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REVISION OF THE PSEUDO-STIPULAR SPECIES OF MEDINILLA (MELASTOMATACEAE)

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SUMMARY

A revision is presented here of a group of mainly Papua New Guinea species of *Medinilla* Gaudich. ex DC. (Melastomataceae) peculiar for possessing a feature nearly unique for the family: leaf blades with a pair of lateral lobes at the base ('pseudo-stipules'). This character was previously recorded for *Astronidium miraculum-dei* J.F. Maxwell & Veldk. (Astronioideae) from the nearby Solomon Islands. Various explanations, none satisfactory, for this phenomenon are explored. The group consists of 15 taxa, 2 previously described, 13 proposed here. The correct authorship of *Medinilla* is 'Gaudich. ex DC.', the correct name for the type species is *Medinilla medinilliana* (Gaudich.) Fosberg & Sachet, and not *M. rosea* Gaudich. ex DC., nom. superfl. *Medinilla rubicunda* (Jack) Blume var. *hasseltii* (Blume) Bakh.f. is validated. The descriptions of *M. arfakensis* Baker f. and *M. brassii* Markgr. are emended. A study of the palynology confirmed the homogeneity within *Medinilla* and among related genera.

Key words: *Medinilla*, Malesia, pseudo-stipules.

INTRODUCTION

Medinilla Gaudich. ex DC. (Melastomataceae) is a genus of the Old World tropics with centres of diversity in the Malesian area and Madagascar. The reported number of species varies between 150 (Mabberley, 1987) and 400 (Airy Shaw, 1973; Regalado, 1995). A recent count by Regalado (pers. comm.) estimates it at c. 362 (inclusive c. 35 undescribed taxa) (Table 1), which agrees well with Jacques-Félix's (1995) estimate of c. 350.

Obviously, the Central and Eastern Malesian region is an area of speciation with 213 taxa, and also contains a number of satellite groups suggesting that an ancient diversification might have been in this area. In view of the present-day distribution of *Medinilla* a Gondwana origin seems likely (Nayar, 1972; Jacques-Félix, 1995: 274).

Australia, so close to New Guinea, only has a single species, *M. balls-headyi* F. Muell., in N Queensland, which is closely related, if not identical, to the widespread *M. quadrifolia* (Blume) Blume (Regalado, pers. comm.). Perhaps this paucity is due to the near extinction of the genus in Australia caused by the desiccation of that continent which seem to have depauperated Africa as well (Nayar, 1972).

Curiously, the genus is absent in New Caledonia (Morat, pers. comm.).

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Table 1. Endemism and distribution of *Medinilla* (Regalado, pers. comm.).

Number (Endemics/Total)	%	Locality	Source
85/73	85.9	New Guinea	Regalado, ined.; this paper
80/72	90	Philippines	Regalado (1995)
70/70	100	Madagascar & Comores	Perrier (1951)
48/40	83.3	Borneo	Regalado (1990)
25/10	40	Sumatra	Bakhuizen van den Brink f. (1943)
19/3	15.8	Moluccas	Bakhuizen van den Brink f. (1943)
18/10	55.6	Solomon Islands	Merrill & Perry (1943)
16/3	18.8	Celebes	Bakhuizen van den Brink f. (1943)
15/5	33.3	Peninsular Malaysia	Maxwell (1978)
13/1	7.7	Java	Bakhuizen van den Brink f. (1964)
11/11	100	Fiji	Smith (1985)
10/5	50	Vietnam & Laos	Hô (1992), Nguyen (1995)
7/3	42.9	China	Chen (1984)
5/3	60	India	Sastri (1962), Santapau & Henry (1973)
5/0	0	Lesser Sunda Islands	Bakhuizen van den Brink f. (1943)
4/0	0	Thailand	Craib (1931), Maxwell (1978)
3/3	100	Africa	Hossain (1970), Wickens (1975)
3/3	100	Sri Lanka	Bremer (1988)
3/1	33.3	Micronesia	Fosberg et al. (1979)
2/2	100	Taiwan	S.F. Huang & T.C. Huang (1993)
2/2	100	New Hebrides = Vanuatu	Guillaumin (1931)
1/1	100	Samoa	Christophersen (1938)
1/1	100	Réunion	Wickens (1990)
1/1	100	Australia	Whiffin (1990)
Total 324/363			

Another centre is Madagascar with 70 species, all endemic except for *M. fasciculata* Baker var. *comorensis* H. Perrier from the Comores, and *M. loranthoides* Naudin from La Réunion. Nayar (1972: 5) regarded *M. maculata* Gardner of Sri Lanka and *M. malabarica* Bedd. of S India as more related to the species of Madagascar than to those of Malesia.

Much less successful was the genus on the other side of the Mozambique Channel, as continental Africa only has 3 or 4 species, one, *M. mannii* Hook.f., with a trans-continental distribution.

THE PSEUDO-STIPULAR SPECIES

The species studied here are most peculiar for possessing a pair of lateral lobes at the base of what appears to be the petiole. However, Melastomataceae have no stipules nor compound or incised leaves, the margin of the blades is at most minutely denticulate. Yet, we have here relatively small to large excrescences that invite explanation. Although the family is pantropical, and has between 240 genera with 3000 species (Airy Shaw, 1973) or 215 genera with 4750 species (Mabberley, 1987), this feature is

found in a few species mainly restricted to Papua New Guinea. The only known other occurrence is in *Astronidium miraculum-dei* J.F. Maxwell & Veldk. of a different subfamily, the Astronioideae, found in several islands of the nearby Solomon Islands.

That these outgrowths are not true stipules is obvious because of their placement: they are not associated with the stele, but with what appears to be the petiole. The nervature of parallel nerves is identical to that seen in leaves with broadly winged, attenuated bases, and arises from the midrib (compare for instance *M. arfakensis* Baker f. or *M. brassii* Markgr., Fig. 1), not from the branch as would be the case in stipules. Because of this similarity and the presence of intermediary species it seems safe to assume that these appendages originated by constriction of the blade tissue, leading to basal lobes (as in *M. interiaciens* Bodegom and perhaps *M. grandifolia* Bodegom of which there was insufficient material available), and plants with both lobed and 'stipular' blades (as in *M. multibracteata* Bodegom and *M. triochiton* Bodegom).

Because these appendages are not homologous with stipules, they have been called 'pseudo-stipules' by want of a better term, and the petiole is in fact restricted to the base of these, while what appears to be a petiole in some species is the midrib that has become free of blade tissue, hence 'pseudo-petiole'.

The derivation of these features may be easy to explain, the fact that they are there represents an unique situation, for which some possible explanations will be discussed below.

As said above, the Melastomataceae lack true stipules, all other species but one have simple leaves, while the margin is at most finely dentate, but never incised in any way. It is therefore not surprising that the few previous students who had access to material of this group were oblivious of the presence of these pseudo-stipules: they were not expected and therefore not seen. It must be realised, too, that until after

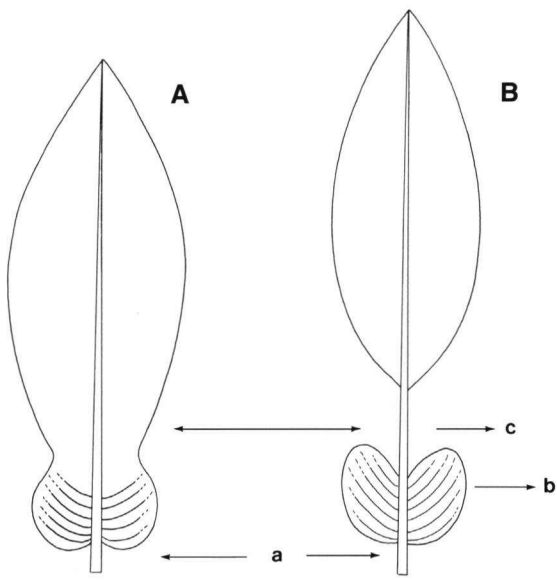


Fig. 1. Postulated origin of pseudo-stipules (schematic). — A: *Medinilla brassii* Markgr.; B: *M. markgrafii* Merr. & L.M. Perry var. *markgrafii*. a. Petiole; b. pseudo-stipules; c. pseudo-petiole.

World War II, the interior of New Guinea, where most species occur, had not been explored. Before World War II there were only 5 collections made by Brass, Carr, and Forbes, seen by few, and studied by no later authors: Bakhuizen van den Brink f. restricted his revisions to the Dutch East Indies (now Indonesia) where only 1 representative, *M. interiaciens*, has only recently been collected just across the border between Papua Barat (Irian Jaya) and Papua New Guinea (Map 1). For the present study about 100 collections were available, many with duplicates.

The first species to be described was *M. sogeriensis* Baker f. (1916, 1923), also mentioned by Mansfeld (1925; *'sogieriensis'*) in his revision of the Papuasian Melastomataceae.

The second was *M. brassii* of Markgraf (1936), who apparently did see the pseudostipules ("stipulis binis interpetiolaribus magnis viridibus glabris"), but misinterpreted them as being interpetiolar, thus equating them with the excrescences of the interpetiolary ridge which not rarely occur in the family. The description and name was based on *Brass 5114*, and the epithet preferably should have been typified by that, were it not that Markgraf appointed *Schlechter 17037* (B) instead, which happens to belong to a non-stipular species, very similar, but on closer inspection quite different. A modified description of *M. brassii* has been added here.

This mixture of two taxa was noted by Merrill & Perry (1943) who erected *M. markgrafii* for the Brass element, unfortunately selecting another Brass collection as the type (*Brass 4018*). They confused matters further by stating "stipulis interpetiolaribus setas ad nodos tegentibus", referring to the interpetiolary bristles, and disregarding Markgraf's "large, green, glabrous stipules".

They also claimed that *Schlechter 17037* from Madang (in NY and "our own herbarium", probably A) together with *Brass 5478* and *12395* "appear to suit the description of *M. arfakensis* Baker f. reasonably well". We have seen type material from the latter and it is quite distinct, as was to be expected from its distant occurrence in the Arfak Mts of the Vogelkop. A description of *M. arfakensis* has been added here.

Gressit & Nadkarni (1978) mentioned a *M. crassinervis* Blume for Mt Kaindi (actually this was misidentified *M. markgrafii*) and noted the presence of "large bracts enclosing the base of each pair of leaves", which is not quite true, as these are not bracts, and they are not at the base of a pair of leaves, but paired at the base of each leaf, as their own plate clearly shows. Two unpublished field notes may be mentioned: a) *Jacobs 8611* (L, LAE), where this eminent observer mentioned "stipules pale to light green" for *M. markgrafii*; b) *NGF 7776 (Native collector)* (L, LAE), where the famous couple of Papua New Guinea explorers, J.S. Womersley and A.N. Millar, were the first to note correctly that "the base of the petiole is produced into a pair of wings" for *M. multibracteata*.

The first published interpretation came from a quite different corner of the family (but not of the world): the discovery of pseudo-stipules in a species of *Astronidium* A. Gray (Astronioideae) from the Solomon Islands by Van Steenis who exclaimed "This is a God's wonder!" and ordered JFV, who had at the time been doing some dabbling in the family, to find out further. This led to the description of *Astronidium miraculum-dei* by J.F. Maxwell & Veldkamp (1990).

In his research JFV came upon Gressit & Nadkarni's Guide to Mt Kaindi (1978) where the same phenomenon was mentioned for *Medinilla crassinervia*. Going through the many identified and unidentified material available in L and LAE he realised the wealth of differences and the obvious presence of a great number of undescribed species. During courses at the then Rijksherbarium in 'Advanced Angiosperm Taxonomy' Ms. C.P.G. van Evert and Mr. H. Schutte (1982), and Ms. L.K. Adhin and Mr. H.H. Edelman (1984) sorted out the material into what they thought were 21 taxa, of which only the 2 mentioned above appeared to have been described. This laid the base of the present independent study, in which their findings were reduced to 15 taxa in all.

THEORY

This account would not be complete without at least an attempt to speculate on possible explanations of the occurrence of these remarkable pseudo-stipules both in place and in relationships, far-fetched as one theory may appear.

Independent parallelism

In view of the nearly unique presence of pseudo-stipules restricted to central and eastern New Guinea it is most simple to regard the pseudo-stipular *Medinillae* as a monophyletic locally evolved group, for if the species are polyphyletic the situation becomes even more perplexing.

The absence of a satisfactory infra-generic structure of the genus makes it premature to make any statements on sister- or outgroups, although *M. arfakensis* and *M. brassii* seem fairly satisfactory candidates at present (of course similarity not necessarily means closely related!). Compare similar possible derivation of *Astronidium miraculum-dei* from *A. sessilifolium* Merr. & L.M. Perry (Maxwell & Veldkamp, 1990). Finding conceivable relatives, however, awaits Regalado's studies on the genus in New Guinea.

To support the monophyly of the pseudo-stipular species there ought to be at least one other autapomorphy (absence of setae on the inflorescence nodes at least in *M. brassii*). In search for one we have omitted the pseudo-stipules when trying various keys, especially that by Mansfeld (1925), but all species got stuck after a few steps. It may be noted that *M. arfakensis* and *M. brassii*, putative outgroups, only differ from the pseudo-stipular species in having glabrous inflorescence nodes and terete or alate branches, which are very plastic features. Because of these transitions, the pseudo-stipular species probably do not belong to a group of their own but to a larger one including non-pseudo-stipular taxa.

If the group is indeed monophyletic, it may be assumed that a mutation caused the occurrence in a common ancestor in the Papuasian area, resulting in the present taxa and a distribution presently restricted to Papua New Guinea but for a small excursion into Papua Barat by *M. interiaciens* (Map 1). Other species, e.g. *M. clathrata* Bodegom and *M. grandifolia* may be expected in the Indonesian Star Mts as well.

The occurrence of the same feature in *A. miraculum-dei* can be explained away as a similar, parallel mutation, which also must have occurred some time ago, as the species is found on several islands of the archipelago.

The late Dr. J.J. Wurdack (US) at the Melastomataceae Conference in Washington D.C. (August, 1991) produced a short-list of South American taxa (pers. comm.) where pseudo-stipules have also been suggested or mentioned; in e.g. *Blakea* P. Br. (Blakeae), *Macrocentrum* Hook.f. (Sonerileae), *Meriania* Sw. (Merianieae), and *Miconia* Ruiz & Pav. (Miconieae). A joint inspection by him and JFV of the material available at US showed that these pseudo-stipules were in fact excrescences of the inter-petiolary ridges, and had little to do with the blades.

The 64 K$ question then is why it has not occurred elsewhere in this pantropical family, one of the largest of the flowering plants, and whether the regional occurrence has anything to do with an explanation.

Dependent parallelism: 'Went's Way'

The pseudo-stipular species of *Astronidium* and *Medinilla* belonging to two different subfamilies surely are a polyphyletic group. An explanation for the localised occurrence of this curious phenomenon is provided by the 'Lateral gene transfer theory' of Went (1971). This attempts to explain geographically restricted parallel evolution by rare, non-sexual transfer of chromosome material by micro-organisms of one sort or the other. The examples Went provided have over the years been explained by other theories, e.g. the virgate growth of shrubs and trees of New Zealand was most likely forced upon them by the browsing of moas (McGlone & Clarkson, 1993), but even so with modern gene transfer becoming daily practice in the laboratories, resulting in the present-day genetically manipulated species like maize, soya, cows, sheep, etc. where it is feared that characters artificially induced may escape through micro-organisms, this theory is relevant for consideration.

This explanation in the present case is undermined, however, by the absence of overlap in the contemporary distribution of the species of *Medinilla* and *Astronidium*. The presumed micro-organisms would have had to cross the large distance between the two areas, which in the past was even greater due to the tectonics of the various plates on which they occur.

In case of proven polyphyly within the pseudo-stipular group of *Medinilla*, the lateral gene transfer theory must again be considered, speculative as it may be.

Atavism, the re-appearance of an ancestral feature

This may be ruled out, as pseudo-stipules are clearly exceptional.

Pure coincidence

This may be the best explanation at present for the occurrence of pseudo-stipules in adjacent and restricted areas.

POLLEN MORPHOLOGY

The pollen of several *Medinilla* species has been described by Kubitzki (1965), Huang (1968, 1972), Rao & Tian (1974), Straka & Friedrich (1984) for *M. hasseltii* Blume (= *M. rubicunda* (Jack) Blume var. *hasseltii* (Blume) Bakh.f., see 'New Combination'), *M. hayataiana* H. Keng, and *M. sedifolia* Jum. & H. Perrier. Two other species treated (Fischer, 1890; Long, 1982) do not belong to *Medinilla*: *M. farinosa* Regel (= *M. venosa* Blume = *Hypenanthe venosum* (Blume) Bakh.f.) and *M. septentrionalis* (W.W. Sm.) H.L. Li (based on *Oritrephes septentrionalis* W.W. Sm. = *Pseudodisso-*

chaeta septentrionalis (W.W. Sm.) M.P. Nayar). The pollen of all these species shows little or no variation. However, only one species (*M. sedifolia*) was investigated with SEM. In search for additional characters, pollen of 6 pseudo-stipular *Medinilla* and *M. brassii* were studied for comparison. One sample per taxon was taken (vouchers kept in L) indicated by (p) in the 'List of Collections'.

For light microscopy (LM) and scanning electron microscopy (SEM) the material was acetolysed (Erdtman, 1960). The material for SEM was coated with gold using the Bal-tec SCD 005 Sputter Coater. The grains were observed and photographed with a Jeol JSM-5300 Scanning Microscope at 15 kV with a working distance of 15 mm.

The pollen grains are small-sized (P = 12.6 (15.1) 17.7 μm, E = 10.5 (11.5) 13.2 μm) (Table 2). The shape as determined by the P/E ratio (1.2–1.5) is subprolate to prolate. The equatorial outline (polar view) is inter-hexagonal with slightly depressed mesocolpium centres (Plate 2a); the meridional outline (equatorial view) is more or less elliptic (Plate 1c). The grains are 3-colporate and show three clearly delimited meridional pseudocolpi (Plate 2e). Probably, these pseudocolpi play an important role in harmomegathy, permitting considerable volume changes when folding. The colpi are narrow, and seem to be relatively rigid. The ornamentation is finely rugulate to scabrate, and is mostly similar throughout the grain (Plate 1a, 1d, 2c, 2d, Table 2). Remarkably, in *Brass 22297* (*M. minutifolia* Bodegom) the pseudocolpi are scabrate (Plate 1b).

The pollen of the pseudo-stipular *Medinilla* species shows only minor variation, and is hardly or not different from that of *M. brassii*. As far as can be judged it is similar to that of the species previously described in literature. The scanning electron micrographs of *M. sedifolia* (Straka & Friedrich, 1984) show a finely punctate exine with scabrate pseudocolpi. In conclusion, the pollen morphology of the material studied does not provide taxonomically useful characters.

Table 2. Length of the polar axis, equatorial diameter, their ratio, and the ornamentation for the 8 taxa examined.

Species	P	E	P/E	Ornamentation	
				Pseudocolpi	Exine
M. glandulosa	14.7	11.1	1.3	Scabrate	Indistinctly finely rugulate
M. interiaciens	15.5	12.4	1.2	Scabrate	Finely rugulate
M. markgrafii var. *markgrafii*	14.6	11.5	1.3	Scabrate	Scabrate to indistinctly finely rugulate
M. markgrafii var. *insularis*	15.6	12.1	1.3	Scabrate	Finely rugulate
M. minutibracteata	12.6	10.7	1.2	Scabrate	Scabrate
M. minutifolia	17.7	13.2	1.3	Scabrate	Finely rugulate
M. multibracteata	14.6	10.6	1.4	Scabrate	Indistinctly finely rugulate
M. brassii	15.5	10.5	1.5	Scabrate	Scabrate

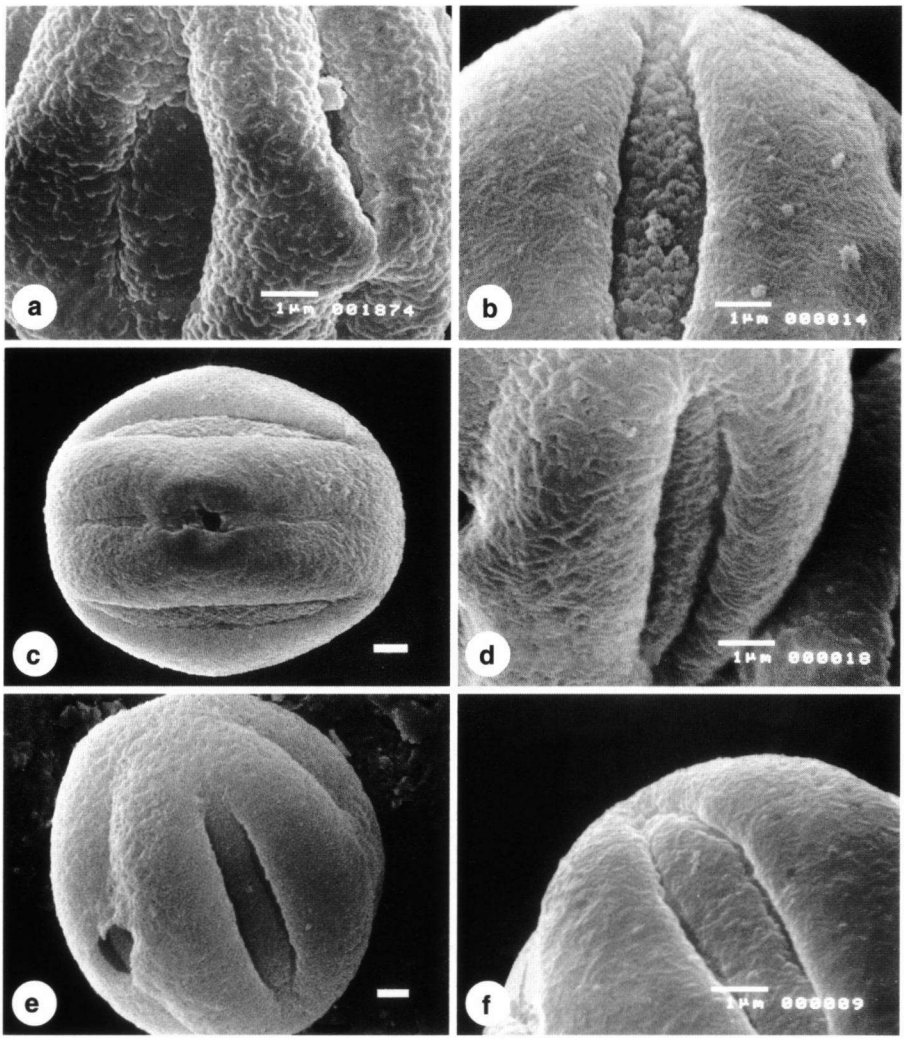


Plate 1. SEM photographs. — a. *Medinilla brassii* Markgr., detail of oblique equatorial view showing the scabrate exine and pseudocolpi. — b. *M. minutifolia* Bodegom, detail of equatorial view showing the finely rugulate exine and the scabrate pseudocolpi. — c, d: *M. glandulosa* Bodegom. c. Equatorial view; d. detail of c. — e, f: *M. interiaciens* Bodegom. e. Equatorial view; f. detail of e. — Scale bars = 1 μm.

AUTHORSHIP OF MEDINILLA AND THE CORRECT NAME FOR ITS TYPE

Traditionally the authorship of *Medinilla* (and its type species *M. rosea*) is attributed to C. Gaudichaud-Beaupré, a French naturalist and circumnavigator, and is said to have been published in the 'Voyage autour du monde ... Uranie' which supposedly appeared in 1826. The genus was named after José de Medinilla y Pineda, governor of the Marianas about 1820, for all his assistance.

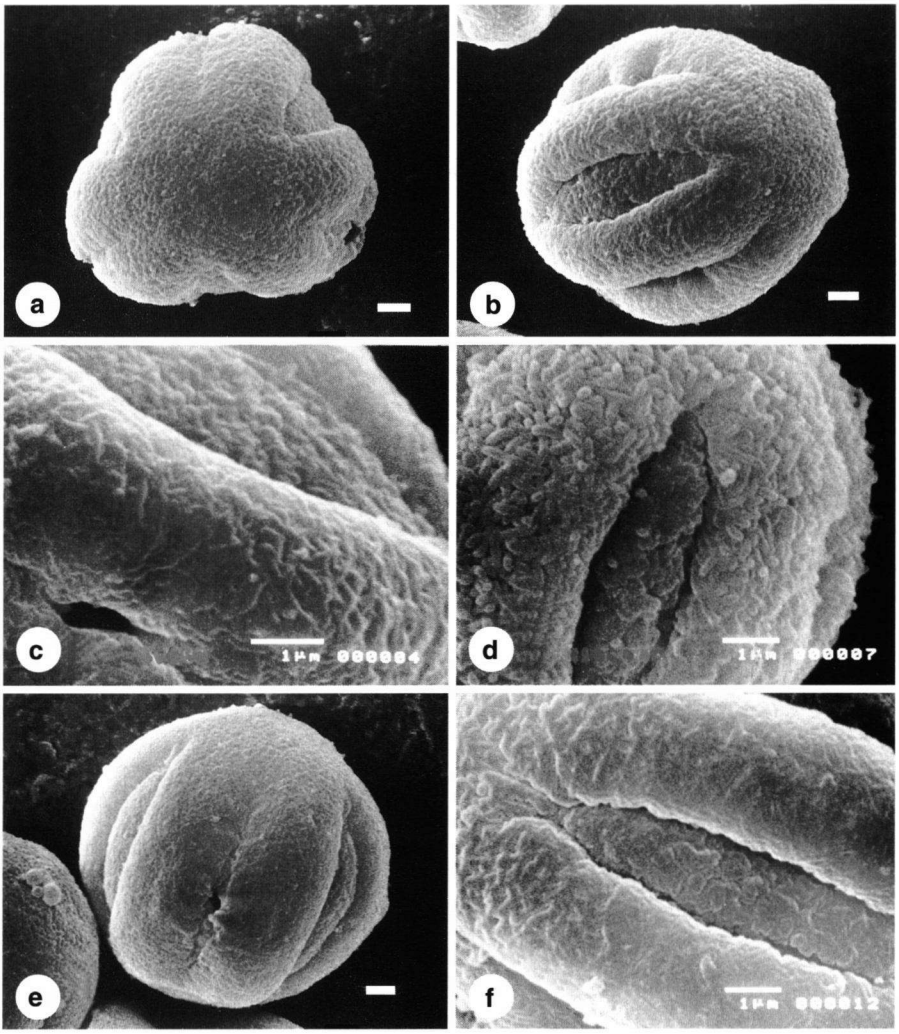


Plate 2. SEM photographs. — a, b, c: *Medinilla markgrafii* Merr. & L.M. Perry var. *markgrafii*. a. Polar view; b: oblique equatorial view; c. detail of equatorial view showing the scabrate to indistinctly finely rugulate exine and the scabrate pseudocolpi. — d. *M. markgrafii* var. *insularis* Bodegom, detail of equatorial view. — e. *M. minutibracteata* Bodegom, equatorial view showing the scabrate exine and pseudocolpi. — f. *M. multibracteata* Bodegom, detail of equatorial view. — Scale bars = 1 μm.

This citation, again, as with the pseudo-stipules, is a case of original data not being closely examined, but one author copying a previous one. One excuse is that it was not realised that the 'Voyage' appeared in a number of instalments, the first with the title page bearing the date 1826. Correct dates have been made available by Stafleu & Cowan (1976).

In 1826 Gaudichaud gave a description of the coastal vegetation of Guam, in which (p. 69) he had found a *Melastoma medinilliana*, cryptically mentioned as "qui se trouve aussi à l'état de liane sur les coteaux madréporique", i.e. 'a liana on limestone', and, in the description of the inland forest (p. 73) as "Les lianes de ces forêts sont: ... *Melastoma medinilliana* ... ici à rameaux grêles, très-longs ...", i.e. 'a liana with slender, very long branches'. These diagnoses at first sight appear to be on the borderline of validity, however, in Guam there are only two native Melastomataceae (Stone, 1970), one *Melastoma mariannum* Naudin, a white-flowered shrub in southern savannas, the other *Medinilla rosea*, a pink-flowered liana in coastal and inland forests. In this context the identity of the species is quite clear, and the diagnoses are sufficient for certain identification.

In the fascicle of 1829 Gaudichaud published plate 106 with analyses depicting a *Medinilla rosea* Gaudich., which by some has been cited as the place of publication of the genus and species (acceptable under Art. 41, Note 2, 42.3 of the ICBN, 2000).

The trails come together in 1830 in the formal descriptive part of the 'Voyage', where under *M. rosea* the remark is found "olim: *Melastoma medinilliana*" with reference to the previously published pages 69 and 73. This shows that he changed the epithet, perhaps because of the near tautonymy, which is not permitted, and *'rosea'* is superfluous.

This was apparently also the opinion of Fosberg et al. (1979) who without comment made the combination *M. medinilliana* (Gaudich.) Fosberg & Sachet, unfortunately invalidly so by lack of a full reference to the basionym. Validation took place by Fosberg & Sachet (1980).

The generally accepted supposition that Gaudichaud published the genus and species is erroneous, too. De Candolle had access to Gaudichaud's manuscript, plate, and specimen(s) and in early 1828 described *Medinilla* "Gaudichaud ined.", and *M. rosea* "Gaudich. descr. et icon. ined.". Many later authors have included the reference to De Candolle, but apparently did not realise from his very words that the plate and description had not yet been published, and that here was the first occurrence of the name and combination. De Candolle made no mention of *Melastoma medinilliana*, but because he referred to the type specimen, *M. rosea* Gaudich. ex DC. must be regarded as superfluous here, too. The citation must be 'ex' (Art. 46.4, ICBN, 2000) for De Candolle gave both a generic and specific diagnosis which differs considerably from and sometimes even conflicts with Gaudichaud's generic-specific description of *Medinilla*. The correct citation is therefore *Medinilla* Gaudich. ex DC.

The only specimen found in P is a poor specimen without inflorescence and labels of a later date in view of the citations on the labels. In G-DC there is a sheet with a leaf and a satchel presumably with flower parts which also cannot be the holotype. The resulting synonymy is:

Medinilla medinilliana (Gaudich.) Fosberg & Sachet

Medinilla medinilliana (Gaudich.) Fosberg & Sachet [Micronesica 15 (1979) 194, comb. inval.], Smithsonian Contr. Bot. 45 (1980) 15. — *Melastoma medinilliana* Gaudich. in Freyc., Voy. Uranie (27 Dec. 1826) 69, 73. — *Medinilla rosea* Gaudich. ex DC., Prodr. 3 (1828) 167; Gaudich. in Freyc., Voy. Uranie (1829) t. 106; (1830) 484; nom. superfl. — Lectotype: *Herb. Gaudichaud s.n.* (holo P, photocopy in L; iso G-DC, microfiche IDC 2562, fiche 3:167/1), Marianas, 1817–1820; designated here.

Distribution — Marianas (Guam to Sarigan).

Note — Clarke (1879) reported *M. rosea* for Malacca, but this was a misidentification for *M. clarkei* King (King, 1900; Maxwell, 1978). Bakhuizen van den Brink f. (1943) cited it for N Celebes, but of the specimens cited only *Koorders 17861* could be unearthed in L, which obviously is a quite different, possibly undescribed species. It is unlikely that he had any 'true' *M. rosea* available for comparison, and it seems that his use of this name was based on the misidentification by Koorders on the field labels.

NEW COMBINATION

In the search for possibly related species *M. rubicunda* (Jack) Blume var. *hasseltii* (Blume) Bakh.f. (1964) was encountered, but this combination was not validly made, lacking the full and direct reference to the basionym required by the ICBN (2000) after 1 January 1953.

Medinilla rubicunda (Jack) Blume var. **hasseltii** Bakh.f. ex Bodegom, *comb. nov.*

Medinilla hasseltii Blume, Flora 14 (1831) 513. — *Medinilla crassifolia* (Reinw. ex Blume) var. *hasseltii* (Blume) Bakh.f., Thesis (1943) 189. — [*Medinilla rubicunda* (Jack) Blume var. *hasseltii* (Blume) Bakh.f. in Backer & Bakh.f., Fl. Java 1 (1964) 368, nom. inval.] — Type: *Kuhl & Van Hasselt 43* (holo L).

MATERIAL AND METHODS

This revision of New Guinea species of pseudo-stipular *Medinilla* was based on herbarium specimens (A, BM, K (also visited by JFV), L, LAE, and NY (type of *M. markgrafii*)) and literature. The descriptions and diagnoses were made using DELTA version 4.06 (Dallwitz, 1980; Dallwitz et al., 1993) and TAXASOFT (Gouda, version 29 Oct. 1996). The key was constructed with DEDIT and KCONI (Pankhurst, 1988). Distribution maps were generated by the KORT mapping programs (© B. Hansen, 1993).

SYSTEMATIC TREATMENT

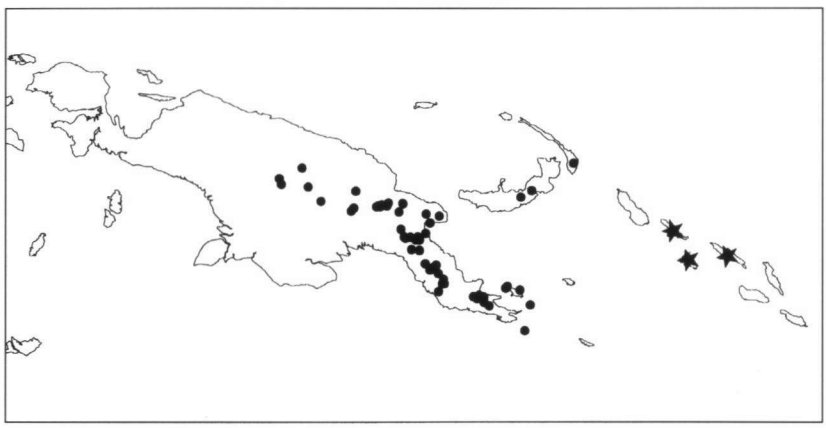
GENERAL DESCRIPTION

Terrestrial or epiphytic, erect to scandent shrubs or trees, sometimes climbing with roots. *Innovations* usually densely covered with minute, protruding, white vesicles, sometimes smooth. *Branchlets* terete or quadrangular, appressed, shaggy-tomentose or setose to glabrous. Branches terete, glabrous, smooth to sometimes scabrous; lenticels usually elliptic, slit-like and pusticulate or slit-like and protruding (*M. markgrafii* var. *markgrafii*) or sometimes punctiform and crateriform. Saddle-shaped subpetiolary ridges absent or present, glabrous. Nodes not or sometimes swollen, setose. *Pseudostipules* free or adnate with the blade (*M. interiaciens* adnate, *M. multibracteata* and *M. triochiton* free or adnate, *M. grandifolia* adnate?), broadly sessile, orbicular to linear-lanceolate, setose, soon glabrescent to glabrous; margin entire; apex obtuse to acuminate. Petioles very short to nearly absent. Leaves equal to somewhat unequal,

pseudo-petiolate; blades obovate, or orbicular to lanceolate, coriaceous, glabrous to pubescent; base attenuate to cuneate; margin entire, eglandular or remotely glandular-denticulate to sinuate-denticulate (mostly when young); apex acute to cuspidate; 3–7-plinerved; nerves above impressed to thickened, below raised to flattened; transverse veins above inconspicuous to raised, below inconspicuous to flattened. *Peduncles* terete, usually without, sometimes with cataphylls. Inflorescence terminal to cauliflorous, a few- to many-flowered thyrse, sometimes a compound umbel with many-flowered terminal umbels supported by 2–4 bracts (*M. glandulosa*) or a fascicle of thyrses (*M. multibracteata* and *M. interiaciens*); lowermost branches opposite or whorled (*M. frodinii*); usually many-branched with some empty bracts, sometimes few-branched, or few-branched with many nodes and many empty bracts (*M. multibracteata*); nodes setulose; bracts present, free to connate at base (*M. sogeriensis*), elliptic to lanceolate, apex obtuse to cuspidate; bracteoles usually absent, sometimes present (*M. clathrata, M. frodinii*, and *M. sogeriensis*), orbicular to lanceolate, apex acute to obtuse; pedicels not thickened, puberulous or setose to glabrous. Flowers 4–6-merous. *Hypanthium* urceolate to cup-shaped, rarely globose (*M. lenticellata*), ciliolate or setose to glabrous, usually verrucose, sometimes smooth (*M. minutibracteata*), rim truncate to lobed, with or without glands. Petals ovate and apex acuminate (in bud) to spathulate and apex truncate to obtuse (at anthesis), membranous. Stamens subequal, 8–12; plectrum triangular to linear-triangular. Style filiform, stigma punctiform. *Fruits* globose, ciliolate or setose to glabrous, usually verrucose, sometimes smooth (*M. minutibracteata*). Seeds numerous and cuneate; testa reticulate, rarely smooth (sometimes in *M. minutifolia*); with a bright red with yellow, water-soluble pigment.

Distribution — Mainly Papua New Guinea with 1 species (*M. interiaciens*) just across the border in Papua Barat. *Medinilla clathrata* found near Telefomin in the Star Mts may be expected there as well (Map 1).

Habitat — The species occur in mid- to high-montane forest, (300–)800–2775 m altitude.



Map 1. Distribution of the pseudo-stipular *Medinilla* species (●) and *Astronidium miraculum-dei* J.F. Maxwell & Veldk. (★).

KEY TO THE TAXA
(incl. *M. arfakensis* and *M. brassii*)

Note: The intramarginal veins are not included in the number of nerves.

1a. Pseudo-stipules absent. Blades base broadly attenuate, or winged. — The upper pair of nerves arising 5–80 mm above the base 2
b. Pseudo-stipules present. Blades base attenuate or cuneate 3
2a. Plants non-scandent. Branchlets and branches alate, wings undulate. Blades 7–11-plinerved. Inflorescence lowermost branches opposite. Flowers 5-merous. Hypanthium rim denticulate, teeth glandular. Stamens 10. Plectrum 0.2 mm long, lateral appendages 0.7 mm long. — Arfak, Wandammen Peninsula, Karkar Island ..... **M. arfakensis**
b. Plants scandent. Branchlets terete or quadrangular, branches terete. Blades 5-plinerved. Inflorescence lowermost branches whorled. Flowers 4-merous. Hypanthium rim truncate, eglandular. Stamens 8. Plectrum 1 mm long, lateral appendages 0.3 mm long. — Central Range from Paniai to Madang ..... **M. brassii**
3a. Flowers 4-merous 4
b. Flowers 5- or 6-merous 11
4a. The upper pair of nerves arising 3–13 mm above the base. — Pseudo-stipules 6–20 by 2–15 mm 5
b. The upper pair of nerves arising more or less from the base. — Leaf base attenuate to cuneate, transverse veins below inconspicuous to flattened. Inflorescence terminal to axillary 6
5a. Branchlets terete. Leaf base decurrent into the petiole, margin remotely glandular denticulate, transverse veins below flattened. Inflorescence axillary to cauliflorous. Hypanthium pubescent, rim dentate or lobed, lobes glandular, 0.5–3 mm long. Petals in bud 5–6 by c. 4 mm, at anthesis 9–13 by 6–7 mm. Alternipetal filaments in bud 1.5–2 mm long, at anthesis 3.5–4 mm long. Alternipetal anthers in bud 3.5–4 mm long, at anthesis 4.5–5 mm long. Epipetal anthers at anthesis 3.5–4 mm long, plectrum triangular, 0.1–0.2 mm long. Style at anthesis 7–8 mm long. Fruits pubescent. — E Papua Barat, W Sepik Prov., S Highlands Prov. ..... **5. M. interiaciens**
b. Branchlets quadrangular. Leaf base not decurrent into the petiole, margin entire, transverse veins below inconspicuous. Inflorescence terminal. Hypanthium glabrescent, rim dentate, teeth c. 0.2 mm long. Petals in bud 3.5–3.7 by c. 2 mm, at anthesis c. 5 by 2.5 mm. Alternipetal filaments in bud c. 1.2 mm long, at anthesis c. 2.5 mm long. Alternipetal anthers in bud 2.2–3 mm long, at anthesis c. 2.7 mm long. Epipetal anthers at anthesis c. 2.5 mm long, plectrum linear-triangular, c. 0.5 mm long. Style at anthesis c. 4 mm long. Fruits glabrous. — New Britain, New Ireland ..... **7b. M. markgrafii** var. **insularis**
6a. Branchlets quadrangular. — Inflorescence many-flowered, bracts 1–11 mm wide, pedicels puberulous to glabrous. Hypanthium urceolate or cup-shaped 7
b. Branchlets terete. — Pseudo-stipules 5–10 by 3–6 mm 8
7a. Pseudo-stipules 8–38 by 4–25 mm 9
b. Pseudo-stipules 2.5–5 by 0.8–3 mm. — Longest bristles at the nodes 4–9 mm long. Leaves equal, transverse veins above inconspicuous, margin entire or re-

motely glandular denticulate (only young leaves). Hypanthium glabrous. Calyx lobes 0.15–0.3 mm long. Epipetal anthers in bud c. 2.5 mm long. Milne Bay Prov.: Fergusson, Goodenough Island, Mt Dayman, Mt Simpson ..... **9. M. minutifolia**

8a. Leaf margin remotely denticulate to sinuate-dentate, teeth glandular. Hypanthium setose, glabrescent, rim with glandular, 0.5–1 mm long teeth. — Milne Bay Prov. ..... **3. M. glandulosa**

b. Leaf margin entire. Hypanthium ciliolate, glabrescent to glabrous, rim with eglandular, 0.1–0.5 mm long teeth. — Mainland New Guinea, Goodenough Island ..... **7a. M. markgrafii** var. **markgrafii**

9a. Branchlets pubescent. Leaves equal. Inflorescence many-flowered, bracts 2.5–5 mm wide, pedicels pubescent. Hypanthium urceolate or cup-shaped 10

b. Branchlets glabrous. Leaves subequal. Inflorescence few-flowered, bracts c. 2 mm wide, pedicels glabrous. Hypanthium globose. — Saddle-shaped subpetiolary ridges present. Pseudo-stipules apex acute. Leaves 3-plinerved. Inflorescence 1.5–2.2 cm long, peduncles 0.8–1.1 cm long, pedicels 2–3 mm long. Hypanthium globose, ciliolate, glabrescent. — Milne Bay Prov., Suckling complex ..... **6. M. lenticellata**

10a. Branchlets shaggy-tomentose. Saddle-shaped subpetiolary ridges absent. Pseudo-stipules apex acute. Leaves 3-plinerved. Inflorescence 2–3 cm long, peduncles 0.5–0.7 cm long, pedicels 1–2.5 mm long. Calyx lobes c. 0.3 mm long. Fruits ciliolate, glabrescent. — Milne Bay Prov., Normanby Island .. **11. M. punicea**

b. Branchlets setose. Saddle-shaped subpetiolary ridges present. Pseudo-stipules apex obtuse. Leaves 5-plinerved. Inflorescence 4–7 cm long, peduncles 1–1.4 cm long, pedicels 3–5 mm long. Calyx lobes 0.5–0.7 mm long. Hypanthium and fruit setose. — Morobe Prov., Wau area ..... **12. M. setiflora**

11a. The upper pair of nerves arising 4–24 mm above the base. — Longest bristles of the nodes 4–16 mm long. Hypanthium 3–5 mm wide, verrucose 12

b. The upper pair of nerves arising more or less from the base. — Pseudo-stipules soon glabrescent. Lowermost branches of the inflorescence opposite 15

12a. Pseudo-stipules soon glabrescent. Lowermost branches of the inflorescence opposite, bracteoles absent. — Blades soon glabrescent 13

b. Pseudo-stipules glabrous. Lowermost branches of the inflorescence whorled, bracteoles present. — Branchlets quadrangular, c. 4 mm thick. Saddle-shaped subpetiolary ridges absent. Blades glabrous, transverse veins above impressed. — S Highlands Prov. ..... **2. M. frodinii**

13a. Branchlets terete. Transverse veins above impressed. Petals at anthesis 6–7 mm wide. Alternipetal anthers at anthesis 4.2–5 mm long 14

b. Branchlets quadrangular. Transverse veins above inconspicuous or raised. Petals at anthesis 2.5–5.5 mm wide. Alternipetal anthers at anthesis 2.7–3.7 mm long. — Branchlets setose. Pseudo-stipules apex acute. Leaves margin entire to remotely glandular denticulate, the upper pair of nerves arising 4–12 mm above the base. Inflorescence axillary to cauliflorous. Bracts 4–11 mm long. Peduncles without cataphylls, pedicels glabrous to setose. Hypanthium setose, rim denticulate, teeth glandular (when young). Petals in bud 6–7 mm long. — W Highlands Prov., E Highlands Prov., Chimbu ..... **10. M. multibracteata**

14a. Saddle-shaped subpetiolary ridges present. Pseudo-stipules apex obtuse. Leaf base decurrent into the petiole, margin remotely glandular denticulate, the upper pair of nerves arising 5–13 mm above the base. Peduncles without cataphylls, pedicels pubescent. Hypanthium rim dentate or lobed, teeth glandular. — E Papua Barat, W Sepik Prov., S Highlands Prov. ..... **5. M. interiaciens**

b. Saddle-shaped subpetiolary ridges absent. Pseudo-stipules apex acute. Leaf base attenuate, margin entire, eglandular, the upper pair of nerves arising 15–20 mm above the base. Peduncles with cataphylls, pedicels glabrous. Hypanthium rim dentate, teeth eglandular. — S Highlands Prov. ..... **14. M. triochiton**

15a. Branches smooth, longest bristles of the nodes 4–30 mm long. Peduncles without cataphylls. Hypanthium 1–6 mm wide, verrucose 16

b. Branches scabrous, longest bristles of the nodes c. 3 mm long. Peduncles with cataphylls. Hypanthium c. 7 mm wide, smooth. — Branchlets terete. Pseudo-stipules elliptic to oblong, 1–1.5 mm wide. — W Highlands Prov., E Highlands Prov., Chimbu ..... **8. M. minutibracteata**

16a. Pseudo-stipules elliptic to lanceolate, 3–25 mm wide. Inflorescence many-branched, with or without some empty bracts. — Plants terrestrial or epiphytic 17

b. Pseudo-stipules linear-lanceolate, c. 1.5 mm wide. Inflorescence few-branched with some empty bracts. — Plants climbing with roots. Branchlets quadrangular, 2–3 mm thick. Saddle-shaped subpetiolary ridges absent. Pseudo-petioles 10–15 mm long. Leaf base attenuate, transverse veins above impressed. Bracts 2–2.5 mm long. Hypanthium rim denticulate, teeth eglandular. — W Sepik Prov. ..... **1. M. clathrata**

17a. Branchlets quadrangular, 2–6 mm thick. Saddle-shaped subpetiolary ridges present. Pseudo-petioles 5–30 mm long. Leaf base not decurrent into the petiole, transverse veins above inconspicuous or raised. Hypanthium rim dentate, teeth eglandular 18

b. Branchlets terete, c. 8 mm thick. Saddle-shaped subpetiolary ridges absent. Pseudo-petioles 32–35 mm long. Leaf base decurrent into the petiole, transverse veins above impressed. Hypanthium rim dentate, teeth glandular. — Innovations smooth. Blades 22–26 cm long. Inflorescence few-flowered, peduncles 0.8–1.2 cm long, bracteoles absent, pedicels c. 5 mm long. Hypanthium and fruits setose. — Western Province ..... **4. M. grandifolia**

18a. Inflorescence many-flowered, peduncles 1–5 cm long, bracteoles absent, pedicels 3–10 mm long. Hypanthium glabrous or glabrescent. Alternipetal filaments in bud 1.5–2.5 mm long, anthers in bud 2.3–3.3 mm long, plectrum 0.1–0.5 mm long. Style in bud 3–4.5 mm long. Fruits glabrous. — Mainland New Guinea, Goodenough Island ..... **7a. M. markgrafii** var. **markgrafii**

b. Inflorescence few-flowered, peduncles 0.4–0.9 cm long, bracteoles present, pedicels 1–2 mm long. Hypanthium setose. Alternipetal filaments in bud c. 1.2 mm long, anthers in bud c. 2 mm long, plectrum c. 0.6 mm long. Style in bud c. 2.5 mm long. Fruits setose. — Central Prov., Milne Bay Prov. ..... **13. M. sogeriensis**

1. Medinilla clathrata Bodegom, *spec. nov.* — Fig. 2

A omnibus speciebus pseudo-stipulatis radiculis scandens, cristis subpetiolaribus selliformibus absentibus, pseudo-stipulis lineari-lanceolatis 6–7 mm longis c. 1.5 mm latis, folii lamina nervis transversalibus conspicuissimis, bracteis 2–2.5 mm longis, bracteolis presentibus differt. — Typus: *LAE 67576 (Barker & Wiakabu)* (holo LAE; iso L, LTB n.v.), Papua New Guinea, W Sepik Prov., junction of Bielga and Mogofogola Rivers, 1900 m alt., 22 April 1975.

Shrub, climbing with roots. *Innovations* densely covered with minute, protruding, white vesicles. *Branchlets* quadrangular, 2–3 mm thick, glabrous. Branches smooth, lenticels elliptic or punctiform, slit-like and pusticulate or crateriform. Saddle-shaped subpetiolary ridges absent. Nodes with the longest bristles 10–15 mm long. *Pseudostipules* linear-lanceolate, 6–7 by c. 1.5 mm wide, soon glabrescent, apex acute. Pseudopetioles 10–15 mm long. Blades equal, oblong to lanceolate, 6–10 by 2–3.5 cm, 3–5-plinerved, soon glabrescent, base attenuate, not decurrent into the petiole, margin entire, eglandular, apex acute. Nerves above impressed, below flattened, the upper pair arising more or less from the base. Transverse veins above impressed, below inconspicuous to flattened. Thyrses ramiflorous to cauliflorous, few-branched with some empty bracts, few-flowered, 1.5–3.5 cm long. *Peduncles* without cataphylls, 2.5–3 cm long. Lowermost branches opposite. Bracts free at base, oblong to lanceolate, 2–2.5 by 0.75–1 mm, apex acute. Bracteoles lanceolate, c. 2.25 by 0.75 mm, apex acute. Pedicels 3–4 mm long, setose. Flowers 5-merous, c. 9 mm long in bud. *Hypanthium* urceolate to cup-shaped, c. 4 by 3 mm, ciliolate to setose, verrucose, rim dentate, teeth eglandular. Calyx lobes 0.3–0.5 mm long. Petals 6–7 mm long in bud, c. 4 mm wide in bud, 8–10 mm long at anthesis, c. 6 mm wide at anthesis, apex truncate at anthesis. Stamens 10. Filaments alternipetal c. 1.75 mm long in bud, c. 2.5 mm long at anthesis, epipetal c. 1.25 mm long in bud, epipetal c. 2 mm long at anthesis. Anthers alternipetal c. 3.25 mm long in bud, c. 3.75 mm long at anthesis, epipetal c. 2.75 mm long in bud, c. 3 mm long at anthesis. Plectrum triangular, c. 0.5 mm long. Lateral appendages c. 0.4 mm long. Style c. 3.5 mm long in bud, c. 6 mm long at anthesis. *Fruits* unknown.

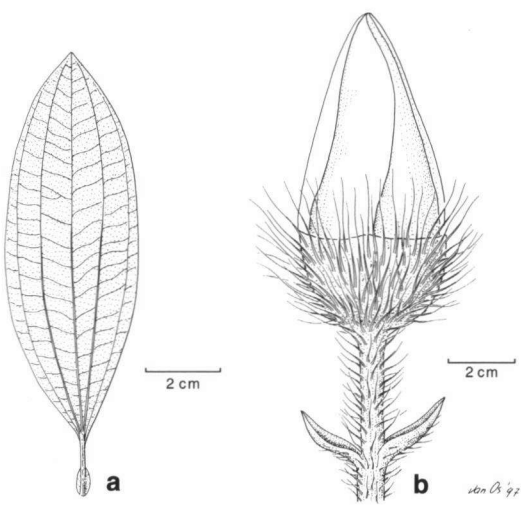


Fig. 2. *Medinilla clathrata* Bodegom. a. Leaf with pseudo-stipules; b. flower in bud with bracteoles (both *LAE 67576 (Barker & Wiakabu)*).

Distribution — Papua New Guinea: W Sepik Prov.: Telefomin (1).

Habitat — Secondary montane rain forest, 1900 m altitude.

Collector's notes — Small shrub. Leaves with conspicuous cross-veins; above dark green; below light grey-green. Pedicels deep red with brown-white tomentum. Sepals with brown-white tomentum. Petals pink, white at base. Filaments white; anthers pale yellow with dark brown mucro. Ovary dark green with brown-white tomentum. Style white.

Note — *Clathrata* is botanical Latin for 'provided with a trellis or grating', referring to the transverse veins.

2. **Medinilla frodinii** Bodegom, *spec. nov.* — Fig. 3

Ab omnibus speciebus pseudo-stipulatis ramulis c. 4 mm crassis, cristis subpetiolaribus selliformibus absentibus, pseudo-stipulis glabris, folii lamina glabra, inflorescentiae ramis infimis verticillatis, bracteolis evolutis differt. — Typus: *UPNG 4225 (Frodin)* (holo L; iso K, UPNG n.v.), Papua New Guinea, S Highlands Prov., Pangia Road, 2100 m alt., 17 December 1973.

Shrub, terrestrial or climbing with roots. *Innovations* densely covered with minute, protruding, white vesicles. *Branchlets* quadrangular, c. 4 mm thick, glabrous. Branches smooth, lenticels elliptic, slit-like and pusticulate. Saddle-shaped subpetiolary ridges absent. Nodes with the longest bristles c. 8 mm long. *Pseudo-stipules* lanceolate, c. 13 by 4 mm, glabrous, apex obtuse to acute. Pseudo-petioles 20 mm long. Blades equal, elliptic, c. 15 by 8 cm, 7-plinerved, glabrous, base attenuate, not decurrent into the petiole, margin entire, eglandular, apex acute to acuminate. Nerves above impressed, below flattened, the upper pair arising c. 19 mm above the base. Transverse veins above impressed, below flattened. Thyrses cauliflorous, many-branched with some empty bracts, few-flowered, c. 5 cm long. *Peduncles* without cataphylls, 6 cm long. Lowermost branches whorled. Bracts free at base, oblong to lanceolate, c. 12 by

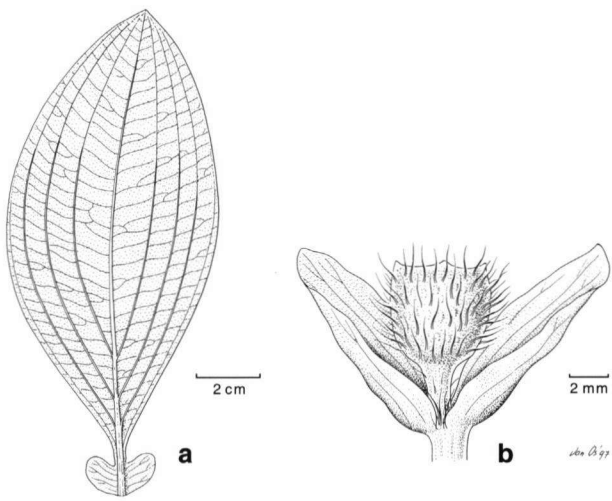


Fig. 3. *Medinilla frodinii* Bodegom. a. Leaf with pseudo-stipules; b. very immature fruit with bracteoles (both *UPNG 4225 (Frodin)*).

4–5 mm, apex obtuse to acute. Bracteoles orbicular, c. 8 by 6 mm, apex obtuse. Pedicels 2.5–3.5 mm long, glabrous. Flowers incompletely known, 5-merous. *Hypanthium* urceolate to cup-shaped, c. 5 by 5 mm, ciliolate to setose, verrucose, rim dentate, teeth eglandular. Calyx lobes c. 0.4 mm long. *Fruits* c. 5 mm in diameter, setose, verrucose. Seeds 0.5–1 mm long, testa reticulate.

Distribution — Papua New Guinea: S Highlands Prov.: Ialibu (1).

Habitat — In primary montane forest, 2100 m altitude.

Collector's notes — Ground shrub growing in patches. Leaves above yellow-green; below whitish. Inflorescences red-violet.

Note — Small adventitious roots were found on the branches, most likely it is a root-climber and not a terrestrial shrub. This species was named after its first collector, Dr. D.G. Frodin.

3. **Medinilla glandulosa** Bodegom, *spec. nov.* — Fig. 4

Ab omnibus speciebus pseudo-stipulatis ramulis quadrangularibus hirto-tomentosis, ramis laevibus, pseudo-stipulis 12–35 mm longis, folii marginibus remote denticulatis ad glandulose sinuato-dentatis, nervorum pari superiore plusminusve e basi orienti, inflorescentia plerumque umbella umbellulis multifloris composita, hypanthii margine dentibus glandulosis differt. — Typus: *Brass 22727* (holo L; iso K, LAE), Papua New Guinea, Milne Bay Prov., Maneau Range, Mt Dayman, 2060 m alt., 3 June 1953.

Shrub or tree, terrestrial, erect to scandent, 1.2–5 m high. *Innovations* densely covered with minute, protruding, white vesicles. *Branchlets* quadrangular, 2–5 mm thick, glabrous or setose, hairs appressed. Branches smooth, lenticels elliptic or punctiform, slit-like and pusticulate or crateriform. Saddle-shaped subpetiolary ridges 5–15 mm wide. Nodes with the longest bristles 3–30 mm long. *Pseudo-stipules* elliptic to oblong, 12–35 by 5–20 mm, apex obtuse to acute, soon glabrescent. Pseudo-petioles 10–40 mm long. Blades equal to subequal, orbicular to oblong, 14–26 by 5–20 cm, (3–)5-plinerved, soon glabrescent, base attenuate to cuneate, not decurrent into the petiole, margin remotely denticulate to sinuate-dentate, teeth glandular, apex acute to acuminate. Nerves above impressed to thickened, below raised to flattened, the upper pair arising more or less from the base. Transverse veins above inconspicuous to raised, below inconspicuous to flattened. Inflorescence a thyrse or compound umbel with many-flowered terminal umbels supported by 2–4 bracts, terminal to axillary, many-branched with some empty bracts, many-flowered, 2.5–7 cm long. *Peduncles* without cataphylls, 1–6 cm long. Lowermost branches opposite. Bracts free at base, elliptic to lanceolate, 7–25 by 4–10 mm, apex acute. Bracteoles absent. Pedicels 2.5–9 mm long, puberulous. Flowers incompletely known, 4-merous, 6–9 mm long in bud. *Hypanthium* urceolate to cup-shaped, 3–5 by 2.5–4.5 mm, ciliolate, verrucose, rim dentate, teeth glandular. Calyx lobes 0.5–1 mm long. Petals 3–4.5 mm long in bud, c. 3 mm wide in bud, 5–8 by 4–5 mm at anthesis, apex truncate at anthesis. Stamens 8. Filaments alternipetal 1–2 mm long in bud, 3.5–4 mm long at anthesis, epipetal 0.75–1 mm long in bud, 2–3.5 mm long at anthesis. Anthers alternipetal 3–3.5 mm long in bud, 3.5–5 mm long at anthesis, epipetal 2–2.5 mm long in bud, 2.5–4 mm long at anthesis. Plectrum triangular to linear-triangular, 0.25–0.5 mm long. Lateral appendages 0.25–0.5 mm long. Style 3–5 mm long in bud, 5.5–8 mm long at anthesis. *Fruits* 4–5 mm in diameter, glabrous to ciliolate, verrucose. Seeds 0.5–1 mm long, testa reticulate.

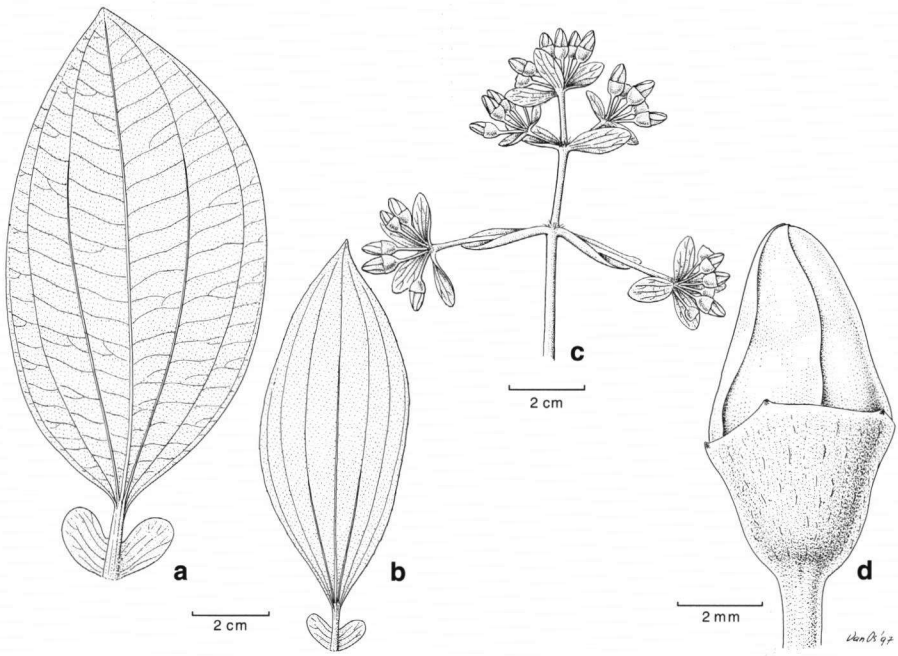


Fig. 4. *Medinilla glandulosa* Bodegom. a. Leaf with pseudo-stipules; b. young leaf with pseudo-stipules and glandular leaf margin; c. compound umbel with terminal partial umbels supported by 2–4 bracts; d. flower in bud with glandular calyx teeth (a, c, d: *Pullen 7895*; b: *Brass 22928*).

Distribution — Papua New Guinea: Milne Bay Prov.: Mt Suckling (1), Mt Dayman (6), Agaun-Bonenau (2).

Habitat — In primary montane forest, 1370–2200 m altitude.

Collector's notes — Terrestrial shrub or tree, erect to creeping, sparsely branched. Petiole red. Leaves large and fleshy; above dull dark green; below pale green with a purple tinge; nerves faintly tinged pink on the underside. Panicle dark pink. Inflorescences axes (sometimes white) and bracts pale pink to red. Calyx red. Petals white. Filaments white; anthers bright yellow with white connective. Ovary red. Young fruit green; calyx tube pinkish after the petals have dropped off.

Notes — Similar to *M. markgrafii* var. *markgrafii*, differing by the glandular leaf margins and calyx teeth, and the compound umbel with terminal partial umbels supported by 2–4 bracts.

Glandulosa is botanical Latin for 'glandular'.

4. **Medinilla grandifolia** Bodegom, *spec. nov.* — Fig. 5

Ab omnibus speciebus pseudo-stipulatis innovationibus laevibus, ramulis teretis c. 8 mm crassis, cristis subpetiolaribus selliformibus absentibus, nodi setis longissimis 4–5 mm longis, pseudo-petiolis 32–35 mm longis, folii lamina 22–26 cm longa differt. — Typus: *NGF 42782 (Henty, Foreman & Galore)* (holo L; iso LAE), Papua New Guinea, Western Prov., Ok Tedi headwaters, 855 m alt., 29 October 1969.

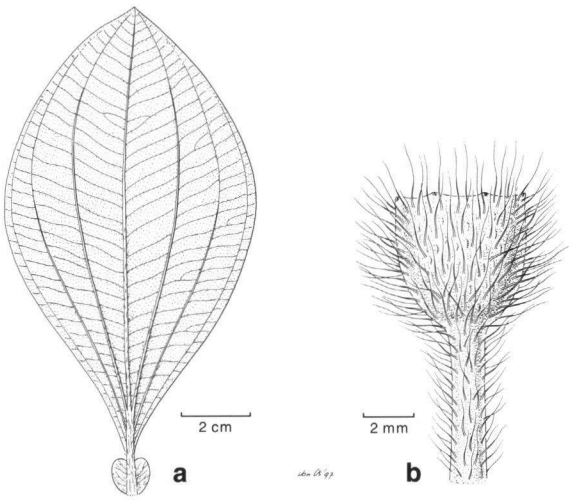


Fig. 5. *Medinilla grandifolia* Bodegom. a. Leaf with pseudo-stipules; b. very immature fruit (both *NGF 42782 (Henty, Foreman & Galore)*).

Shrub, epiphytic, 1.5–1.85 m high. *Innovations* smooth. *Branchlets* terete, c. 8 mm thick, setose. Branches smooth, lenticels elliptic, slit-like and pusticulate. Saddle-shaped subpetiolary ridges absent. Nodes with the longest bristles 4–5 mm long. *Pseudo-stipules* oblong to lanceolate, 22–25 by 9–10 mm, soon glabrescent, apex acute. Pseudo-petioles 32–35 mm long. Blades equal, elliptic to oblong, 22–26 by 11–15 cm, 5- or 7-plinerved, soon glabrescent to pubescent, base attenuate, decurrent into the petiole, margin entire, eglandular, apex acute to cuspidate. Nerves above thickened, below flattened, the upper pair arising more or less from the base. Transverse veins above impressed, below flattened. Thyrses axillary to cauliflorous, many-branched with some empty bracts, few-flowered, c. 6 cm long. *Peduncles* without cataphylls, 0.8–1.2 cm long. Lowermost branches opposite. Bracts free at base, oblong to lanceolate, c. 17 by 8 mm, apex acute. Bracteoles absent. Pedicels c. 5 mm long, setose. Flowers incompletely known, 5-merous. *Hypanthium* urceolate to cup-shaped, c. 4 by 5 mm, ciliolate to setose, verrucose, rim dentate, teeth glandular. Calyx lobes c. 0.3 mm long. *Fruits* c. 5 mm in diameter, setose, verrucose. Seeds 0.5–1 mm long, testa reticulate.

Distribution — Papua New Guinea: Western Prov.: Kiunga (1), Star Mts (2).

Habitat — Mixed rain forest, rough topography, peaty soil, 855–1500 m altitude.

Collector's notes — Shrub, epiphytic on tree bole, or small tree. Leaves dark green above, light green with light brown tomentum below. Pedicels and bracts dark pink with brown-white tomentum. Ovary dark green with white tomentum. Fruit black.

Note — *Grandifolia* is botanical Latin for 'large-leaved'.

5. **Medinilla interiaciens** Bodegom, *spec. nov.* — Fig. 6

Ab omnibus speciebus pseudo-stipulatis ramulis teretis, pseudo-stipulae apice obtuso, laminae basi attenuata pseudo-stipulis adnata, marginibus remote glanduloso-denticulatis, nervorum pari superiore 5–13 mm supra par proximum orienti, calycis lobis saepe 3 incrassatis 1–3 mm longis, petalis 6–7 mm latis differt. — Typus: *NGF 41723 (Henty, Isgar & Galore)* (holo L; iso LAE), Papua New Guinea, W Sepik Prov., Oksapmin, 1985 m alt., 23 October 1975.

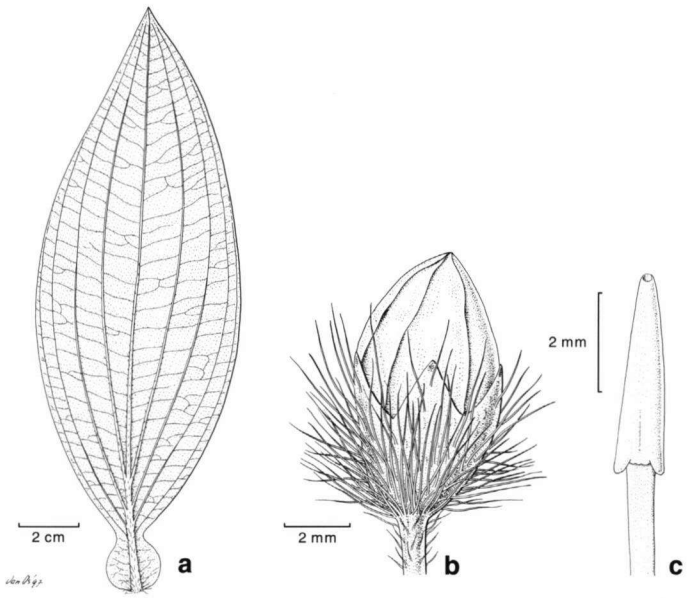


Fig. 6. *Medinilla interiaciens* Bodegom. a. Leaf with pseudo-stipules; b. flower in bud; c. stamen (all *Gebo 1650*).

Shrub, terrestrial or epiphytic, 1.25–3 m high. *Innovations* densely covered with minute, protruding, white vesicles. *Branchlets* terete, 3–5 mm thick, glabrous or setose. Branches smooth, lenticels elliptic, slit-like and pusticulate. Saddle-shaped subpetiolary ridges 5–10 mm wide. Nodes with the longest bristles 4–15 mm long. *Pseudo-stipules* elliptic to oblong, 10–20 by 5–15 mm, soon glabrescent, apex obtuse. Pseudo-petioles 15–30 mm long. Blades equal, elliptic to lanceolate, 10–19 by 5–9 cm, (5- or) 7-plinerved, soon glabrescent, base attenuate, decurrent into the petiole, margin remotely denticulate, teeth glandular, apex acute. Nerves above impressed, below flattened, the upper pair arising more or less from or up to 13 mm above the base. Transverse veins above impressed, below flattened. Thyrses solitary or in fascicles, axillary to cauliflorous, many- to few-branched with some empty bracts, many- or few-flowered, 2.5–5 cm long. *Peduncles* without cataphylls, 0–3.5 cm long. Lowermost branches opposite. Bracts free at base, elliptic to lanceolate, 7–12 by 3–8 mm, apex acute. Bracteoles absent. Pedicels 3–5 mm long, setose. Flowers (4- or) 5-merous, 4–9 mm long in bud. *Hypanthium* urceolate to cup-shaped, 4–5 by c. 3 mm, ciliolate to setose, verrucose, rim lobed, lobes glandular or dentate, teeth sometimes glandular. Calyx lobes (0.5–)1–3 mm long. Petals 5–6 by c. 4 mm in bud, 9–13 by 6–7 mm at anthesis, apex truncate at anthesis. Stamens (8 or) 10. Filaments alternipetal 1.5–2 mm long in bud, 3.5–4 mm long at anthesis, epipetal 1–1.5 mm long in bud, 2.5–3 mm long at anthesis. Anthers alternipetal 3.5–4 mm long in bud, 4.5–5 mm long at anthesis, epipetal 2.5–2.75 mm long in bud, 3.5–4 mm long at anthesis. Plectrum triangular, 0.1–0.2 mm long. Lateral appendages 0.2–0.4 mm long. Style 4.5–5 mm long in bud, 7–8 mm long at anthesis. *Fruits* 4–6 mm in diameter, setose, verrucose. Seeds 0.5–1 mm long, testa reticulate.

Distribution — E Papua Barat: Star Mts, Ok Denim (1); Papua New Guinea: W Sepik Prov.: Telefomin (2); S Highlands Prov.: Koroba (1), Tari (1).

Habitat — In primary montane and secondary forest, 800–2440 m altitude.

Collector's notes — Terrestrial small undershrub or climber on tree bole. Outer bark brown, inner green. Wood creamy-brown. Leaves with red-violet ribs; above dark green; below pale green to dark red-violet. Inflorescences axes and bracts red. Flowers red-white. Calyx purple. Petals white. Ovary yellow to yellow-green. Young fruits green to dark green.

Notes — *Interiaciens* is botanical Latin for 'intermediate'. This species seems to take an intermediate position between non-stipular and pseudo-stipular *Medinilla* species. The pseudo-stipules are well developed, but apparently always adnate with the blade. Instead of a solitary thyrse a fascicle of thyrses may be present (*NGF 28395 (Frodin)*). Three of the four specimens examined exhibited three enlarged calyx lobes, the fourth one (*LAE 74231 (Kerenga & Lelean)*) had 5.

This is the only species so far that has been found in Papua Barat.

6. **Medinilla lenticellata** Bodegom, *spec. nov.* — Fig. 7

Ab omnibus speciebus pseudo-stipulatis lenticellis conspicuis, ramulis teretis, pseudo-stipulis 5–7 mm longis, foliis subaequalibus, inflorescentia pauciflora, bracteis c. 2 mm latis, floribus 4-meris, hypanthio globoso differt. — Typus: *LAE 55675 (Stevens)* (holo L; iso K, n.v.: A, BRI, CANB), Papua New Guinea, Milne Bay Prov., Tantam Plateau, 1980 m alt., 19 July 1972.

Shrub, c. 3 m high. *Innovations* densely covered with minute, protruding, white vesicles. *Branchlets* terete, c. 2 mm thick, glabrous. Branches smooth, lenticels elliptic, slit-like and pusticulate. Saddle-shaped subpetiolary ridges c. 6 mm wide. Nodes with the longest bristles 8–10 mm long. *Pseudo-stipules* elliptic, 5–7 by 3–4 mm, soon

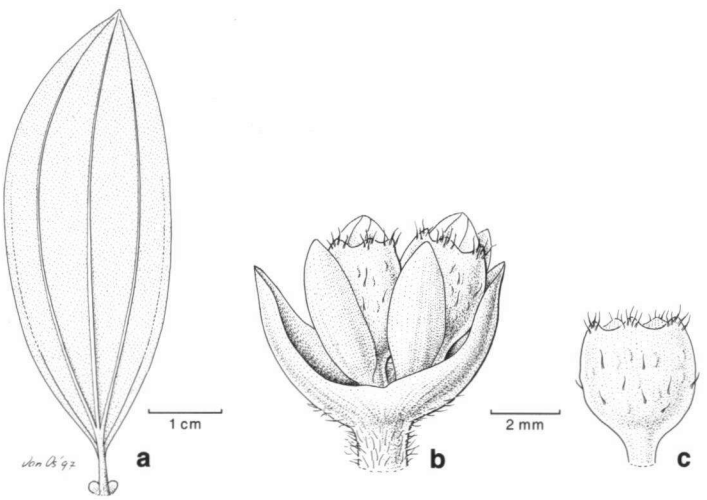


Fig. 7. *Medinilla lenticellata* Bodegom. a. Leaf with pseudo-stipules; b. young terminal inflores cence; c. very immature fruit (all *LAE 55675* (*Stevens*)).

glabrescent, apex acute. Pseudo-petioles 10–12 mm long. Blades subequal, oblong to lanceolate, 9–11 by 3.5–4.5 cm, 3-plinerved, soon glabrescent, base attenuate, not decurrent into the petiole, margin entire, eglandular, apex acute to acuminate. Nerves above thickened, below flattened, the upper pair arising more or less from the base. Transverse veins inconspicuous. Thyrses terminal, many-branched with some empty bracts, few-flowered, 1.5–2.2 cm long. *Peduncles* without cataphylls, 0.8–1.1 cm long. Lowermost branches opposite. Bracts free at base, lanceolate, c. 6 by 2 mm, apex acute. Bracteoles absent. Pedicels 2–3 mm long, glabrous. Flowers incompletely known, 4-merous. *Hypanthium* globose, c. 4 by 4 mm, glabrescent, verrucose, rim dentate, teeth eglandular. Calyx lobes c. 0.4 mm long. *Fruits* unknown.

Distribution — Papua New Guinea: Milne Bay Prov.: Tantam Plateau (1).

Habitat — Ridge forest, 1980 m altitude.

Collector's notes — Shrub. Leaves above dark dull green; below paler. Inflorescences axes dark red. Bracts dark red. Calyx green. Corolla white.

Note — *Lenticellata* is botanical Latin for 'having lenticels'.

7. **Medinilla markgrafii** Merr. & L.M. Perry

Shrub or tree, terrestrial or epiphytic, erect to scandent, 0.5–6 m high. *Innovations* smooth or densely covered with minute, protruding, white vesicles. *Branchlets* quadrangular, 2–6 mm thick, glabrous or appressed setose. Branches smooth, lenticels elliptic or punctiform, slit-like and pusticulate or slit-like and protruding, or crateriform. Saddle-shaped subpetiolary ridges 6–16 mm wide. Nodes with the longest bristles 4–30 mm long. *Pseudo-stipules* elliptic to oblong, 8–38 by 4–25 mm, soon glabrescent, apex obtuse to acuminate. Pseudo-petioles 10–30 mm long. Blades equal to subequal, elliptic to lanceolate, 9–26 by 2.5–14 cm, (3- or) 5- (or 7-)plinerved, soon glabrescent, base attenuate to cuneate, not decurrent into the petiole, margin entire, eglandular, apex acute to acuminate. Nerves above impressed to thickened, below raised to flattened, the upper pair arising more or less from the base. Transverse veins above inconspicuous to raised, below inconspicuous to flattened. Thyrses terminal to axillary, many-branched, sometimes with some empty bracts, many-flowered, 2.5–10 cm long. *Peduncles* without cataphylls, 1–5 cm long. Lowermost branches opposite. Bracts, when present, free at base, elliptic to lanceolate, 6–30 by 1–11 mm wide, apex acute to cuspidate. Bracteoles absent. Pedicels 3–10 mm long, glabrous or puberulous. Flowers 4-, rarely 5-merous, 4–10 mm long in bud. *Hypanthium* urceolate to cup-shaped, 2–5 by 1–5 mm, glabrous or ciliolate, verrucose, rim dentate, teeth eglandular. Calyx lobes 0.1–0.5 mm long. Petals 2–5.5 by 2–3 mm, 5–8 by 3.5–5 mm, apex truncate to obtuse at anthesis. Stamens 8 or 10. Filaments alternipetal 1.5–2.5 mm long in bud, 2.5–3.5 mm long at anthesis, epipetal 1–1.4 mm long in bud, 1.5–2.75 mm long at anthesis. Anthers alternipetal 2.3–3.3 mm long in bud, 3–4 mm long at anthesis, epipetal 1.3–2.3 mm long in bud, 2.5–3.25 mm long at anthesis. Plectrum triangular to linear-triangular, 0.1–0.5 mm long. Lateral appendages 0.05–0.5 mm long. Style 3–4.5 mm long in bud, 4.5–7 mm long at anthesis. *Fruits* 3.5–8 mm in diameter, glabrous, verrucose. Seeds 0.35–1 mm long, testa reticulate.

a. var. **markgrafii** — Fig. 1b, 8

Medinilla markgrafii Merr. & L.M. Perry, J. Arnold Arbor. 24 (1943) 427; T.G. Hartley et al., Lloydia 36 (1973) 283; Streimann, Pl. Upper Watut (1983) 134, '*margrafii*'. — Type: *Brass 4018* (holo NY n.v.; iso A n.v.).

Medinilla bismarck-ramuensis Takeuchi, Sida 18 (1999) 1073, quoad *Craven & Schodde 1157* (A, CANB, K, L, LAE), see note on p. 562.

Medinilla brassii auct. non Markgr.: Markgr., Brittonia 2 (1936) 142, quoad *Brass 5114*.

Medinilla crassinervia auct. non Blume: Gressit & Nadkarni, Wau Ecol. Inst. Handb. 5 (1978) 66, t. 30, '*crassinervis*'.

Lenticels elliptic to punctiform. Subpetiolary ridges saddle-shaped, 6–16 mm wide. *Pseudo-stipules* 8–38 by 4–25 mm. Blades 9–26 cm long, (3- or) 5- (or 7-)plinerved, the upper pair of nerves arising more or less from the base. *Peduncles* 1–5 cm long. Petals 3.5–5 mm wide (at anthesis). Alternipetalous filaments 1.5–2.5 mm long (in bud), anthers 3–4 mm long (at anthesis).

Distribution — Papua New Guinea: Madang: Finisterre Range (1); Morobe Prov.: Kasanombe (2), Wau (26); E Highlands Prov.: Goroka (1); Central Prov.: region of Efogi and Myola (4), Mt Tafa (1), Sogeri (1), Wharton Range (1), region of Woitape and Goilala (10); Milne Bay Prov.: Goodenough Island (3), Mt Suckling (3).

Habitat — In primary or secondary montane forest of many kinds, on dead tree trunks or rotting logs, loamy soil is often mentioned, with good surface drainage, in open bush and forest edges, 1000–2770 m altitude.

Chemistry — An absence of alkaloids was observed in all parts (Hartley et al., 1973).

Collector's notes — Shrub or small tree, slack, spreading, epiphytic or terrestrial, erect or scandent, soft-woody to more or less fleshy, sparsely to closely branched, layering at base and forming quite large patches up to 5 m across. Outer bark brown, inner green. Twigs green with white lenticels. Innovations olive-green-brown; young leaves tinged purple to reddish, pleated; the 'stipules' *(Jacobs 8611)* paler, to light green. Leaves stiff; veins pink to red; with prominent parallel venation; above dark, bright, olive- or mid-green, mid-glossy; below pale to mid-green or deep pink to purple, glaucous. Inflorescences axes and bracts pink to purple. Flowers fragrant; profuse; very conspicuous; white in bud. Calyx whitish or pale green to purplish red, lobes with violet apices. Petals rather translucent white to pale yellow. Filaments white; anthers yellow at the base and white towards the top, with white connectives. Ovary purple-pink. Style white. Fruit green to purple; after the petals have dropped off the inflorescences axis and 2 bracts become bright purple, the ovary becomes green, calyx pink-purple in fruit.

Notes — Stellate hairs were found on the pseudo-stipules of *LAE 75225 (Sohmer & Kerenga)* (L, LAE).

In *NGF 20322 (Van Royen)* (L, LAE) the petals were contorted to the left.

In *NGF 33785 (Ridsdale & Woods)* (L, LAE) bracts were missing.

In a very young bud the style is up to 5 times as long as the stamens; at anthesis the style is just a little bit longer than the stamens, suggesting protogyny.

The altitude of *Millar 1243* (L, LAE) from Woitape was mentioned as 3130 m, in Leiden someone changed this to 2770 m. Van Royen (1983) mentioned the occurrence of some unnamed *Medinilla* spp. above 3000 m, but apparently not this one, because

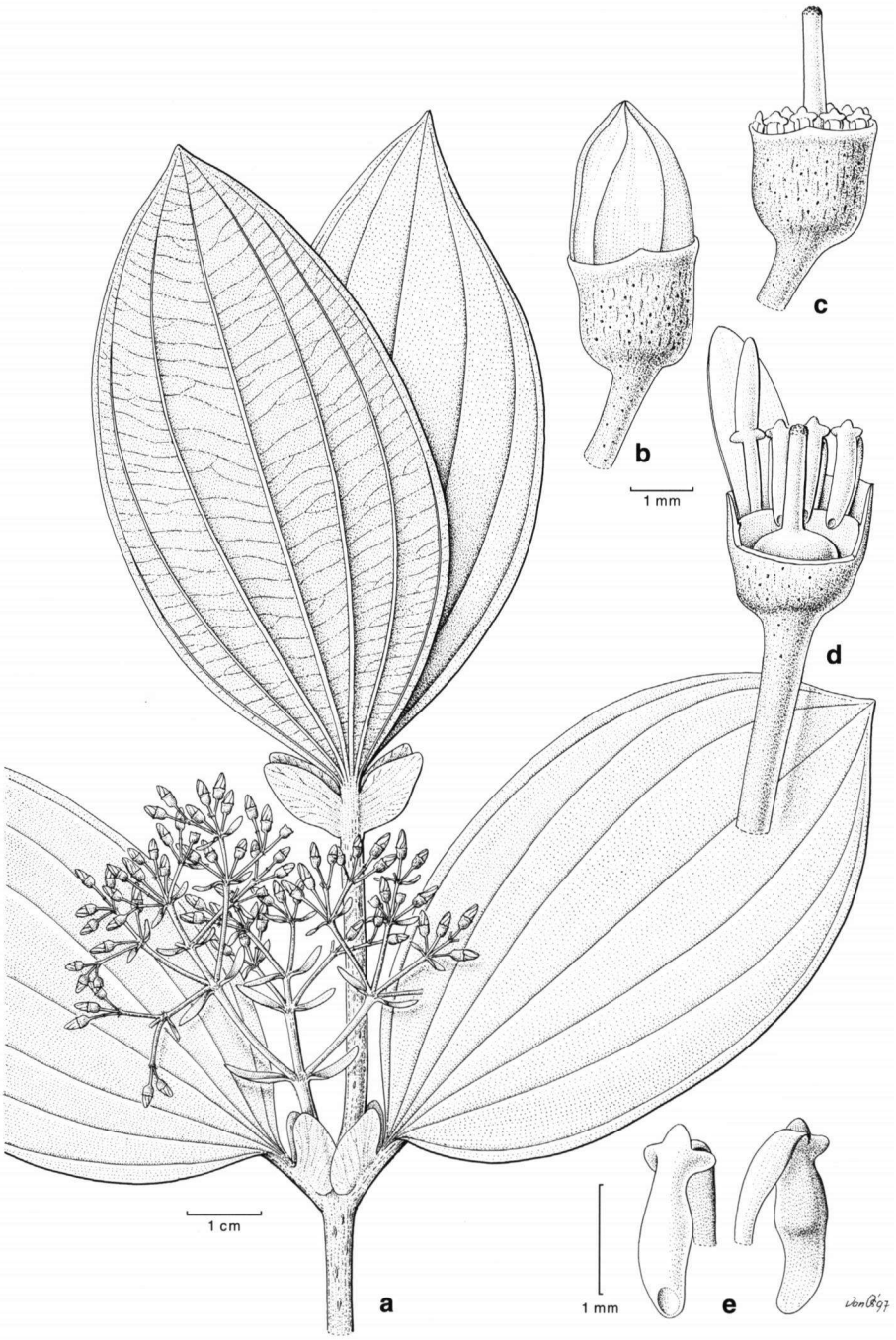


Fig. 8. *Medinilla markgrafii* Merr. & L.M. Perry var. *markgrafii*. a. Habit; b. flower in bud; c. flower in bud, petals removed; d. flower in longitudinal section; e. stamens (all *Pullen 6169*).

his specimens came from Mt Wilhelm and the Naitambi Mts. Curiously, no pseudo-stipular species were seen from Mt Wilhelm, although this is the best collected locality of New Guinea, and well within the range of the group.

b. var. **insularis** Bodegom, *var. nov.*

A var. *markgrafii* folii nervorum pari superiore 3–8 mm supra par proximum orienti, petalis c. 2.5 mm latis, filamentis alternipetalibus c. 1.25 mm longis (in gemma), antheris alternipetalibus c. 2.75 mm longis (in anthesi), distributione insulari differt. — Typus: *Sands, Pattison & Wood 1933* (holo L; iso K), Papua New Guinea, New Ireland Prov., Hans Meyer Range, 1710 m alt., 9 October 1975.

Lenticels slit-like or pusticulate. Subpetiolary ridges saddle-shaped, 4–10 mm wide. *Pseudo-stipules* 6–20 by 2–15 mm. Blades 7–20 cm long, 3- or 5-plinerved, the upper pair of nerves arising 3–8 mm above the next pair. *Peduncles* 0.3–3.5 cm long. Petals c. 2.5 mm wide. Alternipetalous filaments c. 1.25 mm long, alternipetal anthers c. 2.75 mm long.

Distribution — Papua New Guinea: East New Britain (2), New Ireland (2).

Habitat — In primary montane forest of many kinds, on dead tree trunks, loamy soil, with good surface drainage, 1580–2000 m altitude.

Collector's notes — Spreading shrub. Bark pinkish grey, with brown, raised lenticels. Petiole pale green. Leaves fleshy; above dark to mid-green, mid-glossy; below paler flushed purple to light green, glaucous. Inflorescences axes and bracts greenish cream, sometimes flushed pink to white-pale magenta. Flower white in bud. Calyx pale green. Petals white. Anthers pale yellow with white appendages. Fruit green.

Note — The epithet was derived from the disjunct distribution, *insularis* is botanical Latin for 'pertaining to an island'.

8. Medinilla minutibracteata Bodegom, *spec. nov.* — Fig. 9

Ab omnibus speciebus pseudo-stipulatis ramulis teretis, ramis scabris, nodi setis longissimis c. 3 mm longis, pedunculo cataphyllis gerenti, bracteis basi connatis c. 3 mm longis 1–1.5 mm latis, hypanthio c. 7 mm diam. laevi differt. — Typus: *Hoogland 4014* (holo L; iso CANB n.v., LAE), Papua New Guinea, Northern Prov., Iora Valley, 1100 m alt., 26 September 1953.

Terrestrial, height not noted. *Innovations* densely covered with minute, protruding, white vesicles. *Branchlets* terete, 2–3 mm thick, glabrous. Branches scabrous, lenticels elliptic, slit-like and pusticulate. Saddle-shaped subpetiolary ridges 5–7 mm wide. Nodes with the longest bristles c. 3 mm long. *Pseudo-stipules* elliptic to oblong, 2.25–3 by 1–1.5 mm, soon glabrescent, apex acute. Pseudo-petioles 12–25 mm long. Blades subequal, elliptic, 10–13 by 6–8 cm, 3-plinerved, soon glabrescent, base attenuate, not decurrent into the petiole, margin entire, eglandular, apex acute to acuminate. Nerves above thickened, below flattened, the upper pair arising more or less from the base. Transverse veins above raised, below inconspicuous to flattened. Thyrses terminal, no complete ones seen. *Peduncles* with cataphylls, 0–0.8 cm long. Lowermost branches opposite. Bracts connate at base, oblong to lanceolate, c. 3 by 1–1.5 mm, apex acute. Bracteoles absent. Pedicels c. 2 mm long, glabrous. Flowers 5-merous, c. 9 mm long in bud. *Hypanthium* urceolate to cup-shaped, c. 5 by 7 mm, glabrous,

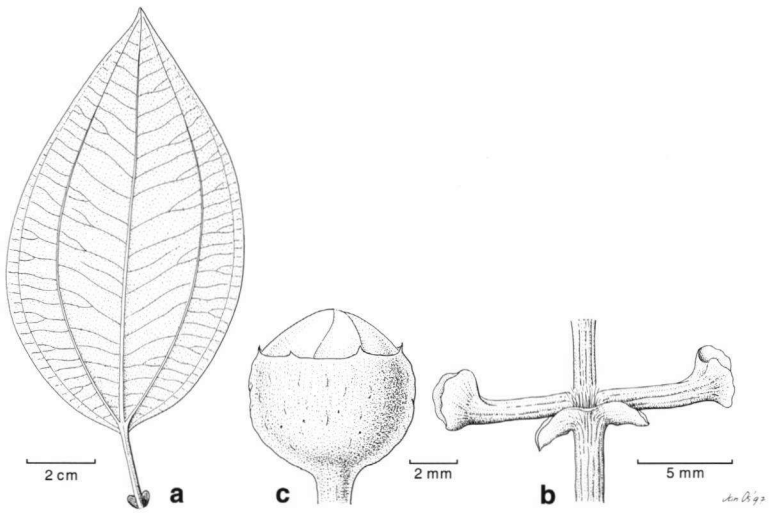


Fig. 9. *Medinilla minutibracteata* Bodegom. a. Leaf with pseudo-stipules; b. inflorescence lowermost branches with setose nodes and connate bracts; c. flower in bud (all *Hoogland 4014*).

smooth, rim dentate, teeth eglandular. Calyx lobes c. 0.4 mm long. Petals c. 4 by 3.5 mm in bud, c. 6 by 4.5 mm at anthesis, apex truncate at anthesis. Stamens 10. Filaments alternipetal c. 2 mm long in bud, c. 2.5 mm long at anthesis, epipetal c. 1.25 mm long in bud, c. 2 mm long at anthesis. Anthers alternipetal c. 2.75 mm long in bud, c. 3 mm long at anthesis, epipetal c. 2.5 mm long in bud, c. 2.75 mm long at anthesis. Plectrum triangular, c. 0.2 mm long. Lateral appendages c. 0.1 mm long. Style c. 4.5 mm long in bud, c. 5 mm long at anthesis. *Fruits* c. 5.5 mm in diameter, glabrous, smooth. Seeds 0.5–1 mm long, testa reticulate.

Distribution — Papua New Guinea: Northern Prov.: Kokoda (2).

Habitat — In forest, along wet track on steep slope, 1100–1370 m altitude.

Collector's notes — On a tree. Calyx green. Corolla white. Filaments white; anthers yellow.

Note — *Minutibracteata* is botanical Latin for 'having small bracts'.

9. **Medinilla minutifolia** Bodegom, *spec. nov.* — Fig. 10

Ab omnibus speciebus pseudo-stipulatis ramulis quadrangularibus, nodi setis longissimis 4–9 mm longis, pseudo-stipulis 2.5–5 mm longis 0.8–3 mm latis, folii laminis aequalibus, nervorum pari superiore circa e basi orienti, supra nervis transversalibus inconspicuis, hypanthio glabro, calycis lobis 0.15–0.3 mm longis, antheris epipetalibus in gemma 2.5 mm longis. — Typus: *LAE 67948 (Benjamin)* (holo L; iso K, n.v.: A, BISH, BRI, CANB, E, LTB, M, UPNG), Papua New Guinea, Milne Bay Prov., Goodenough Island, Mt Oiamadawa'a, 1900 m alt., 22 December 1977.

Shrub, terrestrial, erect to scandent, 1–3 m high. *Innovations* densely covered with minute, protruding, white vesicles. *Branchlets* quadrangular, 2–3 mm thick, glabrous. Branches smooth or scabrous, lenticels elliptic, slit-like and pusticulate. Saddle-shaped subpetiolary ridges 5–9 mm wide. Nodes with the longest bristles 4–9 mm long.

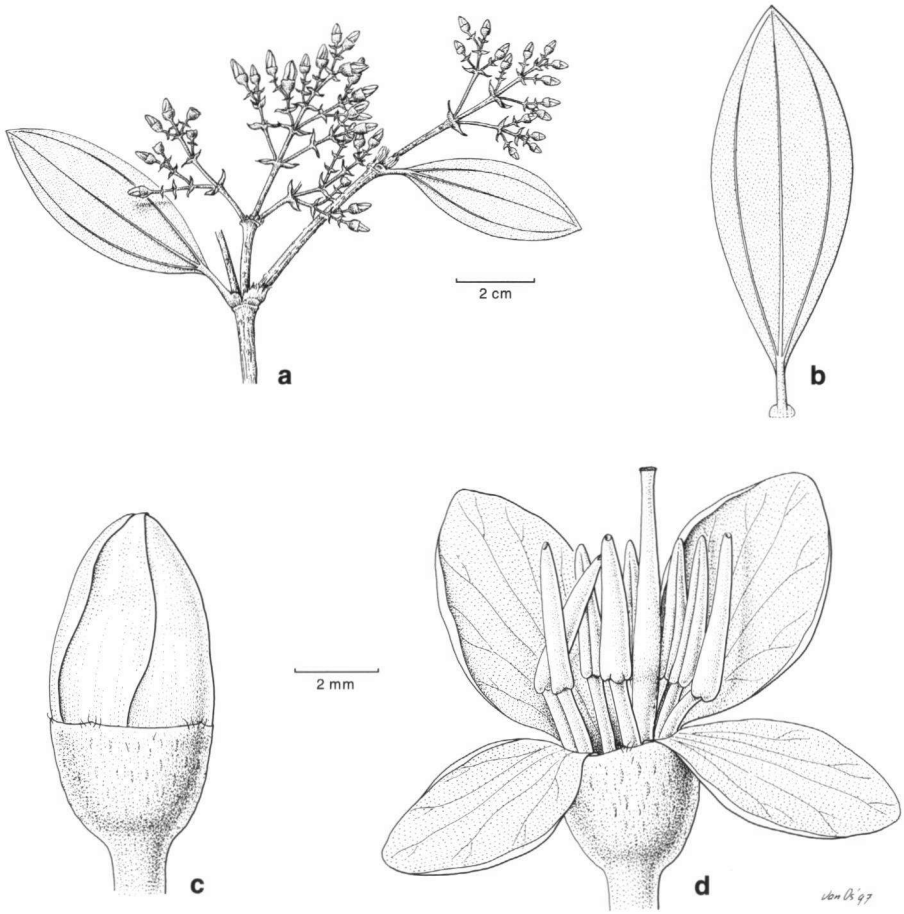


Fig. 10. *Medinilla minutifolia* Bodegom. a. Inflorescence; b. leaf with pseudo-stipules; c. flower in bud; d. flower at anthesis (all *Brass 22297*).

Pseudo-stipules elliptic to lanceolate, 2.5–5 by 0.8–3 mm, glabrous to soon glabrescent, apex obtuse to acute. Pseudo-petioles 7–15 mm long. Blades equal, oblong to lanceolate, 2–10 by 1.5–3.5 cm, 3-plinerved, glabrous to soon glabrescent, base attenuate, not decurrent into the petiole, margin entire, eglandular, or remotely denticulate, teeth glandular (only in young leaves), apex acute. Nerves above impressed, below flattened, the upper pair arising more or less from the base. Transverse veins inconspicuous. Thyrses terminal to axillary, many-branched with some empty bracts, many-flowered, 2.5–5 cm long. *Peduncles* without cataphylls, 0.4–2.5 cm long. Lowermost branches opposite. Bracts sometimes free, usually connate at base, oblong to lanceolate, 3–9 by 1–3 mm, apex acute. Bracteoles absent. Pedicels 1–5 mm long, puberulous. Flowers 4-merous, 3–6 mm long in bud. *Hypanthium* urceolate to cup-shaped, 2.5–5 by 3–5 mm, glabrous, verrucose, rim truncate, eglandular, or denticulate to dentate, teeth glandular (only young flowers seen). Calyx lobes 0.15–0.3 mm long. Petals

2–4 by c. 2.5 mm in bud, 4–8 by 2.5–4.5 mm at anthesis, apex truncate at anthesis. Stamens 8. Filaments alternipetal c. 1.5 mm long in bud, c. 3 mm long at anthesis, epipetal 1–1.25 mm long in bud, c. 2.5 mm long at anthesis. Anthers alternipetal c. 3 mm long in bud, 3.5–4 mm long at anthesis, epipetal c. 2.5 mm long in bud, 3–3.5 mm long at anthesis. Plectrum triangular, 0.3–0.4 mm long. Lateral appendages 0.2–0.3 mm long. Style 3–5 mm long in bud, 5–7 mm long at anthesis. *Fruits* 4–5 mm in diameter, glabrous, verrucose. Seeds 0.5–1 mm long, testa reticulate to non-reticulate.

Distribution — Papua New Guinea: Milne Bay Prov.: NE Fergusson Island (1), Goodenough Island (2), Mt Simpson Range (1), Mt Dayman (2).

Habitat — In primary (cloud) forest and sub-alpine grassland, on slopes, 1700–2230 m altitude.

Collector's notes — Shrub, erect to scandent. Petiole dark pink, red. Leaves above mid-green to dull dark green, shiny; below pale green to red brown with prominent red nerves. Inflorescences axes dark purplish pink, red. Flowers pale green in bud. Calyx cup-shaped, red. Petals white. Stamens yellowish white. Style white. Fruit green to dark reddish purple with green wash.

Note — *Minutifolia* is botanical Latin for 'having small leaves'.

10. **Medinilla multibracteata** Bodegom, *spec. nov.* — Fig. 11

Ab omnibus speciebus pseudo-stipulatis ramulis quadrangularibus setosis, nodi setis longissimis 10–16 mm longis, pseudo-stipulis 10–25 mm longis, apice acuto, laminae basi attenuata pseudo-stipulis adnata ad libera, folii nervorum pari superiore 4–12(–24) mm supra par proximum orienti, pedunculis ad 1.8 cm longis, inflorescentiis axillaribus ad cauliforibus, plerumque bracteis vacuis multis, hypanthio setoso, petalis (2.5–) 4–5.5 mm latis differt. — Typus: *NGF 48631 (Millar)* (holo L; LAE, n.v.: BRI, CANB), Papua New Guinea, E Highlands Prov., Daulo Pass, 2655 m alt., 26 August 1970.

? [*Medinilla sp.*: Takeuchi, Sida 18 (1999) 764.] — *Medinilla bismarck-ramuensis* Takeuchi, Sida 18 (1999) 1073, t. 1. — Type: *Takeuchi 10408* (holo LAE n.v.; iso A, K, L (all n.v.)), see note on p. 562.

Shrub or tree, terrestrial or epiphytic, 1–3 m high. *Innovations* smooth, or densely covered with minute, protruding, white vesicles. *Branchlets* quadrangular, 3–6 mm thick, setose. Branches smooth, lenticels elliptic, slit-like and pusticulate. Saddle-shaped subpetiolary ridges absent, when present, 5–8 mm wide. Nodes with the longest bristles 10–16 mm long. *Pseudo-stipules* elliptic to lanceolate, 10–25 by 4–17 mm, soon glabrescent, apex acute. Pseudo-petioles 15–45 mm long. Blades equal to subequal, elliptic to lanceolate, 10–20 by 3–9 cm, 5- or 7-plinerved, soon glabrescent, base attenuate, decurrent into the petiole or not, margin entire, eglandular or remotely denticulate and teeth glandular in young leaves, apex acute to acuminate. Nerves above impressed to thickened, below flattened, the upper pair arising 4–12(–24) mm above the base. Transverse veins above inconspicuous to raised, below inconspicuous to flattened. Thyrses solitary or in fascicles, axillary to cauliflorous, many-branched with some empty bracts or few-branched with some to many nodes and many empty bracts, few- to many-flowered, 1–10 cm long. *Peduncles* without cataphylls, 0–1.8 cm long. Lowermost branches opposite. Bracts free at base, elliptic to lanceolate, 4–11 by 1.5–5 mm, apex acute. Bracteoles absent. Pedicels 3–9 mm long, glabrous or setose. Flowers 5- or 6-merous, 5–9 mm long in bud. *Hypanthium* urceolate to cup-

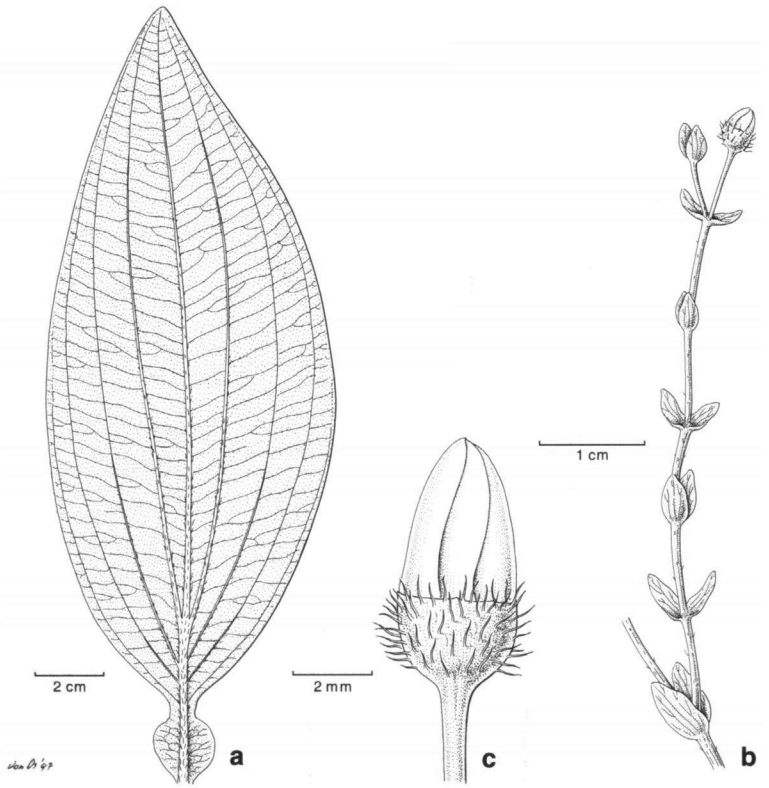


Fig. 11. *Medinilla multibracteata* Bodegom. a. Leaf with pseudo-stipules; b. inflorescence axis with many empty bracts; c. flower in bud (all *NGF 6029* (*Womersley*)).

shaped, 3–4.5 by 3–5 mm, ciliolate to setose, verrucose, rim dentate, teeth eglandular or glandular in young flowers. Calyx lobes 0.3–1 mm long. Petals 6(–7) by 2–4.5 mm in bud, 6–9 by (2.5–)4–5.5 mm at anthesis, apex truncate at anthesis. Stamens 10 or 12. Filaments alternipetal 1–2.25 mm long in bud, 2.5–3 mm long at anthesis, epipetal 0.75–1.75 mm long in bud, 1.75–2.5 mm long at anthesis. Anthers alternipetal 2–3.25(–3.75) mm long in bud, (2.75–)3.25–3.75 mm long at anthesis, epipetal 1.5–2.25(–2.75) mm long in bud, (2–)2.25–3 mm long at anthesis. Plectrum triangular, 0.1–0.25 mm long. Lateral appendages 0.25–0.35 mm long. Style 3.5–5(–6) mm long in bud, 5–7 mm long at anthesis. *Fruits* 4–7 mm in diameter, setose, verrucose. Seeds 0.5–1 mm long, testa reticulate.

Distribution — Papua New Guinea: W Highlands Prov.: Jimmi Valley (1), Chimbu (1); E Highlands Prov.: Goroka (8).

Habitat — In primary montane or in secondary forest, on limestone, in moderate shade, with good surface drainage, on ridges, 1830–2775 m altitude.

Collector's notes — Shrub or small tree, woody to fleshy, terrestrial or epiphytic, erect to scandent, sparsely to closely branched. Outer bark surface whitish brown, inner pale green. Wood pale straw. Stems, twigs, leaves, petioles and inflorescences

with long brownish silver scarious hairs. The base of the petiole produced into a pair of wings (*NGF 7776 (Womersley & Millar)*). Leaves with red veins; above mid-green to dark green, semiglossy; below pale red to green, glaucous. Inflorescences deep plum red. Pedicel and bracts wine red. Calyx green. Petals white. Stamens yellow. Young fruits green with white hairs.

Notes — *McKee 1310, NGF 6029 (Womersley),* and *48631 (Millar)* have few-branched inflorescences with many nodes and empty bracts. They also have a somewhat smaller flower (minima between brackets). *Hide 407* has somewhat larger flowers (maxima between brackets). Instead of a solitary thyrse a fascicle of thyrses may be present.

See also the note on *M. bismarck-ramuensis* Takeuchi on p. 562.

Multibracteata is botanical Latin for 'having many bracts'.

11. **Medinilla punicea** Bodegom, *spec. nov.* — Fig. 12

Ab omnibus speciebus pseudo-stipulatis innovationibus vesiculis minutis protrusis albis obsitis, ramulis teretis hirto-tomentosis, cristis subpetiolaribus selliformibus absentibus, pseudo-stipulis 7–10 mm longis, foliis aequalibus, pedunculo 0.5–0.7 cm longo, pedicello 1–2.5 mm longo, floribus 4-meris, calycis dentibus c. 0.3 mm longis, fructibus glabrescentibus differt. — Typus: *LAE 71190 (Croft & Galore)* (holo L; iso LAE, n.v.: BRI, CANB, LTB, UPNG), Papua New Guinea, Milne Bay Prov., Normanby Island, 800 m alt., 5 December 1977.

Shrub, terrestrial or epiphytic, c. 1.5 m high. *Innovations* densely covered with minute, protruding, white vesicles. *Branchlets* terete, 2–5 mm thick, shaggy tomentose. Branches smooth, lenticels elliptic, slit-like and pusticulate. Saddle-shaped subpetiolary ridges absent. Nodes with the longest bristles 7–13 mm long. *Pseudo-stipules* elliptic to oblong, 7–10 by 4–6 mm, soon glabrescent, apex acute. Pseudo-petioles 12–15 mm long. Blades equal, oblong to lanceolate, 9–11 by 3–5 cm, 3-plinerved, soon glabrescent, base attenuate, not decurrent into the petiole, margin entire, eglandular or remotely

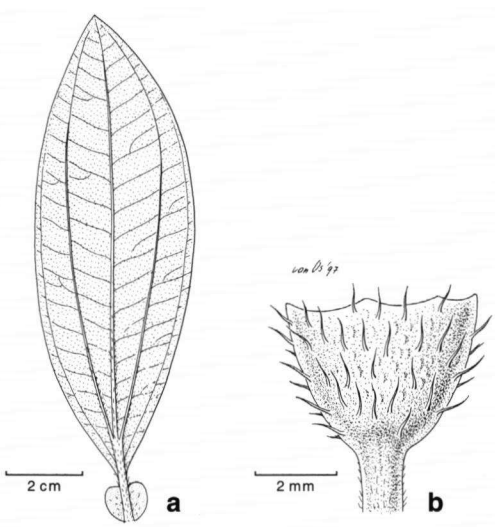


Fig. 12. *Medinilla punicea* Bodegom. a. Leaf with pseudo-stipules; b. very immature fruit (both *LAE 71190 (Croft & Galore)*).

denticulate, and teeth glandular in young leaves, apex acute. Nerves above impressed, below flattened, the upper pair arising more or less from the base. Transverse veins inconspicuous. Thyrses terminal to axillary, many-branched with some empty bracts, many-flowered, 2–3 cm long. *Peduncles* without cataphylls, 0.5–0.7 cm long. Inflorescence lowermost branches opposite. Bracts free at base, oblong to lanceolate, 5–9 by 2.5–4 mm, apex acute. Bracteoles absent. Pedicels 1–2.5 mm long, puberulous. Flowers incompletely known, 4-merous. *Hypanthium* urceolate to cup-shaped, 3–4 by 3.5–4 mm, glabrescent to setose, verrucose, rim dentate, teeth eglandular or glandular. Calyx lobes c. 0.3 mm long. *Fruits* c. 4.5 mm in diameter, ciliolate, verrucose. Seeds c. 0.75 mm long, testa reticulate.

Distribution — Papua New Guinea: Milne Bay Prov.: Normanby Island (2).

Habitat — In primary montane forest, 800–820 m altitude.

Collector's notes — Large epiphytic or terrestrial shrub. Petioles purple. Leaves below dull dark green. Peduncles and bracts purple. Flowers purple. Fruit green.

Note — *Punicea* is the classical Latin for 'purple-red' referring to the colour of the petioles, peduncles, bracts, and petals.

12. Medinilla setiflora Bodegom, *spec. nov.* — Fig. 13

Ab omnibus speciebus pseudo-stipulatis ramulis teretis c. 3 mm crassis setosis, pseudo-stipulis 7–9 mm longis c. 4 mm latis, apice obtuso, pseudo-petiolis c. 10 mm longis, folii nervorum pari superiore circa e basi orienti, inflorescentia 4–7 cm longa, hypanthio fructibusque pubescentibus differt. — Typus: *NGF 19943 (Sayers)* (holo L; iso LAE, n.v.: A, BO, BRI, CANB, K, NSW, SING), Papua New Guinea, Morobe Prov., Edie Creek, 2195 m alt., 17 September 1964.

Shrub, 0.9–1 m high. *Innovations* smooth, or densely covered with minute, protruding, white vesicles. *Branchlets* terete, c. 3 mm thick, setose. Branches smooth, lenticels elliptic, slit-like and pusticulate. Saddle-shaped subpetiolary ridges 6–8 mm wide. Nodes with the longest bristles 12–13 mm long. *Pseudo-stipules* elliptic to lanceolate, 7–9 by c. 4 mm, soon glabrescent, apex obtuse. Pseudo-petioles c. 10 mm long. Blades equal, oblong to lanceolate, 9–16 by 3.5–6 cm, 5-plinerved, soon glabrescent, base attenuate, not decurrent into the petiole, margin entire, eglandular, apex acute to cuspidate. Nerves above impressed to thickened, below flattened, the upper pair arising more or less from the base. Transverse veins inconspicuous. Thyrses terminal to axillary, many-branched with some empty bracts, many-flowered, 4–7 cm long. *Peduncles* without cataphylls, 1–1.4 cm long. Inflorescence lowermost branches opposite. Bracts free at base, oblong to lanceolate, 8–15 by 4–5 mm, apex acute. Bracteoles absent. Pedicels 3–5 mm long, puberulous. Flowers incompletely known, 4-merous. *Hypanthium* urceolate to cup-shaped, 3–4 by 3–5 mm, ciliolate to setose, verrucose, rim dentate, teeth eglandular. Calyx lobes 0.5–0.7 mm long. *Fruits* c. 5 mm in diameter, setose, verrucose. Seeds unknown.

Distribution — Papua New Guinea: Morobe Prov.: Wau (2).

Habitat — In forest, open area, 2195–2350 m altitude.

Collector's notes — Small shrub. Leaves hirsute, above dark green; below paler; young leaves tinged purple. Bracts dark red. Petals pale wine red to purple. Filaments white; anthers yellow. Fruit dark green, scales white.

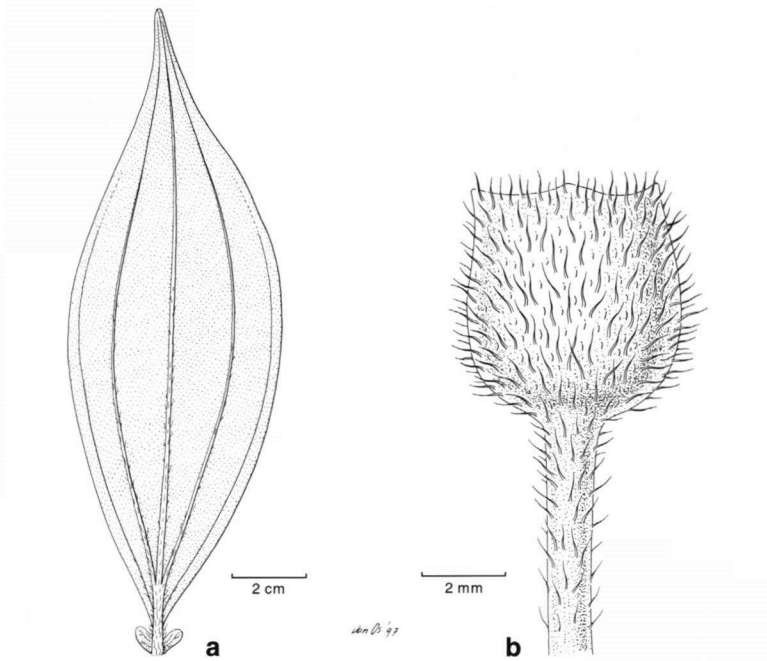


Fig. 13. *Medinilla setiflora* Bodegom. a. Leaf with pseudo-stipules; b. very immature fruit (both *NGF 19943* (*Sayers*)).

Notes — *Setiflora* is botanical Latin for 'with bristled flowers'.

Similar to the sympatric *M. markgrafii* var. *markgrafii*, but differing especially by the terete, setose branchlets, and pubescent hypanthium and fruits.

13. Medinilla sogeriensis Baker f. — Fig. 14

Medinilla sogeriensis Baker f. in Ridl., Trans. Linn. Soc. London, Bot. 9 (1916) 56; Baker f., J. Bot. 61, Suppl. (1923) 21; Mansf., Bot. Jahrb. Syst. 60 (1925) 115, 129, '*sogieriensis*'. — Lectotype: *Forbes 305* (holo BM; iso A n.v., K, L), designated here.

Shrub, epiphytic, scandent, c. 5 m high. *Innovations* densely covered with minute, protruding, white vesicles. *Branchlets* quadrangular, 2–3 mm thick, shaggy tomentose. Branches smooth, lenticels elliptic, slit-like and pusticulate. Saddle-shaped subpetiolary ridges 6–10 mm wide. Nodes with the longest bristles 5–10 mm long. *Pseudo-stipules* elliptic to oblong, 5–9 by 3–4 mm, soon glabrescent, apex acute. Leaves equal to somewhat unequal. Pseudo-petioles 5–20 mm long, or when heteromorphous in the shorter 10–20 mm long, and in the longer 20–24 mm long. Blades elliptic to lanceolate, 11–19 by 6–8 cm, or in the shorter 9–13 by 3–6 cm, and in the longer 17.5–18 by 5–7 cm, 3-plinerved, soon glabrescent, base attenuate, not decurrent into the petiole, margin entire, eglandular, apex acute to cuspidate. Nerves above impressed, below flattened, the upper pair arising more or less from the base. Transverse veins above raised, below inconspicuous. Thyrses terminal to axillary, many-branched with some

empty bracts, few-flowered, 1.5–3 cm long. *Peduncles* without cataphylls, 0.4–0.9 cm long. Lowermost branches opposite. Bracts free to connate at base, elliptic to oblong, 6–8 by 3.5–4 mm, apex acute. Bracteoles elliptic to oblong, 4–9 by 2–6 mm, apex obtuse. Pedicels 1–2 mm long, setose. Flowers 5-merous, c. 6 mm long in bud. *Hypanthium* urceolate to cup-shaped, 3–5 by 4–6 mm, ciliolate to setose, verrucose, rim dentate, teeth eglandular. Calyx lobes 0.5–0.75 mm long. Petals c. 3 by 3 mm in bud, c. 7 by 4 mm at anthesis, apex truncate at anthesis. Stamens 10. Filaments alternipetal c. 1.25 mm long in bud, c. 3 mm long at anthesis, epipetal c. 1.1 mm long in bud, c. 2.5 mm long at anthesis. Anthers alternipetal c. 2 mm long in bud, c. 3.5 mm long at anthesis, epipetal c. 1.5 mm long in bud, c. 3 mm long at anthesis. Plectrum triangular, c. 0.6 mm long. Lateral appendages c. 0.3 mm long. Style c. 2.5 mm long in bud, c. 6 mm long at anthesis. *Fruits* 6–7 mm in diameter, setose, verrucose. Seeds 0.5–1.5 mm long, testa reticulate.

Distribution — Papua New Guinea: Central Prov.: Sogeri Region (2); Milne Bay Prov.: foothills of Mt Suckling (2).

Habitat — In primary forest, 300–365 m altitude.

Collector's notes — Terrestrial or epiphytic shrub. Leaves dark green above, pale green-grey below. Panicle and petals dark pink to mauve, sepals pale pink. Fruit green.

Notes — *Sogeriensis* refers to the region where the species was first collected.

In several herbaria specimens were encountered erroneously identified as this. They are indeed very similar, but lack the pseudo-stipules, have a different indument on the well-developed true petioles, blade margins with small setae, etc. The identity of these collections remains unknown and they probably represent an undescribed species.

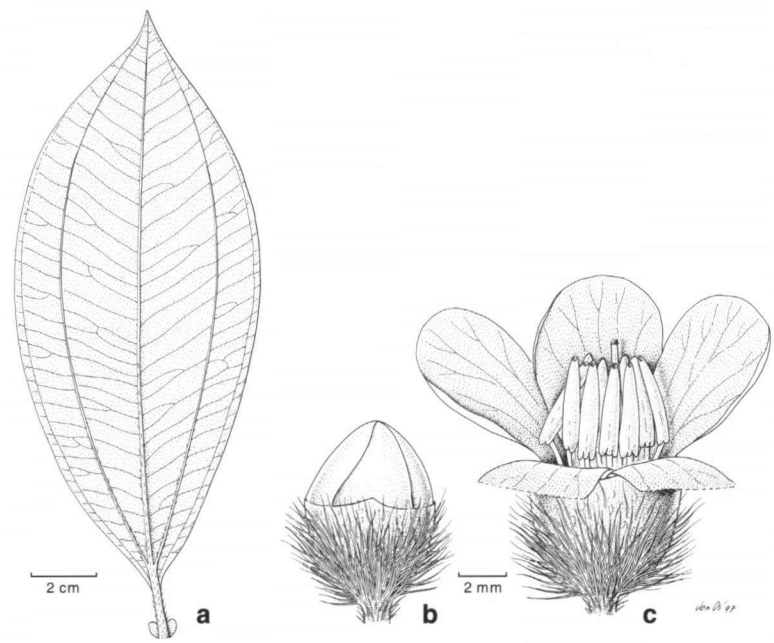


Fig. 14. *Medinilla sogeriensis* Baker f. a. Leaf with pseudo-stipules; b. flower in bud; c. flower at anthesis (all *LAE 56317* (*Katik*)).

14. **Medinilla triochiton** Bodegom, *spec. nov.* — Fig. 15

Ab omnibus speciebus pseudo-stipulatis ramulis teretis 4–7 mm crassis glabris, cristis subpetiolaribus selliformibus absentibus, nodi setis longissimis 10–15 mm longis, pseudo-stipulis 15–30 mm longis, apice acuto, laminae basi attenuata pseudo-stipulis adnata ad libera, folii nervorum pari superiore 15–20 mm supra par proximum orienti, pedunculo 2.5–6 cm longo cataphyllis 3 gerenti differt. — Typus: *NGF 40294 (Coode, Wardle & Katik)* (holo L; A n.v., CANB n.v., K, LAE), Papua New Guinea, S Highlands Prov., Mt Ialibu, 2045 m alt., 22 June 1969.

Shrub, terrestrial, scandent, 1.25–2 m high. *Innovations* densely covered with minute, protruding, white vesicles. *Branchlets* terete, 4–7 mm thick, glabrous. Branches smooth, lenticels elliptic, slit-like and pusticulate. Saddle-shaped subpetiolary ridges absent. Nodes with the longest bristles 10–15 mm long. *Pseudo-stipules* orbicular to elliptic, 15–30 by 15–20 mm, soon glabrescent, apex acute. Pseudo-petioles 20–30 mm long. Blades equal to subequal, elliptic to oblong, 16–19 by 7–11 cm, 7-plinerved, soon glabrescent, base attenuate, decurrent into the petiole or not, margin entire, eglandular, apex acute. Nerves above impressed, below flattened, the upper pair arising 15–20 mm above the base. Transverse veins above impressed, below flattened. Thyrses axillary to ramiflorous, many-branched with some empty bracts, many-flowered, 2–4 cm long. *Peduncles* with cataphylls, 2.5–6 cm long. Lowermost branches opposite. Bracts free at base, elliptic to lanceolate, 12–25 by 5–10 mm, apex acute. Bracteoles absent. Pedicels 4–6 mm long, glabrous. Flowers 5-merous, 7 mm long in bud. *Hypanthium* urceolate to cup-shaped, 3–4 by 3–5 mm, ciliolate to setose, verrucose, rim dentate, teeth eglandular. Calyx lobes 0.4–0.5 mm long. Petals 4–6 by 4–5 mm in

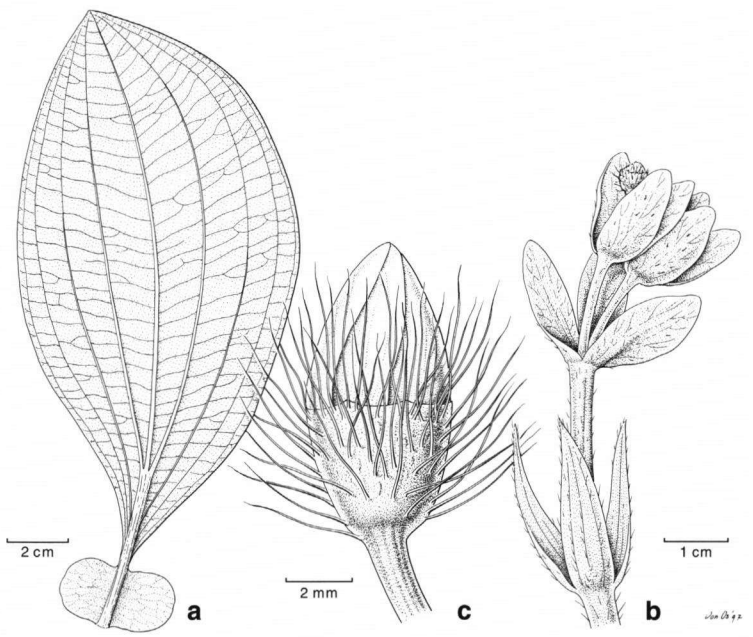


Fig. 15. *Medinilla triochiton* Bodegom. a. Leaf with pseudo-stipules; b. inflorescence with 3 cataphylls; c. flower in bud (all *NGF 40294* (*Coode, Wardle & Katik*)).

bud, 8–10 by c. 7 mm at anthesis, apex truncate at anthesis. Stamens 10. Filaments alternipetal c. 2 mm long in bud, 3–3.5 mm long at anthesis, epipetal c. 1.5 mm long in bud, c. 2.5 mm long at anthesis. Anthers alternipetal c. 3.5 mm long in bud, 4.25–5 mm long at anthesis, epipetal c. 2.5 mm long in bud, 3–3.5 mm long at anthesis. Plectrum triangular, c. 0.1 mm long. Lateral appendages 0.25–0.4 mm long. Style 3–5 mm long in bud, 5.5–9 mm long at anthesis. *Fruits* c. 6 mm in diameter, setose, verrucose. Seeds unknown.

Distribution — Papua New Guinea: S Highlands Prov.: Ialibu (3).

Habitat — In primary rain forest, understorey, or grass and garden areas, pathside near village, 1950–2045 m altitude.

Collector's notes — Terrestrial, erect to semi-scandent shrub. Leaves with midrib red at base; dark green. Inflorescences red. Bracts purple. Flower white. Calyx red. Fruit green.

Note — *Triochiton* is derived from Greek, meaning 'with three shirts' and refers to the 3 cataphylls, inserted about halfway the peduncle.

NOTE ADDED IN PRINT

Takeuchi (1999) has described *M. bismarck-ramuensis* Takeuchi from the W Highlands and Morobe Provinces based on *Takeuchi 10408* (holo LAE; A, K, L) and *Craven & Schodde 1157* (A, CANB, K, L, LAE). We have only seen the latter and it represents *M. markgrafii* var. *markgrafii*.

Takeuchi compared his species with *M. mansfeldiana* Merr. & L.M. Perry and specifically with *M. schlechteri* Mansf., with which it has at most a superficial resemblance. Obviously his study was hampered by the fact that all representatives deposited in LAE were on loan to L. It may not be ruled out that his material was a mixture of two taxa, with most elements taken from the type. From his extensive description the best match with ours appears to be with *M. multibracteata*, with which the differences are mainly quantitative. With only 10 collections seen the variability of the latter may well be greater. The occurrence in the Morobe Province would be an extension of its range.

The two appear to differ as follows:

- Branchlets terete. Pseudo-stipules up to 31 mm long, glabrous. Bracts up to 8 mm wide. Hypanthium apparently smooth. Petals up to 13 by 9 mm at anthesis ... . **M. bismarck-ramuensis**
- Branchlets quadrangular. Pseudo-stipules 10–25 mm long, soon glabrescent. Bracts 1.5–5 mm wide. Hypanthium verrucose. Petals 6–9 by 2.5–5.5 mm at anthesis ..... **M. multibracteata**

REDESCRIPTIONS OF MEDINILLA ARFAKENSIS AND MEDINILLA BRASSII

As mentioned in the introduction the non-pseudo-stipular species *M. arfakensis* and *M. brassii* have been confused with each other and the pseudo-stipular *M. markgrafii*. As the first two are here regarded as a likely sister group of the pseudo-stipular taxa redescriptions were prepared.

Medinilla arfakensis Baker f.

Medinilla arfakensis Baker f., Fl. Arfak Mts (1917) 158. — Type: *Gibbs 5597* (holo BM, no. 510199; iso BM, no. 510200), Irian Jaya, Koebré Mt, Anggi Lakes, 2440–2745 m alt., December 1913.

Shrub, epiphytic, erect, 0.5–2.5 m high. *Innovations* densely covered with minute, protruding, white vesicles. *Branchlets* alate, wings undulate, 4–6 mm thick, glabrous. Branches alate, wings undulate, smooth, lenticels elliptic, slit-like and pusticulate. Saddle-shaped subpetiolary ridges present, c. 6 mm wide. Nodes with the longest bristles 11–14 mm long. *Pseudo-stipules* absent. Blades equal, oblong, 16–26 by 6–12 cm, 7–11-plinerved, setose and soon glabrescent, base broadly attenuate to winged, decurrent into the petiole or not, margin entire, eglandular, apex acute to acuminate. Nerves above thickened, below flattened, the upper pair arising 40–80 mm above the base. Transverse veins above impressed, below inconspicuous. Thyrses axillary, many-branched, many-flowered, 5–11 cm long. *Peduncles* without cataphylls, 3–6.5 cm long. Lowermost branches opposite. Bracts free at base, oblong to lanceolate, 1–6 by 0.2–2 mm, acute. Bracteoles absent. Pedicels 3–7 mm long, glabrous. Flowers 5-merous, 5–7 mm long in bud. *Hypanthium* urceolate to cup-shaped, 1.5–3 by 2–3 mm, glabrous to glabrescent, sometimes ciliolate on the teeth, verrucose, rim denticulate, teeth glandular. Calyx lobes c. 0.25 mm long. Petals 3–5 by c. 2 mm wide in bud, up to 6 by 3.5 mm at anthesis, apex truncate at anthesis. Stamens 10. Alternipetal filaments 1.5 mm long in bud, 3 mm long at anthesis, the epipetals 1 mm long in bud, 2.5 mm long at anthesis. Alternipetal anthers 3 mm long in bud, 3.5 mm long at anthesis, the epipetals 2.5 mm long in bud, 2.5–3 mm long at anthesis. Plectrum linear-triangular, c. 0.25 mm long. Lateral appendages c. 0.75 mm long. Style 3–4 mm long in bud (filiform), up to 5 mm long at anthesis. *Fruits* present, 5–6 mm in diameter, glabrous, verrucose. Seeds c. 0.7 mm long, testa reticulate.

Distribution — Papua Barat: Vogelkop: Nettoti Mts (1), Arfak Mts (4); Wandammen Peninsular (1); Papua New Guinea: Madang: Karkar Island (2).

Habitat — In primary forest, *Pandanus/Eugenia* forest, locally common, 700–2745 m altitude.

Collector's notes — Undershrub. Young stems hairy. Leaves red when young, later olive to dark green, blotchy above. Inflorescence axes and pedicels pink to red. Ovary green to pinkish red. Petals white, once pink. Anthers yellow. Fruit and stalk red.

Note — See the disjunction between the Vogelkop area and Karkar Island.

Medinilla brassii Markgr. — Fig. 1a

Medinilla brassii Markgr., Brittonia 2 (1936) 142. — Type: *Schlechter 17037* (holo B n.v., presumably lost; iso A n.v., K, L), Papua New Guinea, Madang Prov., near Sausi, 24 December 1907.

Shrub, epiphytic, scandent, 1.8–3.6 m high. *Innovations* densely covered with minute, protruding, white vesicles. *Branchlets* terete, rarely quadrangular, 3.5–4 mm thick, glabrous. Branches terete, smooth, lenticels elliptic, slit-like and pusticulate. Saddle-shaped subpetiolary ridges present, 10–14 mm wide. Nodes with the longest bristles 10–20 mm long. *Pseudo-stipules* absent. Blades equal, elliptic to oblong, (7–)13–28 by (4–)8–16.5 cm, 5-plinerved, setose and soon glabrescent, base broadly attenuate

to auriculate, not decurrent into the petiole, margin entire, eglandular, apex acute to acuminate. Nerves above thickened, below flattened, the upper pair arising 5–25 (–60) mm above the base. Transverse veins above impressed, below inconspicuous. Thyrses terminal and axillary, many-branched, many-flowered, 5.5–11 cm long. *Peduncles* without cataphylls, 4–7 cm long. Inflorescence lowermost branches usually whorled. Bracts free at base, oblong to lanceolate, 0.8–2 by 0.2–1 mm, apex acute. Bracteoles absent. Pedicels 2.5–5 mm long, glabrous. Flowers 4-merous, 6–7 mm long in bud. *Hypanthium* urceolate to cup-shaped, 3–3.5 by 3–4 mm, glabrous, tuberculate, rim truncate, eglandular. Petals c. 5 by 4 mm in bud, up to 6 by 4 mm at anthesis, apex truncate. Stamens 8. Filaments alternipetal c. 2 mm long in bud, up to 3.5 mm long at anthesis, epipetals c. 1.75 mm long in bud, up to 3 mm long at anthesis. Anthers alternipetal c. 3.5 mm long in bud, up to 3.75 mm long at anthesis, epipetals c. 3 mm long in bud, up to 3.25 mm long at anthesis. Plectrum linear-triangular, c. 1 mm long. Lateral appendages c. 0.3 mm long. Style c. 4 mm long in bud, filiform, up to 5 mm long at anthesis. *Fruits* c. 6 mm in diameter, glabrous, tuberculate. Seeds 0.5–1 mm long, testa reticulate.

Distribution — Papua Barat: Paniai: Exploration Bivouac (1); Jayapura: Cycloop Mts (2); Papua New Guinea: W Sepik Prov.: Busilmin (1); Western Prov.: Mt Bosavi (1), Kiunga (2); Madang: Sausi (1); W Highlands Prov.: Jimmi Valley (1), Kopiago (2).

Habitat — In secondary and primary *Castanopsis, Eugenia, Myristica* forest, in moss cushions, locally common, 0–1710 m altitude.

Collector's notes — Epiphytic shrub, scandent. Leaves above pale to dark green, glossy, below paler to greyish or olivaceous yellow. Inflorescence axes pink to red. Calyx dark red. Petals (pale) pink to (pale) purple. Filaments white. Stamens yellow. Fruit red, when ripe black.

Notes — Markgraf designated *Schlechter 17037* as the type, but his description was mainly based on *Brass 5114*, a different species, described by Merrill & Perry (1943: 427) as *M. markgrafii*. An emended description of *M. brassii* was therefore necessary.

Merrill & Perry (1943) have suggested that *M. brassii* would belong to *M. arfakensis* Baker f., but Dr. Regalado and we have come to the conclusion that they are distinct. See Table 3 and the general key for the differences.

Docters van Leeuwen 10607 and *10986* (L) from the Nassau Mts, Papua Barat (700 and 1500 m alt.), resemble *M. arfakensis* because of their distribution, but *M. brassii* because of the very long plectrum, quite rare among the species here treated, therefore a most distinctive character. We have identified them provisionally as *M.* cf. *brassii*.

Table 3. The distinctive characters between *Medinilla arfakensis* and *M. brassii*.

	M. arfakensis	*M. brassii*
Distribution	Papua Barat: Vogelkop, Arfak Mts	Papua New Guinea: Madang, W Highlands
Length of plectrum	c. 0.25 mm	c. 1.0 mm
Number of nerves	7	5

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INDEX OF COLLECTIONS

All the collections used are listed below. Specimens used for pollen analyses are indicated by (p). Type specimens are indicated by (T). Numbers in brackets indicate specimens not seen, of which the identity seems certain.

arf	= *arfakensis*	gra	= *grandifolia*	mif	= *minutifolia*
bis	= *bismarck-ramuensis*	int	= *interiaciens*	mul	= *multibracteata*
bra	= *brassii*	len	= *lenticellata*	pun	= *punicea*
cla	= *clathrata*	mvm	= *markgrafii* var. *markgrafii*	set	= *setiflora*
fro	= *frodinii*	mvi	= *markgrafii* var. *insularis*	sog	= *sogeriensis*
gla	= *glandulosa*	mib	= *minutibracteata*	tri	= *triochiton*

Allison AA-NG-108: mvm; AA-NG-170: set; AA-NG-178: mvm — Anderson ECNG-23: mvm — ANU 16401 (Deveson): mvm.

Brass (4018: mvm T); 5114: mvm; 22297: mif (p); 22533: gla; 22727: gla (T, p); 22928: gla; 23126: gla; 23234: gla; 23262: gla; 24591: mvm; 24790: mvm; 25793: pun; 30853: mul — BW 11481 (Vink): arf; 12707 (Versteegh): arf; 13613 (Koster): arf.

Carr 13865: mvm; 13916: mib — Conn & Campbell 342: mvm — Craven & Schodde (1157: bis).

Docters van Leeuwen 10607: cf. bra; 10796: bra; 10986: cf. bra — Durand & Nelson 104: mvm.

Fallen 386: mvm — Forbes 305: sog (T); 596: sog — Frodin 674: mvm.

Gebo 1650: int — Gibbs 5597: arf (T); 6133: arf — Gillison 355: mvm.

Hartley 11666: mvm — Hide 407: mul — Höft 2406: mvm; 2411: mvm; 3852: mvm — Hoogland 4014: mib (T, p).

Jacobs 8611: mvm (p); 8739: bra.

Kanai 752829: mvm; 752857: mvm — Kanis 1435: mvm — Kostermans 2331: arf.

LAE 54524 (Lelean): mvm; 55645 (Stevens): mvm; 55675 (Stevens): len (T); 56127 (Leach & Katik): sog; 56146 (Leach): gla; 56317 (Katik): sog; 56392 (Katik & Taho): mvm; 59877 (Vinas): mvm; 60352 (Foreman): mvm; 61906 (Croft): mvm; 62066 (Katik & Larivita): mvm; 63082 (Clunie): mul; 63284 (Clunie et al.): mvi; 67576 (Barker & Wiakabu): cla (T); 67588 (Barker): gra; 67934 (Benjamin): mvm; 67948 (Benjamin): mif (T); 68966 (Croft et al.): mif; 71190 (Croft & Galore): pun (T); 74228 (Kerenga & Lelean): mvm; 74231 (Kerenga & Lelean): int; 75225 (Sohmer & Kerenga): mvm.

McKee 1310: mul — Millar 1243: mvm.

NGF 6029 (Womersley): mul; 6170 (Womersley & Floyd): mul; 6913 (Womersley & Floyd): mvm; 7667 (Native collector): bra; 7776 (Womersley & Millar): mul (p); 8727 (Womersley & Millar): mvm; 12386 (Womersley & Woolliams): tri; 12827 (Womersley & Thorne): mvm; 12926 (Corner & Gray): mvm; 13499 (Womersley & Sleumer): mvm; 13902 (Womersley & Sleumer): mvm; 14145 (Womersley): mul; 15958 (Millar & Van Royen): mul; 18324 (Streimann & Lelean): bra; 19943 (Sayers): set (T); 19960 (Sayers): mvm; 20181 (Van Royen): mvm; 20322 (Van Royen): mvm; 27954 (Streimann & Kairo): mvm; 28395 (Frodin): int; 33066 (Henty, Ridsdale & Galore): int; 33785 (Ridsdale & Woods): mvm; 34410 (Isles et al.): mvi; 34558 (Croft & Lelean): mvm; 35469 (Millar): bra; 36882 (Ridsdale & Woods): mvm; 37211 (Womersley et al.): bra; 37263 (Womersley et al.): bra; 37749 (Millar): arf; 40294 (Coode, Wardle & Katik): tri (T); 41723 (Henty, Isgar & Galore): int (T, p); 42782 (Henty, Foreman & Galore): gra (T); 43189 (Mann & Vandenberg): arf; 48631 (Millar): mul (T).

Pullen 6169: mvm; 7894: gla; 7895: gla.

Reeve 144: tri.

Sands, Pattison & Wood 1933: mvi (T, p); 2426: mvi — Schlechter 17037: bra (T, p) — Schodde 5503: mif — Streimann 8377: mvm — Szent-Ivany 14: mvm.

Takeuchi (10408: bis; T).

UPNG 4225 (Frodin): fro (T).

Van Royen 3641: bra — Van Royen & Sleumer 5751: bra; 8043: arf — Van Valkenburg 102: mvm — Veldkamp 6894: bra — Veldkamp & Stevens 5513: mvm; 5802: mvm — Vinas 20: mvm.

Woods & Black 1680: mvm.