (6 a), 5134 (6 a); *Kanehira & Hatusima 13990* (8), *14074* (11 a); *de Kock 105* (3 b); *Kostermans 2071* (11 a), *Kostermans & Soegeng 778* (14).

Lam 1725 (12 b), *1799* (12 b): *Ledermann 8494* (9 a), *8941* (9 b), *9947* (9 b).

Millar NGF 14667 (3 b), *NGF 18588* (9 a), *NGF 23112* (9 a); *Moi 52* (6 a), 64 (13).

Paijmans 603 (5), *631* (5); *Pulle 575* (14), *882* (7), *942* (14); *Pullen 130* (14), *234* (6 a), *333* (3 b), *5010* (4), *5177* (14), *5188* (14), *5348* (9 a), *5411* (9 a), *6130* (6 a), *7915* (9 a), *8036* (9 a).

Ridsdale NGF 30278 (9 a), *NGF 36803* (5); *Robbins 2916* (14), *3088* (6 a); *von Römer 1125* (9 a), *1248* (9 a), *1284* (7), *1286* (14); *Rosenberg 32* (13); *RGSA expedition 1891, s.n.* (6 a); *van Royen & Sleumer 7195* (8), *7383* (9 a), *7864* (2 a), *van Royen NGF 16036* (9 a), *NGF 20400* (6 d), *NGF 30099* (5).

Saunders 723 (6 b), *727* (4), *992* (14); *Sauveur & Sinke 2573* (9 a); *Sayers TGH 12539* (6 a), *TGH 12542* (6 a), *TGH 12545* (6 a), *TGH 12592* (9 a), *Sayers & Millar NGF 19881* (6 b), *Sayers NGF 21245* (9 a); *Schlechter 19756* (9 a); *Schodde 1689* (14), *1793* (6 c), *2020* (14), *Schodde & Craven 4826* (9 a), *4914* (9 a), *4962* (6 a); *Sillitoe 9* (14); *Sleumer & Vink BW 14044* (1), *BW 14127* (8), *BW 14144* (8), *BW 14182* (8), *BW 14203* (11 a), *BW 14203 A* (11 b), *BW 14212* (11 b), *BW 14226* (3), *BW 14227* (8), *BW 14234* (11 b), *BW 15410* (8); *Smith ANU 15105* (3 b), *ANU 15621* (4); *Stevens LAE 51043* (9 a); *Stevens & Veldkamp LAE 54323* (6 d), *Stevens LAE 54567* (3 b), *Stevens & Veldkamp LAE 54896* (14), *Stevens & Foreman LAE 55833* (6 c), *LAE 55837* (6 c), *Stevens LAE 58135* (9 a); *Streimann NGF 24376* (6 a), *NGF 44456* (9 a).

Thorne & Womersley 37884 (6 a)

Vandenberg NGF 35018 (3 b), *Vandenberg, Katik, Kario NGF 39712* (14), *Mc Vean/Wade ANU 7069* (3 b); *Veldkamp 6341* (3 b), *6530* (3 b), *6711* (14); *Versteegh, BW 3117* (9 a); *Vinas & Wiakabu LAE 59460* (2 a), *Vinas LAE 59776* (6 a), *Vinas & Wiakabu LAE 67059* (14), *LAE 67064* (11 b); *Vink & Schram BW 8817* (11 b), *BW 8901* (9 a), *Vink 16005* (6 a), *17025* (14), *17038* (6 a), *17065* (6 a), *17231* (14), *17269* (6 a), *17572* (14).

Walker ANU 752 (14); *Werner 95* (9 a); *Wheeler ANU 6472* (9 a); *Womersley NGF 5304* (6 a), *5336* (9 a), *Womersley & Floyd NGF 6120* (9 a), *Womersley NGF 8935* (3 b), *NGF 11328* (14), *NGF 11486* (4), *NGF 14017* (9 a), *NGF 15228* (2 a), *NGF 15357* (6 b), *NGF 17953* (13), *NGF 24578* (9 a), *NGF 24617* (9 a), *NGF 24661* (9 a), *Womersley & Woolliams NGF 37027* (14), *Womersley & McEwin NGF 37451* (6 a).