

Systematic Studies of
Micronesian Plants

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ABSTRACT

Fosberg, F. Raymond, and Marie-Hélène Sachet. Systematic Studies of Micronesian Plants. *Smithsonian Contributions to Botany*, number 45, 40 pages, 2 figures, 1980.—Taxonomic and nomenclatural treatments of various genera in a number of families known from Micronesia, with new species, varieties, and combinations. A discussion is included of the systematic position of the genus *Fagraea* Thunberg, transferring it from the family Loganiaceae to the Gentianaceae. The genus *Wollastonia* de Candolle (Compositae) is resurrected from the synonymy of *Wedelia* Jacquin, and the widespread species commonly called *Wedelia biflora* (L.) de Candolle is discussed in relation to the Hawaiian genus *Lipochaeta* de Candolle and is moved to *Wollastonia*.

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Introduction

In the course of work on the Micronesian flora we have encountered many taxonomic and nomenclatural problems. Some of our conclusions have been published as small papers, others have accumulated, unpublished. The names and observations which are ready for publication are here made available in advance of their use in the parts of the Flora, which appear at irregular intervals. Thus the correct names may be used and referred to by ourselves and others working on the plants of the region.

This paper includes observations on the families Hymenophyllaceae, genera *Hymenophyllum* and *Trichomanes*; Gleicheniaceae, *Gleichenia*; Polypodiaceae, *Thelypteris*; Gnetaceae, *Gnetum*; Hydrocharitaceae, *Hydrilla*; Gramineae, *Centosteca*; Araceae, *Rhaphidophora*; Urticaceae, *Elatostema*; Leguminosae, *Calliandra* and *Stylosanthes*; Euphorbiaceae, *Acalypha*; Celastraceae, *Loeseneriella*; Clusiaceae, *Calophyllum* and *Garcinia*; Flacourtiaceae, *Flacourtia*; Cucurbitaceae, *Citrullus* and *Zehneria*; Rhizophoraceae, *Bruguiera*; Melastomataceae, *Medinilla* and *Melastoma*; Araliaceae, *Osmoxylon*; Myrsinaceae, *Myrsine*; Sapotaceae, *Pouteria*; Gentianaceae, *Fagraea*; Loganiaceae, *Geniostoma*; Boraginaceae, *Heliotropium*; Verbenaceae, *Callicarpa*; Acanthaceae, *Pseuderanthemum*; Rubiaceae, *Geophila*, *Hedyotis*, *Psychotria*, and *Spermacoce*; Compositae, *Vernonia*, *Wollastonia*. Selected specimens are cited to support the observations; in some cases they may again be cited later in the flora itself.

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For details of herbarium symbols, the history, circumstances, and format of the Flora of Micronesia, see the first three papers in the series, *Smithsonian Contributions to Botany*, numbers 20, 24, and 36.

We are much indebted to those who have supplied specimens and field observations, especially Mrs. Marjorie Falanruw of Yap Island, Miss Joan Canfield in Palau, and Mr. Philip Moore in Guam. Mr. Royce Oliver has given invaluable help in locating specimens and pointing out pertinent details. Miss Dulcie Powell has examined much of the manuscript. Dr. Harold Robinson has made valuable suggestions concerning our treatment of *Wollastonia*. We are much indebted to the authorities of the various herbaria, from which specimens are cited, for their courtesy in allowing us to work with their collections and to borrow specimens when necessary. The Flora Malesiana has been of tremendous assistance in working out many taxonomic and nomenclatural details. Grants from the Smithsonian Research Awards Program to the Smithsonian Research Foundation have supported our work on island floras, including that reported in this paper, for a number of years. We express our thanks to all of the above.

A map of Micronesia, showing the locations of the islands mentioned is included as Figure 1.

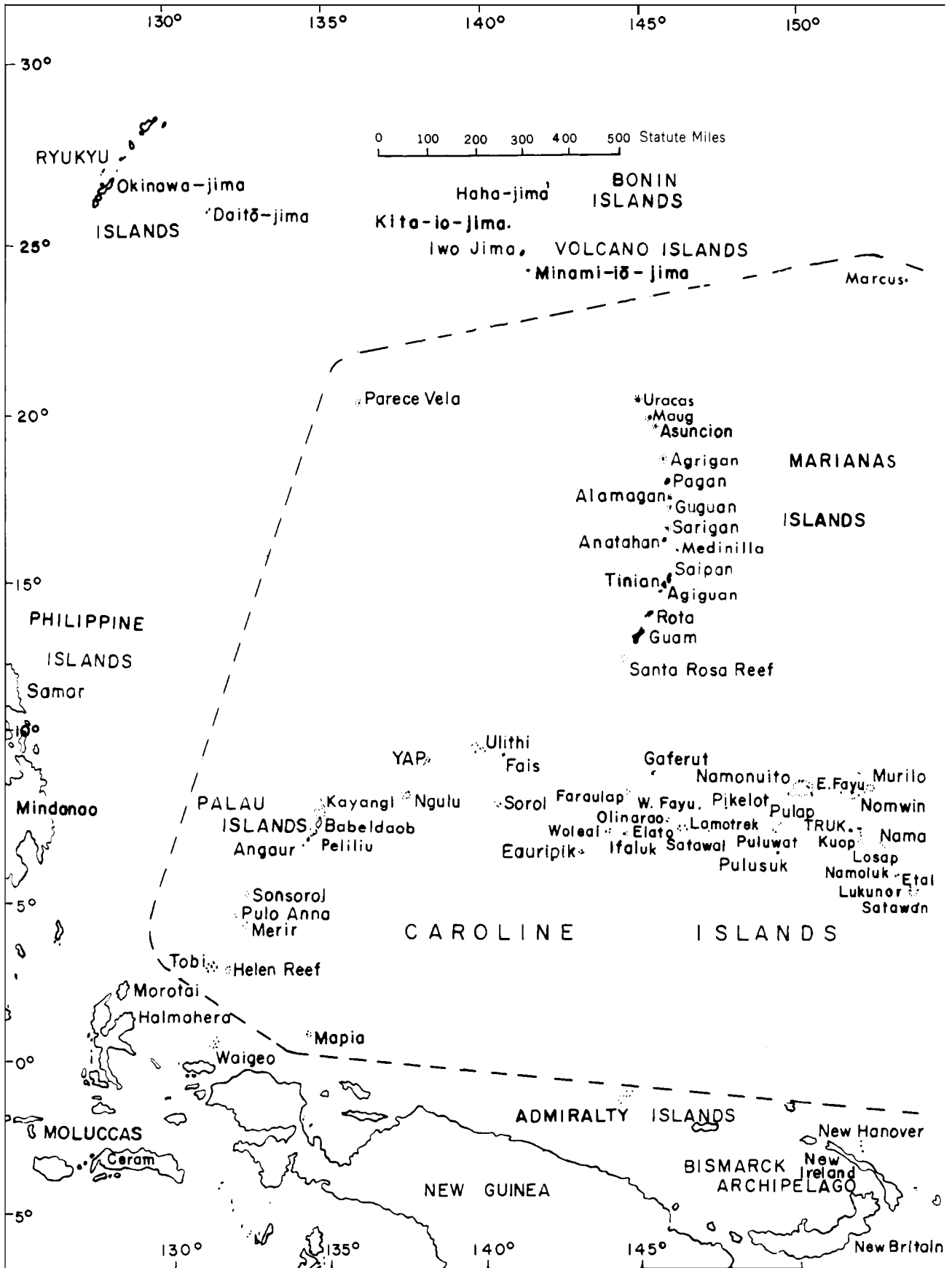
HYMENOPHYLLACEAE

Hymenophyllum Smith

Hymenophyllum digitatum (Swartz) Fosberg, new combination

Trichomanes digitatum Swartz, Syn., 370, 422, 1806.

Microtrichomanes digitatum (Swartz) Copeland, Phil. Jour. Sci., 67:1, 36, 1938.



RYUKYU ISLANDS
Okinawa-jima
Daitō-jima

0 100 200 300 400 500 Statute Miles

Haha-jima
BONIN ISLANDS
Kita-io-jima
Iwo Jima, VOLCANO ISLANDS
Minami-iō-jima

25°

20°

15°

10°

5°

0°

5°

130°

135°

140°

145°

150°

PHILIPPINE ISLANDS

Samar

Mindanao

MOLUCCAS

Ceram

PALAU ISLANDS

Angaur

Sonsorol

Pulo Anna

Merir

Tobi

Morotai

Halmahera

Waigeo

Mapia

YAP

Ulithi

Fais

Kayangi

Ngulu

Babeldaob

Peliliu

Sorol

Faraulap

Olingrao

Woleai

Eauripik

Gaferut

Namonuito

W. Fayu

Olinrao

Elato

Satawal

Pulusuk

Pikelof

Lamotrek

Pulap

TRUK

Puluwat

Kuop

Losap

Namoluk

Lukunor

Satawdn

MARIANAS ISLANDS

Alamagan

Guguan

Sarigan

Anatahan

Medinilla

Saipan

Tinian

Agiguan

Rota

Guam

Santa Rosa Reef

Uracas

Maug

Asuncion

Pagan

Agrigan

Parece Vela

Marcus

CAROLINE ISLANDS

ADMIRALTY ISLANDS

BISMARCK ARCHIPELAGO

NEW GUINEA

New Hanover

New Ireland

New Britain

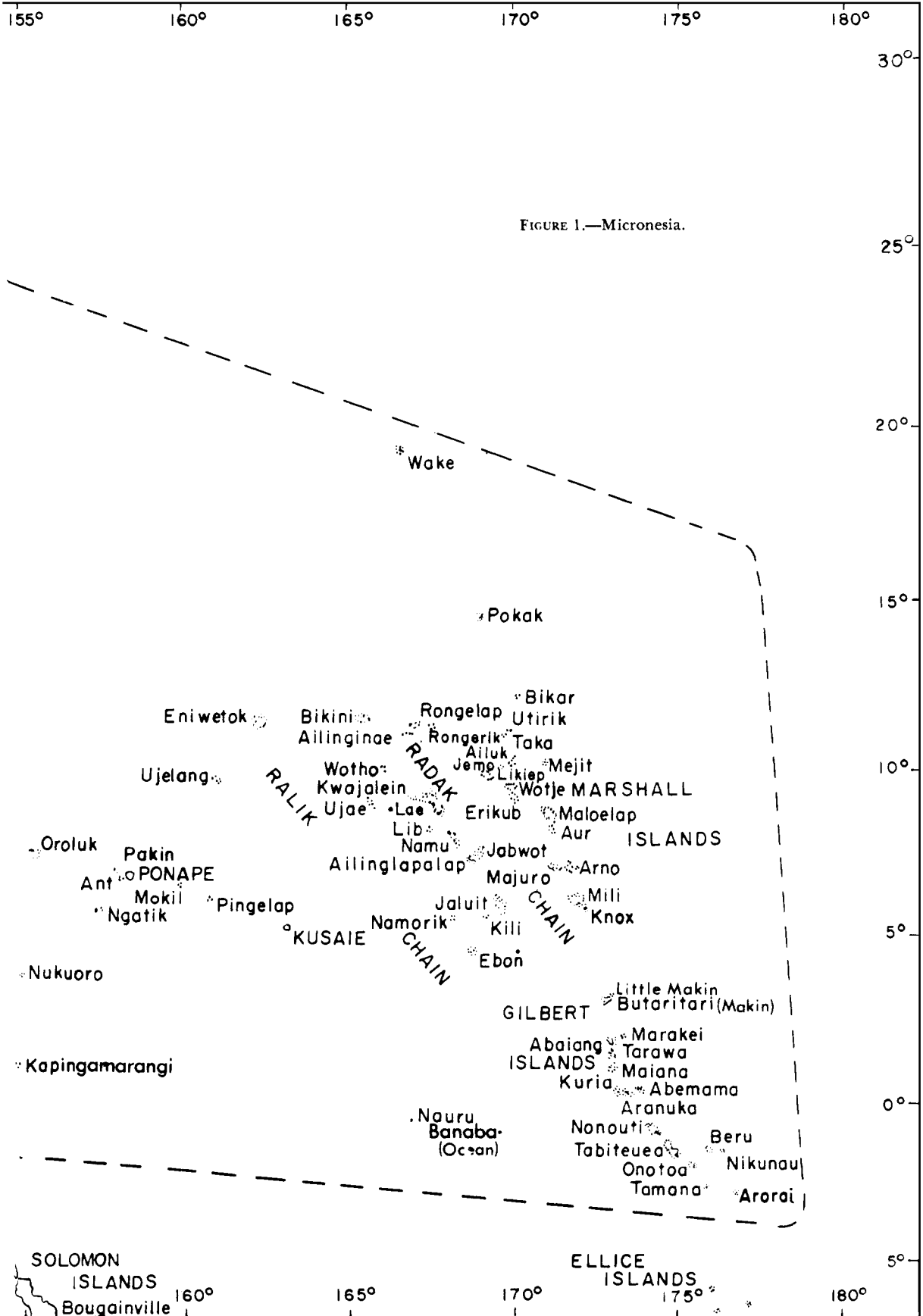


FIGURE 1.—Micronesia.

In spite of their united involucre, transferring the species referred by Copeland to *Microtrichomanes* Copeland, from *Trichomanes* to *Hymenophyllum*, removes some of the artificiality from the circumscription of the traditional genera of the Hymenophyllaceae. This weakens, somewhat, the argument for dismemberment of these large genera. I am unable to find that the appropriate combination has been made for this species.

Trichomanes L.

Trichomanes falsinervulosum (Nishida) Fosberg, new combination

Microgonium falsinervulosum Nishida, Jour. Jap. Bot., 32(5):156, fig. 4, 1957.

This species resembles *Trichomanes craspedoneurum* Copeland, but differs in many details, as brought out in the original description. However, the dimensions given for the frond do not correspond well to the shape illustrated. I have not seen the type, Hosokawa s.n., in Taihoku University Herbarium.

Trichomanes tahitense Nadeaud

Trichomanes tahitense Nadeaud, Enum Pl. Tahiti, 18, 1873.
Microgonium tahitense (Nadeaud) Tindale, Contr. N.S.W. Nat. Herb., Flora Ser., 201:4, 33-34, 1975.
Trichomanes omphalodes C. Christensen, Ind. Fil., 646, 1906.

Dr. Tindale points out that the species commonly known as *T. omphalodes* C. Christensen is identical with the older *T. tahitense* Nadeaud. In Micronesia it is known from Palau and Ponape, where it is an epiphyte on tree trunks in wet forests.

GLEICHENIACEAE

Gleichenia J. E. Smith

Gleichenia linearis var. *latiloba* (Holttum) Fosberg, new combination

Dicranopteris linearis var. *latiloba* Holttum, Reinwardtia, 4:277, 1957.

The several characters used by Holttum (1957a: 258-259; 1957b:168-184) to separate *Dicranopteris Bernhardi* from *Gleichenia* Smith do not seem ade-

quate to justify more than sectional rank. Therefore, this variety must be transferred if it is to be maintained.

POLYPODIACEAE, sensu lato

Thelypteris Schmidel

This genus has been drastically divided by Holttum (1971, 1977), but we find it very difficult to follow most of this segregation and think it more convenient, and perhaps even more natural to follow Morton (1963) in regarding the "family" Thelypteridaceae as principally comprising one large genus. Names are available in *Thelypteris* for most Micronesian species, but we find none for the following three, for which a new combination and two new names are proposed.

In addition, *Cyclosorus jaculosus* (Christ) Ito has been reported from Truk. Neither *Thelypteris jaculosus* (Christ) Panigrahi nor *Thelypteris subpubescens* (Blume) Iwatsuki, which have been confused, are admitted from Micronesia by Holttum. Disposition of the Truk record will have to wait until we can examine the specimen, collected by Kusano in 1915, on which it is based.

Thelypteris carolinensis (Hosokawa) Fosberg, new combination

Dryopteris carolinensis Hosokawa, Trans. Nat. Hist. Soc. Formosa 26:74, 1936.
Christella carolinensis (Hosokawa) Holttum, Kew Bull., 31:307, 1976.

Thelypteris peliliuensis Fosberg, new name

Glaphyopteris palauensis Hosokawa, Trans. Nat. Hist. Soc. Formosa, 32:285-286, 1942.
Dryopteris immersa sensu Hosokawa, Trans. Nat. Hist. Soc. Formosa, 28:147, 1938 [non (Blume) O. Kuntze, Rev. Gen. Pl., 2:813, 1891].

Hosokawa's description is rather full but we are unable, from it, to place the plant in any of Holttum's genera, nor has Holttum accounted for Hosokawa's species. We have not seen the type, Hosokawa's 9221, from Peliliu, Palau. Holttum (1971, 1977) seems to restrict the genus *Glaphyopteris* (Presl ex Fée) Fée to the New World. Therefore, even if it were maintained as a genus, it would

scarcely be an appropriate place for the species under consideration. Because of the already existing *Thelypteris palauensis* (Hosokawa) Reed (1968) the epithet *palauensis* cannot be transferred to *Thelypteris*. Hence a new name is proposed, based on Hosokawa's description and type-specimen.

Thelypteris rupi-insularis Fosberg, new name

Dryopteris rupicola Hosokawa, Trans. Nat. Hist. Soc. Formosa, 26:73, 1936 [non C. Christensen 1917 = *Thelypteris rupicola* (C. Christensen) Ching 1917].
Glaphyopteris rupicola (Hosokawa) Hosokawa, Trans. Nat. Hist. Soc. Formosa, 32:285, 1942.
Christella rupicola (Hosokawa) Holttum, Allertonia, 1:217, 1977.

GNETACEAE

Gnetum L.

Gnetum gnemon sensu Fosberg & Sacht, Smithsonian Contr. Bot., 20:13, 1975 [non L., Mantissa, 1:125, 1767].

The two sterile specimens from Palau, *Hosokawa 9061* and *Stone and Sabino 4541* (both BISH), referred to *Gnetum gnemon* L. by us in 1975 (following uncritically the determination on the label of no. 9061), when compared with fertile specimens of *Phaleria nisidai* Kanehira (Thymeleaceae), seem undoubtedly to belong to the latter species. Since these are the only basis of reports of *Gnetum* in Micronesia of which we know, the family Gnetaceae, genus *Gnetum*, and species *Gnetum gnemon* should be deleted from the flora of Micronesia.

HYDROCHARITACEAE

Hydrilla Richard

Hydrilla verticillata (L.f.) Royle

Hydrilla verticillata (L.f.) Royle, Ill. Bot. Himal., T. 376, 1839.
Serpicula verticillata L.f. Suppl., 416, 1781.
Egeria densa sensu Fosberg, Phytologia, 15:496, 1968 [non Planchon, Ann. Sci. Nat. Bot. 3,11:80, 1849].

In 1968 I (Fosberg) reported *Egeria densa* Planchon from Guam on the basis of *Stone 4305*, from the Talofoto River near the mouth. The Bishop Museum sheet of this collection was determined by Harold St. John as *Egeria densa*. In his Flora of Guam, Stone (1971:101-102) refers this number to both *Egeria* and *Hydrilla*, which caused

me to check the US sheet. This turned out to be *Hydrilla*, on the basis of the prominent, rather than exceedingly minute, spinulose teeth on the leaf margin. The collection is sterile, as is so often the case with both these aquatics. Since this is the only report of *Egeria* from Guam, this genus should be deleted from the flora of Guam.

GRAMINEAE (= POACEAE)

Centosteca Desvaux (*Centotheca* Beauvois, orth. mut.)

Centosteca lappacea (L.) Desvaux

Centosteca lappacea (L.) Desvaux, Nouv. Bull. Soc. Philom. Paris, 2:189, 1810; Jour. de Bot. Desvaux, 1:71, 1813.—Beauvois, Essai . . . Agrost., 69, 1812.—Dandy in Exell. Cat. Vasc. Pl. S. Thomé, 365, 1944.
Cenchrus lappaceus L., Sp. Pl., ed. 2, 1488, 1763.
Holcus latifolius Osbeck, Dagb. Ostind. Resa, 247, 1757.
Centotheca latifolia Trinius, Fund. Agrost., 141, 1820 (nom. superfl. illegit.).—Monod de Froideville, Blumea, 19:58, 60, 1971.

For the benefit of any who may have missed Dandy's 1944 discussion of the nomenclature of this widespread grass species, and who may have read the recent synopsis of the genus *Centosteca* (as *Centotheca*) by Monod de Froideville (1971:57-60), it seems worth while to point out that Monod apparently also missed Dandy's discussion. Dandy showed that Trinius based his *Centotheca latifolia* on *Cenchrus lappaceus* L., not on *Holcus latifolia* Osbeck; therefore, any transfer of the latter to *Centosteca* will create a later homonym. Hence the name *Centosteca lappacea* (L.) Desvaux must stand.

It should be pointed out that Desvaux's original spelling of the generic name was *Centosteca* which was changed ("corrected") by Beauvois; this change does not seem to be warranted according to the International Code, even though it was later accepted by Desvaux in 1813 (Soderstrom and Decker, 1973:433).

ARACEAE

Rhaphidophora Hasskarl

Rhaphidophora carolinensis (Volkens) Fosberg, new combination

Epipremnum carolinense Volkens, Bot. Jahrb., 31:459, 1901.

Epipremnum palauense Koidzumi, Bot. Mag. (Tokyo), 30:401, 1916.

Rhaphidophora koidzumii Kanehira, Enum. Micr. Pl., 286, 1935.

When *Rhaphidophora* Hasskarl, 1842, and *Epipremnum* Schott, 1857, are united under the name *Rhaphidophora*, the name for this species must be based on the earlier *E. carolinense* Volkens. Kanehira, though he did not unite the two genera in his Enumeration, did transfer *E. palauense* Koidzumi to *Rhaphidophora*, renaming it *R. koidzumii* because of the earlier *Rhaphidophora palauensis* Koidzumi (1916). However, the still earlier epithet of *Epipremnum carolinense* Volkens must prevail.

URTICACEAE

Elatostema Forster

Elatostema Forster, Char. Gen. 105, tab. 53, 1775.—

Gaudichaud, Bot. Freyc. Voy. Uranie, 493, 1826 [1830].

Pellionia Gaudichaud, Bot. Freyc. Voy. Uranie, 494, 1826 [1830], [pro parte].

Languetia Gaudichaud, Bot. Freyc. Voy. Uranie, 494, 1826 [1830].

This genus, typified by *Elatostema sessile* Forster and taken in the broad sense here adopted, is large and taxonomically difficult, and there is no adequate treatment of it.

A number of species have been described from Micronesia, some represented only by their type collections. Superficially, they are mostly rather similar, but have not been studied in detail, partly from lack of adequate material. In the Marianas, the oldest name available, *Pellionia divaricata*, was provided by Gaudichaud for a plant from Guam. Merrill (1914:76, 77) described two further species from Guam, *Elatostema stenophyllum* and *E. calcareum*, but made no reference to Gaudichaud's species; yet the original material of *Pellionia divaricata* seen in Paris seems very similar to *Elatostema calcareum* Merrill. However, in our opinion the reduction should not be made until all available material can be assembled and compared critically in minute as well as gross features. So far as present concepts go, the genus is noted for its high degree of local endemism, at least in insular floras. For the present it seems best to accept all three Marianas species.

Elatostema divaricatum (Gaudichaud)

Fosberg, new combination

Pellionia divaricata Gaudichaud, Bot. Freyc. Voy. Uranie, 494, 1826 [1830].

Procris divaricata (Gaudichaud) Steudel, Nom., ed. 2, 2:398, 1841 ["In insulis Mariannis (Guam)"].

For Gaudichaud's species, it is necessary to provide this new combination. This name being oldest, may eventually replace one or both of the two other names for the Marianas species.

LEGUMINOSAE (= FABACEAE)

Calliandra Benth

Calliandra haematocephala Hasskarl

Calliandra haematocephala Hasskarl, Retzia, 1:216, 1855.

Calliandra inaequilatera Rusby, Mem. Torrey Bot. Club, 6:28, 1896.

This attractive ornamental is planted in many tropical countries, but has apparently not been reported before from Micronesia. *Calliandra haematocephala* and *C. inaequilatera* have usually been treated as separate species: R.S. Cowan (1963:94-98) has given characters purporting to separate them. However, the cultivated Micronesian specimens seem to fall between the two by his criteria.

Nevling and Elias (1971:69-85) convincingly demonstrated that two species are not represented and that the material on which the earlier name was based was from cultivated plants in Java that originated from plants brought from the same region in Bolivia from which Rusby brought the type of *Calliandra inaequilatera*.

This species should not be confused with *Calliandra haematomma* [sic] (Bertero ex de Candolle) Benth, an entirely different species, though the name is sometimes misapplied.

SPECIMEN'S SEEN.—Caroline Islands: Palau; Koror, Entomology Laboratory grounds, *Salsedo 119*(US). Ponape: Colonia, 100-150 ft [30-40 m], *Salomon and George 8*(US).

Stylosanthes Swartz

Two species of *Stylosanthes* have been reported from Micronesia, both by Alan Burges (ca. 1935) from Nauru. We have not seen specimens of either. They were reported as *Stylosanthes sundaicus*

Taubert and *Stylosanthes guyanensis* (Aublet) Swartz.

Mohlenbrock (1957:345-346) equates *Stylosanthes sundaicus* with *Stylosanthes humilis* Humboldt, Bonpland & Kunth. Since we have seen no specimen, we can only accept this disposition, and use Mohlenbrock's key characters to separate the two Micronesian recorded species in the key given below.

Mohlenbrock used the orthography *guyanensis* for the other species. Neither spelling seemed likely considering that Aublet was French-speaking. Refer-

ence to the original texts showed that Aublet (1775: 776) used the binomial *Trifolium guianense* and that Swartz (1789:301) transferred it in that form to his new genus *Stylosanthes*. On Aublet's plate, T.309, however, the name is "*Trifolium, guyanense*". Doubtless this form originated with a non-French-speaking engraver. This form could only be correct if the plate had been published prior to the text. There seems to be no evidence that this happened, nor any information about the order in which the 72 fascicles appeared (Staffeu & Cowan, 1976:79) if they did not come out simultaneously.

Key to the Micronesian Species of *Stylosanthes*

- Calyx lobes 3-5 mm long, loment minutely beaked, beak not over 0.5 mm long*S. guianensis*
 Calyx lobes 1.5 mm long, loment with curved or hooked beak 1.5-3.5 mm long*S. humilis*

Stylosanthes guianensis (Aublet) Swartz

Stylosanthes guianensis (Aublet) Swartz, Svenska Vetensk. Acad. Handl. 10:301, 1789.
Trifolium guianense Aublet, Hist. Pl. Guian. Fr., 776, T.309, 1775.

In Micronesia reported only from Nauru, originally from tropical America.

Stylosanthes humilis Humboldt, Bonpland & Kunth

Stylosanthes humilis Humboldt, Bonpland & Kunth, Nov. Gen. Sp., 6:506, 1823.
Stylosanthes sundaica Taubert, Verh. Bot. Brandenb., 32:21, 1890.

In Micronesia reported only from Nauru, originally from tropical America.

EUPHORBIACEAE

Acalypha L.

This vast genus is inherently difficult, but its taxonomic intricacy is enhanced by the myriad of slightly differing forms that have been recognized and described as species. Certain of the complexes would be more manageable if considered as broad aggregate species, with the more recognizable populations regarded as varieties and forms.

One such complex, for which the oldest name seems to be *Acalypha amentacea* Roxburgh, extends from the Malesian area well into the Pacific.

Acalypha amentacea Roxburgh

Acalypha amentacea Roxburgh, Fl. Ind. ed. Carey, 686, 1832.

This was originally described as follows:

Dioecious, shrubby. Leaves long-petioled, ovate-cordate, taper-pointed, three-nerved. Stipules ensiform; spikes axillary, as long as the petioles, the male amentaceous; involucre small, hairy, dentate, one-flowered; style multifid.

A native of the Moluccas. It differs from König's *A. betulina* (in Retz. Obs. or N. 85) in having but one female flower in the involucre.

This species was reduced to *A. fruticosa* Forskål by Müller-Argau (1866:822), this reduction being followed by Pax and Hoffmann (1924:169), and by later botanists generally, except Merrill. This reduction seems manifestly incorrect, because *A. fruticosa* (an African-Arabian western Indian species) does not reach the Moluccas. The description fits the large shrubby or arborescent species that is common in a myriad of variations and local races from India to Fiji and Tonga at least, and north to the Philippines and Carolines.

While it may seem drastic to propose reduction of such long recognized species as *A. grandis*, *A. stipulacea*, *A. angatensis* and *A. wilkesiana*, no one has yet offered any convincing attempt to distinguish them by other than superficial key characters, and these are frequently unreliable.

The differences in this assemblage are in leaf size, shape, length of petiole, pubescence of stem and leaf, size and shape of stipules, thickness, den-

sity, length and hairiness of staminate spike, length and density of pistillate spike, shape and dentation of bracts of pistillate spike, and in the case of *A. wilkesiana* in its forms, color, and modification of leaves.

It is proposed to treat this assemblage as one polymorphic species, within which many lesser units will eventually have to be distinguished. A few of these, most of which already have names, can be recognized at once, but to classify the variations in this group as a whole, and even to be certain which described species are to be included, and what their precise limits are, is a major taxonomic task and cannot be attempted here.

Typification of *A. amentacea* presents problems. No specimen was located at Kew, either in the general herbarium or in the Wallich Herbarium. Dr. J. R. Sealy, formerly of the Kew Herbarium says (pers. comm.) that the Molucca plants described by Roxburgh have not been located. Nothing is known about this collection. Most of the plants were not illustrated and cannot be typified at present, except by the descriptions. Sealy says it would be worth while to look in the Brussels and Calcutta herbaria to see if these Molucca specimens are there, but we have not pursued this suggestion. In the British Museum is a specimen, "Amboyna Dec. 1801" [Christian Smith pencilled on label]. It represents a plant with large ovate-cordate or subcordate leaves, blades 18–22 cm long, 11–15 cm wide, serrate, teeth acute to somewhat acuminate or mucronate, apex prominently acuminate, nerves densely hirsute beneath, reticulation slightly hirsute, petioles densely hirsute, 7–17 cm long; stipules ovate-lanceolate, long-acuminate, 12–14 mm long, sericeous except margins. Staminate spikes slender, about 2 mm thick, 10–13 mm long, the rachis densely hirsute, the basal 1–2 cm almost bare of flowers; bracts scale-like, 1 mm or so long, acuminate, hirsute; a single stout pistillate spike, 1.5 mm thick, 8 cm long, densely pilose, sparsely flowered, bracts reduced, 2 mm long, hirsute without, with 8–12(?) lanceolate teeth, each bract subtending one flower, ovary hirsute, style many-branched, 1–2 mm long.

This specimen bears no name on the original label, but E. D. Merrill has annotated it in 1951 as *Acalypha amentacea* Roxburgh with a note: "This might be the collection on which Roxburgh's species was based as Charles Smith's material went to him."

It is a reasonably good match for *Robinson 353*

(BM), perhaps a bit more hirsute, pistillate spike less densely flowered, bracts less developed than on most spikes of no. 353 but about like those on the youngest spike, which seems comparable in age. It is undoubtedly the same species.

It seems expedient to recognize two subspecies, based mainly on the dentation of the bracts of the pistillate spikes, the aspect of the plants, and leaf outline.

Acalypha amentacea Roxburgh ssp. *amentacea*

Terminal tooth of bract not conspicuously longer than lateral ones.

Pending further study, all of the subordinate taxa excepting *wilkesiana* are placed in this subspecies.

Acalypha amentacea Roxburgh var. *amentacea*

Acalypha amboynensis Bentham, Lond. Jour. Bot., 2:233, 1843.

Acalypha stipulacea Klotzsch in Meyen, Nov. Act. Acad. Cur., 19 (suppl.):416, 1843.

Acalypha grandis var. *amboynensis* (Bentham) Müller-Argau, Linnaea, 34:10, 1865.

There seems to be no significant difference between material collected in Amboina (*Robinson 353, 354*) and some of the variable series of material from the Philippines distributed by Dr. E. D. Merrill and well represented in the U.S. National Herbarium.

Leaves broadly ovate-subcordate, strongly acuminate, softly pubescent beneath; young parts sericeous-tomentose; stipules lanceolate-acuminate; staminate spikes congested, becoming elongate but remaining densely flowered, pistillate more loosely flowered, equally long, with ovate incised bracts, these sparsely hairy.

Characterization based largely on *Robinson 353, 354*, from Amboina.

Acalypha amentacea var. *grandis* (Bentham) Fosberg, new status

A. grandis Bentham in Hooker, Lond. Jour. Bot., 232–233, 1843.

Leaves cordate orbicular, somewhat acuminate, softly and sparsely pubescent or somewhat strigose

beneath, stipules linear acuminate to almost filiform; young growth tomentulose; staminate spikes moderately congested, pistillate with bracts reniform with about 7 acute teeth; ovary and fruit densely hirtellous.

As interpreted here this variety is known definitely only from Fiji. The Barclay specimen cited below is here designated lectotype. The name *Acalypha grandis* Benthham has been applied to a diversity of plants from Melanesia, Micronesia, and Malesia, especially the Philippines, and even Hawaii. These specimens, so far as we have seen them, belong to several other varieties, not all worked out yet. The Micronesian ones are mostly var. *palauensis* and ssp. *wilkesiana*.

SPECIMENS SEEN.—Fiji: without locality, *Hinds* in 1841 (K, syntype); Nukalau, *Barclay s.n.* (K, syntype, photo in US); Kambara, *H. F. Moore 48* (US).

***Acalypha amentacea* var. *palauensis* Fosberg,
new variety**

Acalypha fruticosa sensu Kanehira [non Forskål, Fl. Aegypt., 161, 1775].

Acalypha grandis sensu auct. Micr. [non Benthham in Hooker, Lond. Jour. Bot., 2:232, 1843].

Frutex partibus junioribus tomentulosis vel strigulosis, periantho masculino leviter puberulo, lobis bractearum foeminearum (5-)7-9 ovatis vel lanceolatis glabris vel strigosis. **Type:** Palau Is. Peliliu, *Fosberg 47637* (US, holotype).

Shrub, young stems sparsely to densely strigulose or appressed puberulent; leaves broadly ovate, rounded to subcordate or cordate at base, acuminate, margins rather coarsely crenate-serrate, both surfaces very sparsely appressed hirsute mostly on nerves to almost glabrous, petioles thinly strigose to almost glabrous; stipules narrowly ovate-acuminate to linear-subulate, glabrous to lightly sericeous, about 1 cm long; staminate spikes slender, longer or shorter than leaves, rachis tomentulose or puberulent with appressed or incurved hairs, bracts shorter than flowers, acuminate, perianth sparsely pilosulous; pistillate spikes from much shorter than leaves and slender, to as long as or exceeding leaves and quite stiff, rachis sparsely to densely tomentulose, flowers sparse to crowded, bracts sparsely to densely strigose, lobes (5-) 7-9, ovate to lanceolate, glabrous to somewhat strigose especially on nerves

without, middle one longest; ovary and fruit densely to lightly strigose; ovate; the spikes vary enormously in length and density of flowering; the staminate in prominence of the bracts and presence or absence of one or two pistillate flowers at base; the pistillate in stiffness of rachis and from almost glabrous to densely strigose, the bracts from 5- to 9-toothed, the teeth from glabrous to hairy and from lanceolate to ovate. About the only completely constant features are the appressed pubescence, the crenate-serrate leaf margins, the acuminate apices, and the relatively few teeth on the ovate (vs. reniform) bracts. Yet there seems no reason to believe that this is other than a coherent, freely interbreeding probably monophyletic population. It is found, so far as known, only on the limestone areas of Palau. It differs notably in pubescence from the other native Palauan variety *heterotricha*, which has only been found on the volcanic part of Babeldaob Island.

SPECIMENS SEEN.—Caroline Islands: Palau: without locality, *Ledermann 14072* (B); *Cheatham 163* (US, BISH, UC). Kayangl: Ngajangl I., *Gressitt 19* (US), *39* (US). Gatulel-tò, Ailai-son, *Hosokawa 7307* (Fo). Auluptagel: (Oropusyakaru), *Hosokawa 9096* (A); Orokusyakaru-naisoku. *Hosokawa 9783* (A); Ngerengchol, Lee Marvin Beach, Cape Pkula-beap, 1 m, *Canfield 452* (US). Aulong I., *Salsedo 12* (US). Aulupse'el: NW end, *Stone 4538* (BISH, US); Ngerebe'ed beach, E end, 2 m, *Fosberg 47475* (US, BISH); Dü'ebachel beach, 2 m, *Fosberg 47451* (US, BISH). Peliliu: *Emmons 98* (US, BISH); N end of E side, "Purple Beach," 0-2 m, *Fosberg 26007* (US, BISH); S part near NE end of airstrip, *Fosberg 47637* (US, holotype); Ngalkol village, 2 m, *Fosberg 47632* (US, BISH). Angaur: *Salsedo 356* (US); roadside midway between Lake A and Lake D, 10 m, *Canfield 202* (US). Sonsorol: *Hardy 125* (US, BISH); *Berry 28* (US, BISH).

***Acalypha amentacea* var. *heterotricha* Fosberg,
new variety**

Frutex pubescens, partibus junioribus hirsutis pilibus brevibus vel longis mixtis, stipulis ellipticis vel oblongis valde acuminatis, periantho masculino glabro, rhachidibus spicorum dense hirsutulis, lobis bractearum foeminearum (7-)9 lanceolatis hirsutis adpressis. **Type:** Palau Is.: Babeldaob, *Fosberg 50576* (US, holotype, isotypes; BISH, isotype).

Sparsely branched pubescent shrub to 3 m tall, young stems densely covered with a mixture of appressed and erect sharply pointed hairs of varying lengths; leaves oval or broadly elliptic, sharply and prominently acuminate, base subcordate to cordate, margins finely serrate, ciliate, upper surface with

sparse scattered large hairs, those on veins smaller, under surface more densely hairy, especially on nerves, petioles 5–8 cm long, densely pubescent, nerves 5–7 from base, pinnate above; stipules oblong to elliptic, 1–2 cm long, 3–4 mm wide, thin, strongly acuminate, falcate, appressed to erect pilose within and without, erect hairs near margins and on lower part of midrib, staminate spikes densely flowered, 4–15 cm long, slender, rachis densely hirsute, bracts densely hirsute without and on margin, triangular, scarcely exceeding flowers, perianth glabrous; pistillate spikes on separate branches or distal on same branch with staminate, 5–22 cm long, rachis densely hirsute, flowers and subtending bracts separated to almost touching, bracts appressed hirsute without, especially on nerves, glabrous within (7-)9-lobed, lobes lanceolate, middle one longest, the outermost very short, ovary and fruit shortly hirsute-pilose.

This is the only collection of *Acalypha amentacea* from the volcanic part of Palau, and it is strikingly distinct in its indument from the common var. *palauensis* from the limestone areas.

SPECIMEN SEEN.—Caroline Islands: Palau: Babeldaob, west side, Ngerumongui, on savanna slopes on bauxitic soil, 23 Nov 1968, *Fosberg 50576* (US, holotype, isotypes, BISH, isotype).

Acalypha amentacea var. *trukensis*
(Pax & Hoffmann) Fosberg, new status

Acalypha trukensis Pax & Hoffmann, *Pflr.*, IV, 147(XVI): 151, 1924.

Leaves orbicular, subcordate to cordate, upper as well as lower surfaces of leaves with some hair, pubescence of petioles and young parts of long, stiff, erect hairs; stipules linear subulate, lightly sericeous; staminate spikes slender, loosely flowered; pistillate with longer peduncles than usual, floriferous portion equalling or shorter than peduncle, bracts broadly triangular cordate, sparsely pilose, teeth 7, triangular subulate.

Differs from var. *grandis* principally in the stiff, yellowish pubescence on young growth and petioles, and in the less pubescent lower leaf surfaces.

SPECIMENS SEEN.—Caroline Islands: Truk: Tol, 150–200 m, *Kanehira 1284* (US, NY); Tol Island, Uriribot, *Hosokawa 8254* (A); Moen Island, Tunuk District, *Spence 434* (BISH); Natusima [Dublon Island], *Hosokawa 6526* (A, BISH); *Takamatsu 70* (BISH); Zogeyasi-hayasi, *Hosokawa 6554* (Fo); central part of Ulalu Island, 100 ft [30 m], *Wong 2374*

(US, BISH, K), 237 (US, BISH, K); Melot, *Hosokawa 8344* (BISH). Lukunor Atoll *Anderson 2099* (US, BISH, Fo) (sterile young plant, atypical in broad stipules possibly because young).

Acalypha amentacea var. *velutina* (Müller-Argau)
Fosberg, new combination

Acalypha grandis var. *velutina* Müller-Argau, *Flora*, 47:441, 1864.

Acalypha angatensis Blanco, *Fl. Filip.*, 750, 1837.

Acalypha tomentosa Blanco, *Fl. Filip.*, 750, 1837.

Leaves, ovate, rounded to subcordate at base, strongly but gradually acuminate, plant strongly tomentose, velutinous, and rarely with long stiff hairs, under surface of leaves softly pubescent, especially on nerves, upper surface pubescent on nerves; stipules ovate-lanceolate, acuminate, tomentose.

Merrill (1918:227) equates this with *Acalypha angatensis* Blanco and *Acalypha tomentosa* Blanco. It was referred to *Acalypha grandis* as a variety by Müller-Argau. Actually there is no *Acalypha grandis* (*Acalypha amentacea* var. *grandis*) in the Philippines. *Acalypha amentacea* is very variable there, and includes the specimen, *M.R. 333*, that Merrill uses to illustrate Blanco's *Acalypha angatensis*.

Plants with narrow, gradually acuminate leaves, velvety young growth and under sides of leaves, almost all from Luzon, seem to be separable and to correspond with Müller-Argau's *A. grandis* var. *velutina*, basionym of *A. amentacea* var. *velutina* (Müller-Argau) Fosberg.

SPECIMENS SEEN.—Luzon: central, *Loher 4675* (US); Benguet Prov.: without locality, *Basani 15882* (US); Baguio, *Topping 146* (US); *Elmer 5924* (US); *Mearns 2525* (US). Union Prov.: Bauang, *Elmer 5727* (US); Abra Prov.: Mt. Posuey, *Ramos 26974* (US). Cagayan Prov.: without locality, *Castillo 22727* (US). (Province not indicated) Nueva Viscaya, near Quiaugau, *Merrill 156* (US); Batanes Is.: Sabtan, *McGregor 10161* (US).

Acalypha amentacea ssp. *wilkesiana*
(Müller-Argau) Fosberg,
new combination, new status

Acalypha wilkesiana Müller-Argau in de Candolle, *Prodr.*, 15(2):817, 1866.

Shrub, much branched, twigs with short internodes, condensed toward apices, closely puberulent, leaf-scars prominent, reniform, narrow horizontal stipule scars at sides, circular or broad horizontally

elliptic inflorescence or branchlet scars above; leaves with blades very broadly ovate to suborbicular, cordate to more usually subcordate, up to 15 cm × 13 cm, apex prominently acuminate but acumens with a rounded or emarginate tip, five main veins from base, midrib with about 4 pairs of subopposite pinnate nerves, main nerves connected with ladder-like tertiary veins, intervals filled with network of decreasing prominence, margins serrate-crenate with low, very obtusely pointed crenations, points and sinuses both terminating branch veinlets from the shallowly scalloped marginal vein formed by anastomosing nerves, each point somewhat glandular thickened and with a small straight hair or seta, easily caducous; stipules ovate, very strongly acuminate; spikes dark red, slender, 4–10 cm long, strongly ascending, the staminate much fewer and below the pistillate on the branchlet, staminate buds in dense sessile clusters, rather close together on rachis, pistillate spikes with flowers single, alternate and opposite, each subtended by broadly ovate-cordate somewhat glandular bract, this with a large ovate terminal tooth and 3 or 4 much smaller ovate teeth on each side, these becoming slightly smaller toward the base, ovary densely white-hirsute slightly shorter than bract, styles 3, deeply filiform-fimbriate, 5–8 fimbrials on each branch, these up to about 5 mm long; no fruit seen setting.

The type, U.S. *Expl. Exp.* from "Feejee" (US), does not differ much from this description except that it shows a peculiar contraction of the basal part of nerves often seen in cultivated specimens.

This plant, f. *wilkesiana*, is known throughout Micronesia and the rest of the tropics in cultivation but it is not known in an indigenous wild state anywhere. It apparently persists after cultivation and establishes small seedling populations which tend to "revert," losing the characters of colored and deformed leaves which distinguish it from *A. amentacea* ssp. *amentacea*. Such plants have been collected in Wailau Valley, Molokai, Hawaiian Is. (*Degener 8381*(US)) and Rota, Marianas (*Necker R9*(US)), both determined by A.C. Smith as *A. grandis*. Smith (1952:391) distinguishes *A. wilkesiana* from *A. grandis* on the basis of much shorter petioles often flattened at apex, and colored leaves. The dentation of the bracts on the pistillate spikes is also rather distinctive, the teeth being fewer and broader than in most other varieties, the apical one

much longer than the lateral ones, and the bracts being less hairy. The leaves are variable and tend to be distorted, with the veins drawn down to the petiole. Many garden forms are known, such as the following:

***Acalypha amentacea* ssp. *wilkesiana* f. *circinata* (Müller-Argau) Fosberg,
new combination, new status**

Acalypha wilkesiana f. *circinata* Müller-Argau in de Candolle, Prodr., 15(2):819, 1866.—Pax and Hoffman, Pflr. IV, 147(XVI):154, 1924.

Leaves much distorted, broadly cordate but drawn down to petiole, arcuate, petiole very short, blades usually green with white borders.

Occasionally planted in Micronesia, as in Yap and Nauru. Said to have been introduced into Yap by the Germans.

***Acalypha amentacea* varieties**

What seem to be other varieties of this species are known from Ponape (*Glassman 2916* (BISH, US)) and from the Gilbert Islands and Nauru. They are as yet not well characterized and should be further collected and studied.

***Acalypha cardiophylla* Merrill**

Acalypha cardiophylla Merrill, Phil. Jour. Sci., 1 (suppl.): 80, 1906.

Acalypha caturus sensu auct. [non Blume, Bijdr., 629, 1826].

This species was described from the Philippines. *Acalypha cardiophylla* Merrill seems to be the oldest unequivocal name for it. It has generally been called *Acalypha caturus* Blume, but this is an illegitimate superfluous name, as *Acalypha spicigera* L. was cited as a synonym. The var. *cardiophylla* is known from the Philippines and possibly elsewhere in Malesia. It is not at all closely related to the *Acalypha amentacea* complex.

***Acalypha cardiophylla* var. *ponapensis* (Kanehira & Hatusima) Fosberg,
new combination, new status**

Acalypha ponapensis Kanehira and Hatusima, Bot. Mag. Tokyo, 54:434, 1940.

This variety differs from var. *cardiophylla* principally in being essentially glabrous. The bracts subtending the pistillate flowers are minute, triangular; the pedicels of the staminate flowers are short, 1 mm or less long.

It is endemic in Ponape.

CELASTRACEAE
(including **HIPPOCRATEACEAE**)

***Loeseneriella* A.C. Smith**

***Loeseneriella macrantha* (Korthals) A.C. Smith**

Loeseneriella macrantha (Korthals) A. C. Smith, Am. Jour. Bot., 28:439, 1941.—Ding Hou, Blumea, 12:31–32, 1963; Fl. Males., I, 6:398, 1964

Hippocratea macrantha Korthals, Kruidk. Verh. Nat. Gesch. Nederl. Ind. 187, pl. 39, 1839–1842.

Loeseneriella macrantha* (Korthals) A.C. Smith var. *macrantha

Extends from Ceylon through Malesia to the New Hebrides, not known from Micronesia.

***Loeseneriella macrantha* var. *palauica* (Loesener) Fosberg, new combination**

Hippocratea macrantha var. *palauica* Loesener, Bot. Jahrb., 63:274, 1930.

Found in Palau, Yap, and Truk.

A. C. Smith (1941:439), when he established the genus *Loeseneriella* A. C. Smith with *L. macrantha* (Korthals) A. C. Smith as type, mentioned that Loesener had published a variety of *Hippocratea macrantha* from Palau, but made no comment on it. Neither in *Blumea* (12:31–32, 1963) nor in *Flora Malesiana* (I, 6:399, 1964), where he treated *Loeseneriella macrantha*, did Hou make any mention or disposition of the variety *palauica*. Hence we are transferring it to the correct genus.

GUTTIFERAE (= CLUSIACEAE)

***Calophyllum* L.**

Three species of *Calophyllum* L. have been reported from Micronesia, *C. inophyllum* L., *C. wakamatsui* Kanehira, and *C. cholobtaches* Lauterbach.

Of these we are treating *C. wakamatsui* as a variety of *C. inophyllum* and *C. cholobtaches* as a synonym of the widespread *C. soulattri* Burman f.

Dr. P. F. Stevens is permitting us to publish a new species, *C. pelewensis* Stevens, resulting from his as yet unpublished monographic studies of the genus *Calophyllum*.

***Calophyllum inophyllum* L.**

Calophyllum inophyllum L., Sp. Pl., 513, 1753.

This is a widespread and familiar Indo-Pacific strand and lowland tree, often planted as a shade tree or ornamental. Its var. *inophyllum* has large globose fruits and is fairly uniform. In Palau an endemic upland form seems varietally distinct.

***Calophyllum inophyllum* var. *wakamatsui*
(Kanehira) Fosberg & Sacht,
new combination, new status**

Calophyllum wakamatsui Kanehira, Bot. Mag. Tokyo, 48:401, 1934.

This upland population in Babeldaob Island, Palau, has smaller, more leathery leaves and somewhat smaller slightly elongate or ovoid fruits. Dr. P. F. Stevens (pers. comm.) does not separate this from var. *inophyllum*, but we found it to have a different appearance in the field and the Palauans consider it distinct, calling it *esmolech* while var. *inophyllum* is called *btaches*.

SPECIMENS SEEN.—Caroline Islands: Palau: Babeldaob: Aimeliik, Kanehira 2326 (FU), 200 m, 2343 (FU, holotype); Airai area beyond airfield, Cheatham 181 (US); between Nekken and Ngatpang, Cheatham 188 (US); Airai Dam Site, Fisher 135 (US); 2 miles [3.2 m] on road to Nekken from Airai, Salsedo 317 (US); Ogiwaru, Takamatsu 1430 (US, BISH); Marukiyoku (Melekiok), Takamatsu 1704 (US, BISH); Lake Ngardok, 25 m, Fosberg 32526 (US, BISH); Takamatsu 1317 (US, BISH).

***Calophyllum pelewense* P.F. Stevens, new species**

Calophyllum cholobtaches auct. [non Lauterbach, Bot. Jahrb. 59:20, 1924].—Kanehira, Bot. Mag. Tokyo, 45:329, 1931; Fl. Micronesica, 233, fig. 105, 1933; Jour. Dept. Agric. Kyushu Imp. Univ., 4:370, 1935.

A speciebus aliis *Calophylli* in gemma terminali parva 1–2.5 mm longa, innovationibus axillaribus

cicatricibus basalibus ornatis, lamina mediocra elliptica vel ovata costa infra elevata cum 6–10 nervis per 5 mm, inflorescentiis cum internodiis infimis 0–2 mm longis, et floribus cum 8–11 tepalis, differt.

Type: Palau, July-Aug. 1929, *Kanehira 386* (A, holotype; BISH, NY, isotypes).

Arbor; truncus et cortex haud cogniti. Ramulus complanatus, 1.5–2 mm in transverso, valde 4-angulatus vel subalatus, in siccitate brunneus, glaber; par superius gemmarum axillarium rotundatum, ca. 0.5 mm longum, effusum; gemma terminalis corpulenta 1–2.5 mm longa indumento breve appresso griseo praedita. Petiolus 0.9–1.5 cm longus, supra vadoso et anguste vel late concavus, infra convexus, glaber; lamina elliptica vel ovata, raro obovata, 3.5–10.2 cm longa et 2.1–4.9 cm lata, apice acuminata raro plus minusve rotundata, basi acuta vel attenuata, margine undulata leviter recurvata, coriacea, glaber, costa supra e basi sensim angustata, haud vel leviter depressa, 0.35–0.6 mm lata in medio laminae, infra elevata, plus minusve striata, nervis lateralibus utrinque manifestis, elevatis, 5–10 nervis per 5 mm sub angulo 55–70° e costa divergentibus. Inflorescentiae e axillis foliatis prope apices ramulorum ortae, raro terminales, cum 9–17 floribus, haud ramosae; axes 1.3–8 cm longi, basi indumento puberulo praediti, internodio infimo 0–2 mm longo; bracteae subovatae, circa 3.5 mm longae, mox deciduae; pedicelli 1–2.5 cm longi, glabri. Flos hermaphroditus (?); tepala 8–11, duobus exterioribus late ovatis circa 4 mm longis et latis, pilis brevibus fimbriatis, tepalis interioribus obovatis 5.5–6 mm longis et 3.5–4.5 mm latis, glabris; stamina 125–230, filamentis circa 3 mm longis, antheris suboblongis, 0.8–1 mm longis apicibus retusis; ovarium circa 2 mm longum, glabrum; stylus circa 2.2 mm longus; stigma peltatum, 0.7–1.2 mm in transverso, ± 3 -radiatum. Fructus probabiliter ellipsoideus (valde oppressus), circa 1.5 cm longus et 1 cm latus, apice rotundatus, in siccitate rugosus; stratum exterius circa 0.5 mm crassum; putamen parietibus circa 0.2 mm crassis, laevibus.

Endemic to Palau, *Calophyllum pelewense* has been collected on river banks at the landward edges of mangroves.

Calophyllum pelewense may be recognized by its very short terminal bud, axillary innovations with basal scars and axillary inflorescences with a short basal internode, usually elliptic to ovate leaf blades

with rather prominent, distant venation, flowers with 8–11 tepals, and fruits of moderate size (ca. 1.5 cm long).

Specimens of *Calophyllum pelewense* have been labeled *C. cholobtaches* (equals *C. soulattri*), but the two species are not at all close. *Calophyllum soulattri* has a longer terminal bud, a greenish drying lamina, a branched inflorescence, flowers with four tepals, and a spherical fruit with a thick, compact, outer layer.

SPECIMENS SEEN.—Caroline Islands: Palau: without locality, *Ledermann 14489* (B, K); *Kanehira 386* (A, holotype; BISH, NY, isotypes). Babeldaob: Garasumao, *Takamatsu 1556* (BISH, US); Aimiriik, *Kanehira 1984* (US, NY, K, P); Hosokawa *7216* (BISH): Armatin, 8 m, *Takamatsu 1525* (BISH); Airai, *Kanehira 2380* (NY); Ngerikill River, *Fisher 25* (US), *55* (US). Koror: *Raymundus 334* (WRSL).

Calophyllum soulattri Burman f.

Calophyllum soulattri, Burman f., Fl. Ind., 121, 1768.

Calophyllum cholobtaches Lauterbach, Bot. Jahrb., 59: 20, 1924.

Dr. P. F. Stevens (below) informs us that *Calophyllum cholobtaches*, described as a Palau endemic, is indistinguishable from the widespread *C. soulattri* known from southeast Asia, the Philippines, Malesia, New Guinea, and Melanesia. This is not an unusual distribution pattern for a Palau plant. Dr. Stevens will designate *Ledermann 14251* (WRSL, fragment) as lectotype of *C. cholobtaches* Lauterbach. This specimen is the only one of those originally cited that is fertile and it clearly agrees with the description; the other specimens were collected by Raymundus.

SPECIMENS SEEN.—Caroline Islands: Palau: Koror: *Ledermann 14251* (WRSL); Urukthapel, *Dutton 80* (US).

Garcinia L.

Garcinia ponapensis Lauterbach

Garcinia ponapensis Lauterbach, Bot. Jahrb. 59:21, 1924.

Garcinia ponapensis var. *trukensis* (Kanehira)

Fosberg, new combination, new status

Garcinia trukensis Kanehira, Bot. Mag. Tokyo 46:488, 1932.

This plant is at most a variety of *G. ponapensis* differing in slightly narrower, more oblong leaves.

fruit less strongly ribbed and not umbonate. Kanehira cited two of his own collections, the first of which *Kanehira 1269* (FU, US) is here designated as lectotype.

***Garcinia rumiyo* Kanehira**

Garcinia rumiyo Kanehira, Bot. Mag. Tokyo, 45:329, 1931.

This species has been known from Yap and Palau, where it is not common but is frequently found. Examination shows that the plants from Yap (type locality) and Palau are varietally separable.

Garcinia rumiyo* Kanehira var. *rumiyo

Endemic to Yap.

***Garcinia rumiyo* var. *calcicola* Fosberg,
new variety**

Arbor foliis ad 11 × 6 cm, petiolis crassis, pedicellis 3 mm longis, fructibus 15 mm longis, calicis 10 mm latis. Type: Palau: Ngelobel, *H. Owen 5* (US, holotype).

Small tree, to 10 m tall, leaves somewhat larger than in Yap plants, blades to 11 × 6 cm; pedicels about 3 mm long, fruit 1.5 cm long, fruiting calyx 10 mm across.

Apparently confined to rough limestone substrata, endemic to the southern half of Palau.

SPECIMENS SEEN.—Caroline Islands: Palau: without locality, *Richardson 36* (US). Limestone Islands, without further locality, *Dutton 97* (US, BISH, L); Ngelobel, *H. Owen 5* (US, holotype); Trukodokorokke, coral island, *Takamatsu 1150* (BISH, US). Koror, *Kanehira 1890* (FU, US), *350* (FU); *Hosokawa 9791* (US). Aulupse'el, Dü'ebechel Beach, 2 m, *Fosberg 47461* (US). Peliliu, *Kanehira 2429* (FU).

FLACOURTIACEAE

***Flacourtia* Commerson ex L'Héritier**

***Flacourtia rukam* Zollinger & Moritzi**

Flacourtia rukam Zollinger & Moritzi, Syst. Verh., 33, 1854.

This species has been reported from Palau, Truk, and Ponape. We have studied a series of collections from Micronesia and find that they differ, at least varietally, from the typical variety, which is known from Malesia and Samoa.

***Flacourtia rukam* var. *micronesica*
Fosberg & Sachet, new variety**

Frutex vel arbor parva, folii costa utrinque glabra vel subglabra, stigmatibus 6–7 subsessilibus. Type: Ngarakabesang, *Fosberg 25668* (holotype, US; isotypes, BISH, L).

Small tree or large shrub; leaves broadly ovate or elliptic to oblong, usually about 10 × 6 cm, on fast growing shoots or branches to 20 × 10 cm, bluntly acuminate, rounded at base, margins obscurely or markedly crenate to serrate-crenate, blades subcoriaceous when mature, midrib glabrous or subglabrous on both sides, petioles 7–11 mm long; racemes about 1 cm long; sepals glabrous without; fruit depressed globose, about 8 mm high, 10 mm wide, subtruncate at both ends, 6–7 lobed, at least when dry, with a horizontal constriction at about middle, the 6–7 stigmas subsessile, in a ring or ellipse when mature or almost so.

The Palau and Truk specimens of *F. rukam* differ significantly from those from Indonesia, Melanesia, and Samoa in the glabrous or subglabrous midribs of the leaves and in the subsessile stigmas on the summit of the fruit. The non-Micronesian specimens examined have definite styles up to 1 mm long. We have not seen the specimen (Kanehira 1542) reported from Ponape; but we have seen two sterile sheets from there, collected by *Takamatsu (822, 822-A)* that are probably var. *micronesica*.

This variety is found in secondary forests and thickets, at low elevations in Palau, rather higher in Truk.

SPECIMENS SEEN.—Caroline Islands: Palau (Pelew): without locality, *Kanehira 352* (US) (fruit). Babeldaob: Ngarekalong, *Takamatsu 1674* (BISH); Ngatpang, *Takamatsu 1311* (BISH); Arukodokorokke, *Takamatsu 1145* (BISH); Ngersuul, Ngchesar, *Emmons 81* (US); Arumizu, *Hosokawa 9082* (US); Arumonogui, near Arumatan, *Hosokawa 6758* (A, BISH). Koror: *Kanehira 343* (BISH, 2 sheets); Ngermid, *Salsedo 307* (US); Mt. Kororu, *Hosokawa 9800* (US). Ngarakabesang (Arakabesan): *Takamatsu 1252a* (BISH); west side near old Japanese seaplane base, 1–20 m, *Fosberg 25668* (US, holotype; BISH, L, isotypes) (fruit); west peninsula of Ngarakabesang, 10–20 m, *Fosberg 32471* (US). Aulupse'el (Olopshakal): *Takamatsu 1489* (BISH); Dü'ebechel beach, 2 m, *Fosberg 47443* (US, BISH) (seedling). Urukthapel: West peninsula near old cultured pearl establishment, 2–10 m, *Fosberg 32147* (US) (pistillate flowers); limestone islet, *Dutton 101* (US, BISH, K) (sterile, Palauan name "emeong"). Peliliu: *Kanehira 2432* (US) (fruit). Angaur: East side, 3–5 m, *Fosberg 31994* (US, BISH, MO). Kasioru, *Takamatsu 1516* (BISH). Truk Is.: without locality, *Takamatsu 6* (BISH);

Kanehira 1294 (US) (staminate flowers). Moen: *Takamatsu 245* (BISH, 3 sheets); Mt. Trokken (Wara), *Hosokawa 8407* (BISH); track to highest part of island, 100–400 m, *Evans 1268* (US, BISH, NY). Dublon (Natsushima): *Takamatsu 162* (BISH); upper ridges and top of Mt. Tolomen (Toloman) 200–360 m. *Fosberg 24544a* (US, BISH, L, MO, Fo) (young fruit); (Trowasi) Mt. Troman (Tolomen), *Hosokawa 8510* (US, A) (staminate flowers). Fefan: Mt. Tuktyap, *Hosokawa 8385* (A, BISH). Tol: Suiyō-tō, *Hosokawa 8319* (BISH, A). Ponape: Toleailuka, *Takamatsu 822* (BISH), 822 A (BISH).

CUCURBITACEAE

Citrullus Schrader

Citrullus lanatus var. *caffrorum* (Alefeld) Fosberg, new combination

Citrullus vulgaris var. *caffrorum* Alefeld, Landwirth. Fl., 210, 1866.

Cucurbita caffra Ecklon & Zeyher, Coll. Sem. 1833.

Citrullus caffer Schrader, Linnaea 10, Lit. Ber., 109, 1834.

Citrullus lanatus var. *caffer* (Schrader) Mansfeld, Die Kulturpflanze. Beih., 2:422, 1962.

Var. *caffrorum* Alefeld here lectotypified by *Cucurbita caffra* Ecklon & Zeyher seems to be the earliest varietal epithet for the common red-fleshed cultivated watermelon. It has not apparently been transferred to *Citrullus lanatus* the oldest specific name for what has usually been called *Citrullus vulgaris* Schrader.

Zehneria Endlicher

Zehneria guamensis (Merrill) Fosberg, new combination

Melothria guamensis Merrill, Phil. Jour. Sci. Bot., 9:151–152, 1914.

Studies by Charles Jeffrey (1962:342–344) indicate that the genus *Melothria* L. occurs only in America. The Pacific island species belong to *Zehneria*.

RHIZOPHORACEAE

Bruguiera Lamarck

Bruguiera gymnorrhiza f. *alba* (Stone) Fosberg, new combination

Bruguiera conjugata f. *alba* Stone, Pac. Sci. 13: 102, 1959.

Hou (1958:453, 463) has shown that the correct

name for what has been called *Bruguiera conjugata* (L.) Lamarck is *B. gymnorrhiza* Lamarck (as *gymnorrhiza*).

MELASTOMATACEAE

Medinilla Gaudichaud

Medinilla medinilliana (Gaudichaud) Fosberg & Sacht, new combination

Melastoma medinilliana Gaudichaud, Bot. Voy. Uranie 69, 1826.

Medinilla rosea Gaudichaud, Bot. Voy. Uranie, Tab. 106, 1829, 484, 1830.

Gaudichaud (1826:69), used the name *Melastoma medinilliana* accompanied by a few words of description, effecting valid publication of the binomial. Later he (1830:484) described *Medinilla rosea*, placing *Melastoma medinilliana* in synonymy. The earlier epithet must be restored (ICBN Art. 11).

Melastoma L.

Melastoma malabathricum var. *mariannum* (Naudin) Fosberg & Sacht, new combination, new status

Melastoma mariannum Naudin, Ann. Sci. Nat. III Bot., 13:276, 1849.

The differences between *M. malabathricum* and its immediate relatives, including *M. mariannum*, seem trivial, and several of these entities merit, at most, varietal rank. *M. mariannum* has white flowers and a small few-flowered inflorescence.

ARALIACEAE

Osmoxylon Miquel

Osmoxylon Miquel, Ann. Mus. Bot. Lugd.-Batav. 1:5, 1863. *Boerlagiodendron* Harms in Engler and Prantl, Nat. Pflanzenfam. III, 81:31–32, 1894.

Philipson (1976) demonstrated that in all probability *Boerlagiodendron* Harms is congeneric with the previously poorly known *Osmoxylon* Miquel. He does not treat the Micronesian species. Accepting his conclusion, we here provide the new combinations for the Micronesian species in *Osmoxy-*

lon, and describe one new species to replace a misidentification current in Micronesian literature.

Osmoxylon mariannense (Kanehira)
Fosberg & Sachet, new combination

Boerlagiodendron mariannense Kanehira, Fl. Micr., 288, 1933; Bot. Mag. Tokyo, 47:676, 1933.

Endemic to Rota, Marianas, first collected by Marche (264 P, US), but the species remained undescribed until 1933, when it was based on *Kanehira 1773, 1774* (FU, syntypes).

Osmoxylon truncatum (Kanehira)
Fosberg & Sachet, new combination

Boerlagiodendron truncatum Kanehira, Bot. Mag. Tokyo, 48:403, fig. 2, 1934.

Known only from Aimeliik in the southwest part of Babeldaob, Palau, *Kanehira 2364* (FU, holotype) and *2303* (FU).

Osmoxylon pachyphyllum (Kanehira)
Fosberg & Sachet, new combination

Boerlagiodendron pachyphyllum Kanehira, Bot. Mag. Tokyo, 48:401, 1934.

Known from Babeldaob Island, Palau, described from 3 syntype collections, Aimeliik, *Kanehira 2301, 2311, and 2452* (all FU).

Osmoxylon oliveri Fosberg & Sachet, new species

Boerlagiodendron pulcherrimum sensu Kanehira, Fl. Micr., 185, fig. 143, 1933 [non *Osmoxylon pulcherrimum* Vidal ex F.-Villar, Novis. App., 102, 1880].

Arbor parva, foliis grandis reniformis 11–13 lobatis glabris, alis basalibus petioli integris non pectinatis, umbella multiradiata bracteis linearibus vel ovatis acuminatis marginibus non-fimbriatis, floribus bacciformibus sterilibus pedicellatis.

Type: Palau: Babeldaob, *Cheatham 54* (US, holotype; BISH, NY, L, Fo, isotypes).

Tree to 5 m tall, unbranched (always?), leaves with blades reniform to somewhat orbicular, glabrous, deeply 11–13 lobed, 50 cm or more in diameter, lobes elliptic to lanceolate, apices of lobes obtuse to acute or acuminate, basal sinus deep,

rounded to acute, petiole angular in cross section at least when dried, 80–100 cm long; base swollen with 2–5 thin, entire, nonpectinate, transverse wings or flanges (petiolar crests); stipules clasping, bifid, lobes ovate, acute or acuminate, 1.5–2.5 cm long; inflorescence a sessile or very shortly pedunculate hemispherical compound umbel of many trifid rays, these to 15 cm long, lowest internode lenticellate, up to 5 cm long, subtended by a linear hard bract with a thin white margin, with 2 such bracts at summit, subtending the 2 outer rays, outer rays 6–8 cm long of 2 internodes, the lower 1.5–2 cm long with 2 ovate-lanceolate bracts at summit, upper 4–5 cm long, ending in a tight subcapitate umbel or head of hermaphrodite flowers on extremely short pedicels, attached to an ellipsoid-capitate receptacle or enlargement of the summit of the ray, central ray very short, 0.5 to at most 1 cm long, ending in an umbel of about 10–12 “sterile bacciform flowers” these on slender pedicels up to 5 mm long; perfect flowers with calyx reduced to a persistent fleshy ring, corolla cylindric to cylindric-campanulate, gamopetalous, 3–4 mm long, leathery, lobes 4–5, 1 mm long, ovate, incurved, tips slightly hooked, stamens 4–5 strongly exerted, filaments rather thick, basally attached, hooked at the slender tip, anthers oblong, attached near base; disk elevated, star-like with wide blunt points, in the center a ring of 5–6 oval stigmas depressed in center; fruit turbinate to broadly obovoid, deeply 5 lobed, 6–8 mm long; sterile flowers pea-like, 5–8 mm diameter, with 3 radiating abortive locules.

This species was indicated as amply distinct from *Osmoxylon pulcherrimum* Vidal ex F.-Villar (with which it has been equated up to now) by our assistant, Mr. Royce Oliver, to whom we have dedicated it. With an ample series of collections it has been possible to draw up a rather full description. The most obvious distinctions from *O. pulcherrimum* are in the pedicellate bacciform sterile flowers, in the entire, nonpectinate petiolar flanges and the nonfimbriate bracts. From *Osmoxylon pachyphyllum*, it is distinguished by thinner leaves with many more lobes. It is, so far as known, endemic to Palau, mostly on Koror and Babeldaob islands.

SPICIMENS SEEN.—Caroline Islands: Palau: without locality. *Cheatham 53* (US), *105* (US); *Richardson 55* (US). Babeldaob: *Dutton 74* (US, BISH), *Cheatham 8* (US); Mari-kyoku, *Kanehira 2057* (FU) (sterile, could conceivably be *O. truncatum*); Ogiwal, *Kanehira 2065* (FU), *2066* (FU), *Dudiu's*

homestead near boundary between Ngeremlengui and Ngardmau, below 300 ft [90 m] *Cheatham 54* (US, holotype; BISH, NY, L, Fo, isotypes); Ngeremlengui, *Cheatham 107* (US, BISH, Fo), 108, 109, 110 (all US), 111 (US, BISH, Fo), Ngliaklolubed, old Japanese botanical garden site, *Fosberg 32332* (US, BISH, Fo), west coast, 1 m, *Fosberg 32435* (US, BISH); Ngaraard Mun., on tributary of Ngereakl River, 0.8 mi [1 km] SSW of Kulotauk, 2 m, *Canfield 397* (US); Ngerelong, 0.2 mi [0.3 km] W of Pkulrengelong, 10 m, *Canfield 304* (US). Koror: *Kanehira 129* (FU), 1853 (FU); (cult.) "Kesiamei" *Blackburn 280* (US, BISH); *Ngerbe'edesau*, 5-10 m, "siam" *Fosberg 32379* (US, BISH). Aulupse'el: Risong, Matuker Bay, south side of island, 10-15 m, "kesiamei," *Fosberg 47560* (US, BISH).

MYRSINACEAE

Myrsine L.

Myrsine L., Gen. Pl. ed. 5, 90, 1754 [1753].

Rapanea Aublet, Hist. Pl. Guiane Franc., 1:121, t. 46, 1775.

Following the study by Hosaka (1940) and our own further consideration (1975:3-11) of the Polynesian species, we regard *Rapanea* Aublet as insufficiently distinct from *Myrsine* L. Hence we here transfer the three Micronesian species of *Rapanea* to *Myrsine*.

Myrsine carolinensis (Mez) Fosberg & Sachet, new combination

Rapanea carolinensis Mez, Bot. Jahrb., 56:538, 1921.

Type: Ponape, *Ledermann 13695* (B, 2 isotypes).

Myrsine ledermannii (Mez) Fosberg & Sachet, new combination

Rapanea ledermannii Mez, Bot. Jahrb., 56:538-539, 1921.

Type: Ponape, *Ledermann 13786* (B, 2 isotypes).

Myrsine palauensis (Mez) Fosberg & Sachet, new combination

Rapanea palauensis Mez, Bot. Jahrb. 56:539, 1921.

Type: Palau, Babeldaob, Ngatkip, *Ledermann 14529* (B).

SAPOTACEAE

Pouteria Aublet

We have consistently followed Baehni (1942) in

including in the large pantropical genus *Pouteria* Aublet the Pacific species described in *Sideroxylon* L., and usually comprising the genus *Planchonella* Pierre. This in spite of the opinion of van Royen (1957:239), who separates *Planchonella* from *Pouteria* on the basis of the relative thickness of the cotyledons and the albumen. All other characters, according to van Royen, overlap. He attaches considerable importance to the predominantly American distribution of *Pouteria* and the predominantly Pacific distribution of *Planchonella*. Our present impression is that the single clear difference between the two is insufficient for generic separation. We are not adamant in this opinion and will reconsider the matter critically when preparing the treatment of the family for the Flora. The classification of the Sapotaceae is in a most unsatisfactory state and no disposition can be regarded as very stable at present. We are making, however, two new combinations that are needed for consistent use of *Pouteria* for plants of this affinity in Micronesia.

Pouteria calcarea (Hosokawa) Fosberg, new combination

Sideroxylon calcareum Hosokawa, Trans. Nat. Hist. Soc. Formosa 32:17, 1942.

Planchonella? calcarea (Hosokawa) van Royen, Blumea, 8:422, 1957.

This species seems closest to *Pouteria micronesica* but differs in its smaller leaves and 1-2 seeded fruits.

Caroline Islands: "Hab. Palau, Islet Oropsyacal [Aulupse'el] rare in primary forest on a coral rocky place (Hosok. no. 9790!—Type in Herb. Taihoku Imp. Univ.—Aug. 30, 1941)." We have not seen this specimen.

Pouteria micronesica (Kanehira) Fosberg, new combination

Sideroxylon micronesicum Kanehira, Bot. Mag. Tokyo, 46:671, 1932; Fl. Micr., 308, pl. 158, 1933; Enum. Pl. Micr., 388, 1935.

Planchonella micronesica (Kanehira) Kanehira ex Lam, Blumea, 5:12, 1942; Proc. 6th Pac. Science Congr., 4:681, 1940.—van Royen, Blumea, 8:402-404, fig. 45, 1957.

Chrysophyllum sp? Baehni, Candollea, 9:428, 1942.

This species is amply distinct from the widespread

Pouteria obovata by the large, elliptic-oblong leaves with strongly acuminate apices and more numerous lateral veins.

SPECIMEN SEEN.—Caroline Islands: Kusaie: without locality, *Kanehira 1322* (BISH, isotype).

GENTIANACEAE

Systematic Position of the Genus *Fagraea*

Dr. P. W. Leenhouts (pers. comm., 1976) has questioned our removal of the genus *Fagraea* Thunberg from the Loganiaceae to the Gentianaceae (Fosberg and Sachet, 1974:471–472; Sachet 1975:18–19), and we grant this requires some explanation. These families are usually placed close together, but seem to be separated on the basis of presence or absence of stipules, primarily woody vs. herbaceous habit, and by the Gentianaceae seldom having a baccate fruit.

However, the Gentianaceae do have woody members: *Lisianthus* P. Browne, *Macrocarpaea* Gilg, *Symbolanthus* G. Don, all of tropical America, and *Gentianothamnus* Humbert of Madagascar. *Rusbyanthus* Gilg has “capsule berry-like, with a thin cartilaginous wall, rupturing irregularly” according to Ewan (1948:212). Also, *Gentianothamnus* Humbert has at the bases of the leaf or of the petiole two small lobes resembling the “stipules” of *Fagraea*.

Tachia Aublet, another woody member of the Gentianaceae in South America, has a low stipular collar (Figure 2) and traces of lobes similar to those of *Gentianothamnus*. That no attention has been paid to these may be due to the abundant gum that

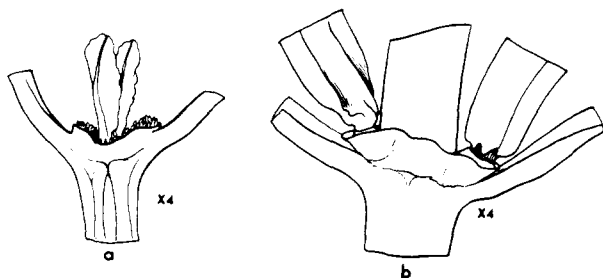


FIGURE 2.—Nodes of *Tachia guianensis* Aublet: a, glandular hairs in collar surrounding young leaves; b, older node with collar separate from leaf bases and surrounding flower stalks in axils.

covers the nodes in this genus, probably secreted by the glandular hairs lining the inside of the collar (Figure 2).

When, in 1942–1944, I (Fosberg) saw living in the Colombian Andes the three genera of woody Gentianaceae subtribe Tachiineae, *Macrocarpaea*, *Symbolanthus*, and *Lisianthus*, I was strongly impressed by their resemblance to the Indo-Pacific loganiaceous genus *Fagraea* Thunberg, though I did not doubt that these three genera belonged to the Gentianaceae. The genus *Lisianthus* serves to connect the first two with more typical members of the Gentianaceae. I had not then seen *Anthocleista* Afzel, the African representative, and *Potalia* Aublet, the American representative of *Fagraea*, especially a form of *Potalia amara* Aublet from the Rio Negro, Vaupes, Colombia (*Schultes et al. 18127* (US), *18304* (US), and *Schultes & Lopez 9339* (US)), which has inflorescences similar to those of *Macrocarpaea*. These specimens incidentally, probably represent a species distinct from *P. amara*.

After re-examining herbarium material of the three genera of the Tachiineae listed above and of the three genera of Potalieae, our conclusion remains that they are closely related. If the transfer of the Potalieae to the Gentianaceae, which is our choice, is unacceptable, we could consider transferring the Tachiineae to the Loganiaceae, increasing the artificiality of the latter family.

Long ago, Asa Gray (1859:323) pointed out that the Loganiaceae is an artificial family, and that *Fagraea* seemed to show similarities to *Lisianthus* and related Gentianaceae, and to connect the latter with Rubiaceae, Orobanchaceae, and Loganiaceae. We are merely agreeing with him and making the necessary transfer. We would suggest that the Potalieae and the Tachiineae be united to form the tribe Potalieae, which name, being the oldest with the rank of tribe, must take precedence over Tachiineae, and be transferred to the Gentianaceae. In this tribe would be included *Potalia* Aublet, *Anthocleista* Afzel, *Fagraea* Thunberg, *Lisianthus* L., *Tachia* Aublet, *Tachiadenus* Grisebach, *Rusbyanthus* Gilg, *Chorisepalum* Gleason and Wodehouse, *Macrocarpaea* Gilg, and *Symbolanthus* Don. *Eustoma* Salisbury does not seem to belong here. Several other genera, placed in the Tachiineae by Gilg (1895:90–94), we do not exclude, but neither are we familiar enough with them to formally include them.

We are not impressed with the "naturalness" of the subdivision of either the Gentianaceae by Gilg (1895) or of that of the Loganiaceae by Solereder (1892). Leenhouts (1962b:293-297) has discussed critically the subdivision of Loganiaceae. His classification takes into account a number of lines of evidence, and his conclusions are eminently conservative. His circumscription of the family is traditional. We differ from it in the placement of the Potalieae.

Fagraea Thunberg

Four species and one variety of *Fagraea* Thunberg have been described from western Micronesia, all considered endemic. Additionally, two names in this genus, *F. berteriana* and *F. morindifolia*, had been used earlier.

To the five endemic taxa we are adding a new one, and these six we consider to represent two species: *Fagraea ksid*, which is endemic on Palau, and *F. berteriana*, which is a widespread Pacific species with five Micronesian varieties.

References to *Fagraea* (mostly as *Fragraea* sphalm.), published earlier than the paper by Gilg and Benedict (1921) and given as *Fagraea* sp., to *F. berteriana* A. Gray ex Benthams, or to *F. morindifolia* Blume, record the genus from Nauru and the Gilbert Islands. To the best of our knowledge, they were not based on specimens. Burges (ca. 1935:4, 5) recorded *Fagraea* sp. in a manuscript list, citing a 1910 record by Hambruch. Burges gave no further indication as to the source of the record. About all one can conclude from this is that *Fagraea*, probably *F. berteriana*, or a plant so identified, may have existed on Nauru. *Fagraea* sp. (written *Fragraea*) reported by Grimble (1924:103) and *Fagraea* (as *Fragraea*) *berteriana*, quoted by Loumala (1953: 117-118) from Krämer (1906:268, 320, 351, 456) as from the Gilbert Islands, specifically Onotoa, both with the vernacular name, "te uri" or "to ori", commonly used in the Gilberts for *Guettarda*, we

regard as misidentifications of *Guettarda speciosa*. The occurrence of *Fagraea* on dry Onotoa Atoll seems very unlikely. Krämer (1905:140), referring to Schumann and Lauterbach (1901), reports *Fagraea morindifolia* Blume, from the Marshall Islands, with the vernacular names, "wut" and "libiruk." Schumann and Lauterbach (1901:499) record this species, quite distinct in its racemiform inflorescence, from the Solomon Islands, with a Malesian distribution, but make no mention of Micronesia or the Marshalls. Judging by the Marshallese name "wut" we believe this to be a misidentification of *Barringtonia asiatica* (L.) Kurz, which has somewhat similar leaves. We have no specimens or reliable records of *Fagraea* from Micronesia east of Kusaie.

The taxonomy of *Fagraea* is in an unsatisfactory state, despite the monographic efforts of Leenhouts (1962a, 1962b.) The six Micronesian taxa are obviously close, but specimens can be sorted on even superficial characters into six piles, each with a definite and coherent geographic range. Workers publishing prior to 1962 unhesitatingly accepted five species as distinct, one of them with a variety. Leenhouts (1962b:335) placed all of these taxa in the synonymy of the widespread *F. berteriana*, not recognizing any of them, not even *F. ksid*, at varietal or other infraspecific rank.

Fagraea ksid, with its slightly zygomorphic flowers and its oblong-obovoid, somewhat dorsiventrally compressed fruit, held horizontally, would satisfy even a moderately broad species concept. The other five, recognizably though only slightly distinct, seem to fit very well as varieties within the broad and polymorphic *F. berteriana* Gray ex Benthams (see Fosberg and Sachet 1974:471-472, for remarks on this species and its taxonomy). We are still not ready to publish a treatment of this species over its entire range, but the Micronesian varieties seem reasonably clear, though forming a closely related group. We are publishing our disposition of them here so that their names may be used.

Key to the Micronesian Species of *Fagraea*

- Calyx lobes 8-10 mm long, acute, corolla tube over 6 cm long, fruit obovoid, slightly dorsiventrally compressed *F. ksid*
 Calyx lobes 3-7 mm, rounded or obtuse. Corolla tube 2-4 cm long, fruit ovoid to globose, subglobose or ellipsoid, not at all compressed *F. berteriana*

***Fagraea berteriana* A. Gray ex Benth**

Fagraea berteriana A. Gray ex Benth, Jour. Linn. Soc. Bot., 1:98, 1857 [1856].

Carissa grandis Bertero ex Benth, Jour. Linn. Soc. Bot., 1:72, 98, 1857 [1856].

Fagraea grandis Pancher in Sébert, Not. Bois Nouv. Caléd., 184, 1874.

Fagraea schlechteri Gilg & Benedict, Bot. Jahrb., 56:551, 1921.

Type: "Hab. In ins. Societatis (Bertero, Bidwill, Hinds, Barclay), ins. Nukahiva e Marquesas (Barclay), in Archipelago Louisiade dicto (Macgillivray)" Benth. The Bertero specimen is indicated as type [lectotype?] by Leenhouts (1962a:420).

Glabrous tree, branchlets rather fleshy, tending to be quadrangular, leaves elliptic to obovate, thin-coriaceous to coriaceous, petiolate, petioles auriculate at base; inflorescence terminal, basically dichasial, 3-4 times branched, a pair of scale-like bracts

at each node; flowers pedicellate, very fragrant, pedicels to 15 mm long; calyx united below, with 5 imbricate, thin-margined rounded lobes, erect, then spreading; corolla salverform, fleshy-cartilaginous, cream-white aging yellow, tube 2-7 cm long, somewhat to notably dilated in the upper part, lobes obovate, rounded distally; stamens inserted on a slightly thickened ring inside the corolla tube, anthers linear; ovary ovoid, style somewhat thickened near base, filiform, almost equalling tube to somewhat exerted, stigma of two flattened lobes erect and pressed together, then spreading; fruit an ovoid to subglobose or globose, usually umbonate, not strongly beaked by style base, orange to red many-seeded berry, the skin firm and glossy, the many seeds embedded in fleshy pulp.

The type locality of this species is Tahiti, and var. *berteriana* is not in Micronesia. In Micronesia it is represented by five very closely related varieties. They may be keyed out as follows:

Key to the Micronesian Varieties of *Fagraea berteriana*

- | | |
|---|-----------------------------|
| 1. Petiole mostly under 20 mm long, slightly winged at least above, by decurrent blade. | |
| 2. Calyx lobes 3-4 (-5) mm | var. <i>sair</i> |
| 2. Calyx 5-6 mm | var. <i>kusaiana</i> |
| 1. Petiole mostly over 20 mm, not winged. | |
| 3. Corolla tube 20-25 mm long | var. <i>pogas</i> |
| 3. Corolla tube 28-35 mm long | |
| 4. Calyx lobes 3-4 (-5) mm long | var. <i>galilai</i> |
| 4. Calyx lobes 4.5-7 mm long | var. <i>ladronica</i> |

***Fagraea berteriana* var. *galilai* (Gilg & Benedict) Fosberg, new combination, new status**

Fagraea galilai Gilg & Benedict, Bot. Jahrb., 56:555, 1921.

Leaves oval to obovate-oval, rounded to very shortly umbonate at apex, petioles 15-30 mm long, calyx lobes (3-) 3.5-4(-5) mm long, corolla tube about 28 mm long, style equalling it or slightly longer, fruit globose to ovoid-globose, 16-18 × 20-22 mm.

Known only from Palau (Truk records all seem to belong to var. *pogas*).

Type: Palau Islands, Babeldaob: "bei Ngalkip, 100 m, Mittelwald," Ledermann 14476 (B, lectotype, in bud only, here designated).

***Fagraea berteriana* var. *kusaiana* (Hosokawa) Fosberg, new combination, new status**

Fagraea kusaiana Hosokawa, Trans. Nat. Hist. Soc. Formosa, 24:204, 1934.

Leaves broadly obovate, slightly acuminate, base cuneate, veins somewhat prominent; petiole (12-) 16-23 mm; calyx lobes 5(-6) mm long; corolla tube 25-39 mm long, stigma included or exerted (possibly heterostylous?); fruit broadly ellipsoid to subglobose or globose, 21-24 mm long, bluntly beaked.

Close to var. *sair*, but petioles longer scarcely winged except at summit. Known only from Kusaie.

Type: Caroline Islands: Kusaie: Mt. Buache, Hosokawa 6288 (A, isotype).

***Fagraea berteriana* var. *ladronica* Fosberg, new variety**

Planta foliis obovatis, petiolis usiter 17-30 mm longis, lobis calycis 5-7 mm longis, tubo corollae 31-35 mm longo, fructu globoso vel ellipsoideo, 25-30 mm longo.

Type: Rota, Fosberg 25142 (US, holotype; BISH, Fo, isotypes).

Leaves obovate, very slightly to not pointed, base somewhat cuneate, veins quite visible, petiole (12-) 17-30 (-31) mm long, calyx lobes (4-) 5-7 mm long, corolla tube 31-35 mm, style subequal with corolla tube or slightly exserted; fruit globose to ovoid or ellipsoid, 25-30 mm long.

This is close to var. *galilai*, to which it has been referred, but differs especially in its much longer calyx lobes, longer corolla tube and larger fruit.

Known from Guam and Rota in the Marianas.

SPECIMENS SEEN.—Marianas Islands: Rota: $\frac{3}{4}$ mi. [1.2 km] E. of Sabana 420-450 m. *Fosberg 25142* (US; type; BISH, Fo, isotypes); Sabana, *Necker RS4* (US), *Necker RS15* (US); road to Sabana, 200-400 m, *Sachet 1807* (US); 150-250 m. *Evans 2096* (US). Guam: without locality, *Anderson 136* (US); N of Almagosa, 330 m. *Bryan 1226* (NY); Mt. Lamlam, *Glassman 233* (A); *Moran 4713* (US, Fo); 900 ft [273 m], *Moore 260* (US, HAW); Mt. Almagosa, *Stone 4340* (US); 300 m, *Stone 4109* (GUAM); Naval Magazine area, near Almagosa Springs, *Stone 4899* (GUAM) (corolla tube not or scarcely exserted, throat 22-23 mm long, lobes 12-14 mm long, fruit oval, slightly umbonate, 19 × 25 mm).

***Fagraea berteriana* var. *pogas* (Hosokawa)
Fosberg, new combination**

Fagraea sair var. *pogas* Hosokawa, Bull. Biogeogr. Soc. Japan, 7:198, 1937.

Leaves obovate to oblong-obovate, petioles (16-) 20-30 (-35) mm long, not or scarcely winged, calyx lobes 3-4 mm, corolla tube 20-25 mm long, style strongly exserted, 23-30 (-38) mm long, fruit oval, 15-18 mm long, with a low umbo 2-4 mm high.

Found on Truk and in the Mortlock Atolls.

Type: Caroline Islands: Truk Group, Toll Island, *Hosokawa 8333* (A, isotype).

***Fagraea berteriana* var. *sair* (Gilg & Benedict)
Fosberg, new combination, new status**

Fagraea sair Gilg & Benedict, Bot. Jahrb., 56:555-557, 1921.

Leaves oblong to obovate, slightly pointed, base cuneate to slightly attenuate, petiole 7-15 (-30) mm long, narrowly winged by decurrent base of blade, venation somewhat obscure but visible, calyx lobes (3-) 4 mm long, corolla tube 23-36 mm long, style included to usually exserted; fruit globose or rarely subglobose, 25-30 mm in diameter.

Known only from the central eastern Carolines,

native in Ponape, probably introduced in Namoluk and Nukuoro.

Type: Caroline Islands: Ponape, "bei Palapolap im Garten," *Ledermann 13932* (B, isotype).

***Fagraea ksid* Gilg & Benedict**

Fagraea ksid Gilg & Benedict, Bot. Jahrb., 56:552-553, 1921.

Small tree, 4-12 m tall, glabrous; leaves broadly obovate to oval, thick, glossy, to 15 × 9 cm, rounded at apex, cuneate to slightly attenuate at base, veins subopposite, 6-8 pairs, visible but not prominent, petioles 2-2.5 cm long, first pair on a branchlet tending to be reduced to obovate cataphylls; cyme terminal several times trichotomously branched, with reduced leaves at first ramification and at first ramification of central branch; flowers slightly zygomorphic, pedicellate, pedicels erect, calyx lobes 8-10 mm long, obtuse, closely erect around base of corolla; corolla tube 6-10 cm long only very slightly dilated upward, lobes obovate 2.5 cm long, 1-1.6 cm wide rounded at apex; anthers included, style exceeding tube, stigma bilobed, exserted; pedicels in fruit nodding and fruit either horizontal or somewhat drooping, calyx spreading in fruit, berry ellipsoidal to narrowly pyriform, dorsiventrally somewhat compressed to about 4.5 × 2 × 1 cm, apex rounded but abruptly strongly beaked by the stiff, narrow style-base, this 4-6 mm long, deep orange when ripe.

Endemic to Palau, rather common on Babeldaob on weathered volcanic rock, on Koror reported by collector as on limestone. The syntypes from Koror Island (*Ledermann 14,189*, *Gibbon* (Kersting's) 1205, and *Raymundus 209*) were probably all destroyed in the World War II bombing of the Berlin herbarium.

LOGANIACEAE

***Geniostoma* J. R. & G. Forster**

The genus *Geniostoma* in the Marianas Islands presents much difficulty in interpretation. Plants of this genus have been collected in the Marianas on Guam, Rota, Saipan, Alamagan, Pagan, and Agri-gan. In all, four species have been described: *G. micranthum* by A. de Candolle, *G. hoeferi* by Gilg and Benedict, its var. *glabrum* and *Geniostoma*

longistylum by Gilg and *Geniostoma glaberrima* by Hosokawa. In addition, Kanehira (1935:392) proposed the name *G. saipanense* "in sched." but apparently never published his description. These four all represent distinguishable forms, differing mainly in hairiness or lack of it, and length of style. In leaf-shape and size and fruit size, there is also much variation but this is not well correlated with the variations in pubescence and style-length.

If only the Guam plants were involved it might be possible to uphold two species, differing in several characters, one, glabrous growing on the volcanic soil, the other, generally hairy, on limestone. The glabrous plant has the summit of the ovary glabrous and the style 0.5–1 mm long. The hairy plant has the style 0.5 mm or less long and a slight hairiness at the summit of the ovary. One plant (*Marche 282*) from Guam but without locality is glabrous but with very short style and hairs at the summit of the ovary.

Plants similar to the common glabrous one from Guam occur on Rota (on volcanic soil), on Agrigan and on Alamagan (one specimen from Alamagan with a few hairs at top of ovary). Agrigan and Alamagan are strictly volcanic islands. The Alamagan specimens have short styles. Essentially glabrous plants, similar to the *Marche 282* collection are also known from Saipan, where they occur on volcanic soil.

On Pagan is a plant with leaves very slightly tomentulose beneath, along midrib and acuminate, with very small fruit, 2.5–4 mm long, style 0.5 mm long, ovary slightly hairy at summit.

Taking into consideration only the separation based on pubescence, the correlation between glabrous plants and volcanic substratum is striking, and that between hairy plants and limestone is complete except for the Pagan Island specimen. In each of the two, however, both short-styled and long-styled plants occur. Even without desirable field studies on the populations, the probability seems strong that *G. micranthum* is a heterostylous species. Accepting this, it seems reasonable to regard the glabrous and the pubescent populations, with the exception of the Pagan plant, as varieties, each inhabiting a distinct habitat. The Pagan specimen, which does not fit this picture, also differs in having a much smaller fruit. The best disposition

of it, at present, seems to be to make it a separate variety of *G. micranthum*.

Geniostoma micranthum A. de Candolle

Geniostoma micranthum A. de Candolle, Prodr., 9:27, 1845.—Gilg and Benedict, Bot. Jahrb., 56:541, 1921.—Merrill, Phil. Jour. Sci. Bot., 9:128, 1914.—Fosberg, Falanruw and Sachet, Smithsonian Contr. Bot., 22:36, 1975.—Stone, Micronesica, 6:473–474, 1971 [as *G. rupestre* Forster].

Geniostoma hoeferi Gilg & Benedict, Bot. Jahrb., 56:541, 1921.

Geniostoma longistylum Gilg, Notizbl., 12:221, 1934.

Geniostoma hoeferi var. *glabrum* Gilg, Notizbl., 12:221, 1934.

Geniostoma glaberrima Hosokawa, Tr. Nat. Hist. Soc. Formosa, 25:34, 1935.

Geniostoma rupestre sensu Stone, Leenhouts [nec J. R. and G. Forster, Char. Gen., 24, 1775, nec A. de Candolle, Prodr., 9:26–27, 1845].

This species has been generally recognized as distinct since the time of de Candolle. However, in 1962, Leenhouts (1962b:369–373) took a much broader view of *Geniostoma rupestre* J. R. & G. Forster, the type-species of the genus. He submerged a vast number of Pacific and Malesian species in *G. rupestre*, not even giving them varietal status. Included was *G. micranthum* A. de Candolle. He was followed in this course by Stone (1971:473–474). Conn, of Lae, New Guinea, who is studying the genus, has also annotated material of *G. micranthum* as *G. rupestre*. On the other hand, in a critical and detailed study of the Western Polynesian, Fijian, and New Hebridean species, Smith and Stone (1962:32–36), have restricted *G. rupestre* to the New Hebrides, Santa Cruz Islands, and possibly New Caledonia.

Geniostoma micranthum is obviously very close to *G. rupestre*, but differs in having much less acuminate, usually smaller leaves with closer venation, usually shorter, thicker petioles; cymes with flowers more congested, usually more numerous, and with peduncles longer.

It seems more consistent with our treatment of the eastern Polynesian species of *Geniostoma* (Fosberg and Sachet, 1975:11–13) to keep the two separate, at least until Conn's monograph appears. Leenhouts (1962b:372) has stated the situation in this genus briefly but rather well; however, coming to opposite conclusions from ours.

Endemic in the Marianas Islands.

Key to the Micronesian Varieties of *Geniostoma micranthum*

1. Plants essentially glabrous var. *micranthum*
 1. Plants tomentulose at least on the underside of the leaf-midrib, young stems and inflorescences pilosulous.
 2. Fruit 5–10 mm long var. *hoeferi*
 2. Fruit 2.5–4 mm long var. *paganense*

Geniostoma micranthum* A. de Candolle var. *micranthum

Plants essentially glabrous except flower parts; fruit 5–10 mm long. Known from volcanic soils on Agrigan, Alamagan, Saipan, Rota, and Guam.

Type: Marianas Islands: Guam: *Gaudichaud 138* (G, holotype; P, isotype).

***Geniostoma micranthum* var. *hoeferi* (Gilg & Benedict) Fosberg, new combination, new status**

Geniostoma hoeferi Gilg & Benedict, Bot. Jahrb., 56: 541, 1921.—Kanehira, Enum. Micr. Pl., 391, 1935.—Stone, Micronesica, 6:474, 1971.

Geniostoma longistylum Gilg, Notizbl., 12:221, 1934.—Kanehira, Enum. Micr. Pl., 392, 1935.—Stone, Micronesica, 6:474, 1971.

Youngest growth and lower side of midribs tomentulose, cymes pilosulous, apex of ovary pilosulous, fruit 5–10 mm long.

Found on limestone on Saipan, Rota, and Guam.

Types: Marianas Islands: Saipan: Schnee XI; Hoefler 64, 77, 84, syntypes, not seen, probably destroyed. *Kanehira 2232* (NY, isotype of *Geniostoma longistylum*).

***Geniostoma micranthum* var. *paganense* Fosberg, new variety**

Folium lamina elliptico-oblonga usque ad 8–10 cm longa leviter acuminata costa infra tomentulosa; fructus late ellipsoidalis 2.5–4 mm longus summi pilosulus. Type: Pagan, *Kanehira 2209* (NY, holotype).

Leaves elliptic oblong, up to 8–10 cm long, somewhat acuminate, midrib very lightly tomentulose beneath; style 0.5 mm long; fruit broadly ellipsoidal, 2.5–4 mm long, slightly hairy at summit.

Apparently endemic on Pagan. The principal distinctive character is the small fruit.

SPECIMEN SEEN.—Marianas Islands: Pagan: without locality, *Kanehira 2209* (NY, holotype).

BORAGINACEAE

Heliotropium* L.**Heliotropium procumbens* Miller**

Heliotropium procumbens Miller, Gard. Dict. ed. 8, Heliotropium 10, 1768 [unpaged].—Johnston, Contr. Gray Herb., 81:52–54, 1928.

Heliotropium inundatum Swartz, Prodr., 40, 1788; Fl. Ind. Occ., 1:343, 1797.

Similarity between specimens from Guam, commonly referred to *Heliotropium ovalifolium* var. *depressum*, and Mexican specimens labeled *Heliotropium procumbens* Miller or *Heliotropium inundatum* Swartz suggested that they might belong to the same taxon. If so, this species may also have been another of the many Mexican and other tropical American plants that were carried to the Philippines and Guam very early by the Spanish “Manila Galleons.” This led to a preliminary comparison of *Heliotropium ovalifolium* Forskål with its New World counterpart, *Heliotropium procumbens* Miller, of which *Heliotropium inundatum* Swartz is a synonym. This rather cursory study showed almost no differences between the two. I. M. Johnston had noted this similarity but continued to maintain the two species. The fact emerged from our studies that the Guam plant is virtually identical with the narrow-leaved form of *Heliotropium procumbens* found on the west coast of Mexico, the area from which the Manila Galleons sailed. Our conclusion is that, whatever the disposition of *Heliotropium ovalifolium* Forskål, its Guam variety should be transferred to *Heliotropium procumbens* and its circumscription made to include the narrow-leaved west Mexican plants, as well as those of the western Pacific area. Before combining the two species *ovalifolium* and *procumbens*, it seems advisable to carry on a more detailed study, but it is

probable that more difference may exist between populations within each of the species than between the two species. Such a study will have to be postponed for the present, however. Here we will discuss only the western Pacific Island variety.

Heliotropium procumbens var. *depressum*
(Chamisso) Fosberg & Sachet, new combination

Heliotropium gracile R. Brown β *depressum* Chamisso, *Linnaea*, 4:457, 1829.

Heliotropium coromandelianum var. *depressum* (Chamisso) A. de Candolle, *Prodr.*, 9:542, 1845.

Heliotropium coromandelianum var. *oblongifolium* A. de Candolle, *Prodr.*, 9:541-542, 1845.

Heliotropium ovalifolium var. *depressum* (Chamisso) Merrill, *Philippine Jour. Sci. Bot.*, 9:134, 1914; 10:340, 1915; *Enum. Phil. Fl. Pl.*, 3:378, 1923.

Generally, both *Heliotropium ovalifolium* Forskål and *Heliotropium procumbens* Miller have obovate to elliptic petiolate leaves that vary in width and shape of apex and in degree of canescence. In New World specimens (*H. procumbens*) the spikes tend to be more slender and more often trichotomous. These differences are by no means sharp or constant. However, some specimens, mostly from the west and north parts of Mexico and a few scattered ones from farther south and east, as well as the Pacific Island population (which we are assigning to *Heliotropium procumbens*), stand out because their leaves are narrow, linear-lanceolate to oblanceolate (or elliptic-lanceolate), acutely or acuminate pointed and frequently notably canescent. The cymes are mostly dichotomous, occasionally simple and axillary, rarely trichotomous. The habit is occasionally depressed, decumbent, as indicated by the epithet *depressum*, but it also may be ascending or erect. In habit this variety occasionally resembles *Heliotropium curassavicum* L., but the latter is never pubescent, while *Heliotropium procumbens* is always more or less strigose. The cymes, in age, become conspicuously elongate.

As indicated above, we suggest that var. *depressum* came to the Philippines and then to Guam by the Manila Galleons several hundred years ago. Judging by the facts that there is only one doubtful Philippine specimen in the U.S. National Herbarium and that Merrill only cites one Philippine collection, this introduction has not prospered in the Philippines, but became common in Guam,

where Chamisso found it in 1817 (*Chamisso s.n.* (K,G,LE)), and Gaudichaud in 1819 (*Gaudichaud 15* (P) *s.n.* (G)). At least by 1889 it had spread to Rota (*Marche 271* (P, US)). In 1939 it was found on Tinian (Fujikawa). In 1965 it was found in Saipan (*Fosberg 47720* (US)) and in 1950 in Pagan (*Fosberg 31640* (US)). By 1965 it had reached Ulithi in the Western Carolines (*Fosberg 46488* (US)). In the Marshalls it was established in Kwajalein in 1952 (*Fosberg 34124* (US)) and in Majuro at least by 1978 (*Fosberg 58810* (US)). On Wake Island it was found in 1961 (*Sachet 904* (US)) and in 1963 (*Fosberg 43537* (US, BISH)). By 1971 it had reached Canton in the Phoenix group (Clapp photo), (*Fosberg and Stoddart 54897* (US)) and in 1973 spread to Hull Atoll, in the same group (*Fosberg & Stoddard 54842* (US, HAW)) where it still persisted in 1975 (*Fosberg & Stoddard 55741* (US, BISH)). Herbst found it in the Hawaiian Islands at Sand Island, Oahu, in 1975 (*Herbst 5466* (US)), and Fosberg found it at Kaneohe Marine Corps Air Station in 1978 (*Fosberg and Evans 58834A* (US)). It is, of course, not to be assumed that the date on which the species was first collected on an island corresponds to the date of introduction. The paucity of collections before World War II of this and other exotics, and their abundance since that period, illustrate a greatly increased dispersion of these plants, presumably due to greatly stepped-up inter-island travel.

The narrow-leaved plant, introduced into the Pacific, corresponds well with plants from Mexico, especially western and northern Mexico, but represented slightly in the more central and southern part. It is there not the exclusive form, even in the northwest part, as broad-leaved plants are fairly well distributed in Mexico. No narrow-leaved specimens were seen in our brief study from either the West Indies or South America where the broad-leaved ones seem to be common. In our experience this variety is a plant of sparsely vegetated weedy places.

Representative specimens are cited below. A full range will be cited with treatment of the Boraginaceae in a later fascicle of the Flora of Micronesia. We have seen only one specimen from the Philippines.

SPECIMEN SEEN.—Marianas Islands: without locality, *Gaudichaud s.n.* (G, type of *Heliotropium coromandelianum* var. *oblongifolium*); Guam: without locality, *Chamisso s.n.* (K,G,LE) (isotypes of *Heliotropium gracile* var. *depressum*).

Commarianas (Fonte), hills N of Mt. Alutom, 175 m, *Fosberg 25435* (US, BISH, NY, L). Rota: *Marche 271* (P, US); Song-song, *Fosberg 25111* (US BISH, NY); Sasan Haya bay, *Sachet 1791* (US, BISH). Saipan: Marpi Point, 15 m, *Fosberg 47720* (US, BISH). Pagan: near landing, *Fosberg 31640* (US).

Caroline Is.: Ulithi Atoll, Falalap Islet, *Fosberg 46488* (US).

Marshall Islands: Kwajalein Atoll, Kwajalein Islet, *Fosberg 54124* (US), *48022* (US, BISH). Majuro Atoll, Long Islet, *Fosberg 58810* (US, BISH).

Wake Island: Wake Islet, *Fosberg 43537* (US, BISH).

Phoenix Islands: Canton Island, *Fosberg & Stoddard 54897* (US), Hull Atoll: *Fosberg & Stoddard 54842* (US, HAW), *55741* (US, BISH).

Hawaiian Islands: Oahu, Sand Island, *Herbst 5466* (US); Kaneohe, Mokapu Peninsula, *Fosberg & Evans 58834A* (US).

Mexico: Baja California: Arroyo San Juan, 30 m, *Moran & Reveal 20129* (US), Agua Verde Bay, *I. M. Johnston 3883* (US); 17.6 km E of San Ignacio, *Carter et al. 1970* (US); San Jose del Cabo, *Wiggins 5684A* (US); *Rose 16482* (US). Sonora: without locality, *Palmer in 1865* (US); San Bernardo, Rio Mayo, *Gentry 1483* (US); San Pedro Bay, *I. M. Johnston 4327* (US). Sinaloa: Mazatlan, *W. G. Wright 1238* (US); *Ortega 5437* (US); Culiacan, *Palmer 1506* (US). San Luis Potosi: Minas de San Rafael, *Purpus 5343* (US). Tamaulipas: San Vicente, Jaumaol, *von Rozynski 376* (US). Nuevo Leon: Monterrey, *Pringle 1879* (US); Cerro del Obispado, near Monterrey, *Fernandez & Barkley 14515* (US). Jalisco: Guadalajara, *Palmer 258* (US). State not given: Yaqui River, *Palmer in 1869* (US); Lodiago, *Palmer 1563* (US).

VERBENACEAE

Callicarpa L.

The Micronesian plants of this genus are a part of a taxonomically almost insoluble complex extending from southern Asia to the eastern Carolines, for which the correct name seems to be *Callicarpa candicans* (Burman f.) Hochreutiner, based on *Urtica candicans* Burman f. Two species have been segregated from this in Micronesia. *Callicarpa elegans* Hayek and *Callicarpa lamii* Hosokawa (as *lammii*). A third, *Callicarpa paucinervia* Merrill seems no more than a variety of *Callicarpa candicans*. Two other varieties of this species are separable in the Caroline Islands. These dispositions are tentative and may be changed when the Philippine and Malesian plants of this affinity are critically studied. The names for the Micronesian plants are given here with necessary new combinations. A more intensive study of these plants is in progress but the names are needed now for the taxa that seem reasonably definite.

Callicarpa candicans (Burman f.) Hochreutiner

Callicarpa candicans (Burman f.) Hochreutiner, *Candollea*, 5:190, 1934.

Urtica candicans Burman f., *Fl. Indica*, 297 [197], 1768.

Callicarpa cana L., *Mantissa Pl.*, 2:198, 1771.

Callicarpa candicans (Burman f.)

Hochreutiner var. *candicans*

Not known from Micronesia, originally described from Java.

Callicarpa candicans var. *integrifolia* (H. J. Lam)

Fosberg, new combination

Callicarpa cana var. *integrifolia* H. J. Lam, *Verb. Malay Arch.*, 74, 1919.

Caroline Islands.

Callicarpa candicans var. *integrifolia* (Lam)

Fosberg, f. *integrifolia*

Common almost throughout the Caroline Archipelago. Some plants are intermediate with the following.

Callicarpa candicans var. *integrifolia* f.

glabriuscula (H. J. Lam) Fosberg, new combination

Callicarpa cana var. *integrifolia* f. *glabriuscula* H. J. Lam, *Verb. Malay Arch.*, 74, 1919 [pro parte, Caroline Islands specimens].

Callicarpa erioclona f. *glabrescens* Moldenke, *Phytologia*, 8:385, 1962.

Western Caroline Islands, occasional. Some plants are intermediate with f. *integrifolia*.

Callicarpa candicans var. *paucinervia* (Merrill)

Fosberg, new combination

Callicarpa paucinervia Merrill, *Philippine Jour. Sci. Bot.*, 9:134, 1914.

Callicarpa erioclona var. *paucinervia* (Merrill) Moldenke, *Phytologia*, 8:57, 1961.

Marianas Archipelago, probably endemic. Plants approaching this have been recorded as *Callicarpa paucinervia* from Palau, but should probably be included in var. *integrifolia*.

Callicarpa candicans var. *ponapensis*
Fosberg, new variety

Callicarpa erioclona sensu Glassman 1952 [non Schauer in de Candolle, Prodr., 11:643, 1847].

Arbuscula foliis valde acuminatis marginibus valde dentatis, pagina infra dense arcte albotomentosa. Type: Ponape, *Takamatsu 796* (US, holotype).

A shrub with slender, densely light brownish stellate-tomentose branches; leaves elliptic to ovate-elliptic, apices strongly acuminate, bases decurrent, margins strongly dentate with triangular teeth, upper surface nearly glabrous except midrib and principal veins, lower surface closely and densely white stellate-tomentose.

Caroline Islands: Ponape, Jokaj, in forest near coast, 8 Mar 1936, *Takamatsu 796* (US, holotype).

Callicarpa lamii Hosokawa

Callicarpa elegans Hayek, Fedde Repert. Nov. Sp., 2:88, 1906.

Caroline Islands: Palau and Yap, type from the Philippines (Cuming 1460).

Callicarpa lamii Hosokawa

Callicarpa lamii Hosokawa, Jour. Soc. Trop. Agr., 6:206, 1934 (as *lammii*).

Callicarpa glabra H. J. Lam, Verb. Malay Arch., 82, 1919 [non Koidzumi, 1918].

Marianas, endemic, only rather weakly distinct from *C. candicans*, but maintained until further field observations can be made.

ACANTHACEAE

Pseuderanthemum Radlkofer

The species of this genus in the western Pacific badly need revision. Two or possibly three are native in Micronesia, plus two cultivated species originating elsewhere. The Ponape plant *Pseuderanthemum laxiflorum* may be native or an accidental introduction. The data in the label are not very helpful in this respect. The plants native to Palau have, up to now, been placed in *Pseuderanthemum inclusum* Hosokawa. On careful study they prove to belong to two distinct species, the

other of which (*P. palauense*) is herein described as new. The relationship of these to other western Pacific species is not clear, but at least superficially they seem to be distinct from those of other islands.

Pseuderanthemum acuminatissimum (Miquel)
Benoist

Pseuderanthemum acuminatissimum (Miquel) Benoist in Lecomte, Fl. Gen. l'Indochine, 4:721, 1935.—Radlkofer, Sitz. Bayer Akad. Wiss. München. Nat.-Phys., 13:286, 1884. *Eranthemum acuminatissimum* Miquel, Fl. Ind. Bat., 2:835, 1858.

Pseuderanthemum sp. of Glassman, Bishop Mus. Bull., 209: 102, 1952.

Glassman compared his Ponape specimen with *P. sumatrense* (Ridley) Merrill, but the inflorescence is far too short and dense for that species. It is a much better match for *Pseuderanthemum acuminatissimum* of Thailand and Indo-China, and may tentatively be referred to that species. Radlkofer may be said to have published this combination, but so much ambiguity surrounds his attempted transfer that it seems best to ascribe it to Benoist who published it very clearly.

Pseuderanthemum carruthersii var.
atropurpureum (Bull) Fosberg

Pseuderanthemum carruthersii var. *atropurpureum* (Bull) Fosberg, Phytologia, 5:290, 1955.

Pseuderanthemum jaluitense Lindau in Fedde, Repert. Sp. Nov., 13:553, 1915.

Pseuderanthemum jaluitense seems, from the description, especially that of the red color of leaves and flowers and the form of the corolla, to belong to the common *Pseuderanthemum carruthersii* var. *atropurpureum* (Bull) Fosberg. The type, Gibbons 1068, was most likely destroyed in the bombing of Berlin, so this is probably the best disposition of this name that will be possible. Also *Pseuderanthemum carruthersii* is the only species of the genus known from the Marshall Islands, or likely to occur there.

Pseuderanthemum carruthersii var. *reticulatum*
(Bull) Fosberg, new combination, new status

Eranthemum reticulatum Bull, Gard. Chron., n.s., 3:619, 1875.

This differs from var. *carruthersii* mainly in the pronouncedly ovate leaves with a yellow zone along

the midrib and veins. It is occasionally planted as an ornamental.

***Pseuderanthemum laxiflorum* (Gray) Hubbard**

Pseuderanthemum laxiflorum (Gray) Hubbard in Bailey, *Rhodora*, 18:159, 1916.

Eranthemum laxiflorum Gray, Proc. Amer. Acad. Sci., 5:349, 1861-1862.

Eranthemum pulchellum Hort., *Gartenmag.*, 176, t. 17, 1810 [non Andrews, Bot. Repos., t. 88, 1800].

Pseuderanthemum pulchellum (Hort.) Merrill, Phil. Jour. Sci. Bot., 7:248, 1912.

Pseuderanthemum bicolor sensu auct. Micr. [non (Schrank) Radlkofer].

The widely planted ornamental species, commonly called *Pseuderanthemum bicolor*, seems to be this. *Pseuderanthemum bicolor* is a wild Philippine species. The taxon *Pseuderanthemum pulchellum* has been used for this species, but its basionym is a later homonym and hence illegitimate.

***Pseuderanthemum palauense* Fosberg & Sacht,
new species**

Planta herbacea, foliis ovatis acuminatis, racemis terminalibus, bracteis ovatis, sepalis lanceolatis ceribus, corolla curvata 2 cm longa, semine diametro 3-4 mm discoideo faciebus verrucatis margine sinuato dentato.

Herb a few decimeters tall, young parts and grooves on 2 sides of stem pilosulous, nodes rather prominent; leaves thin, ovate, strongly acuminate, obtuse or acute at base, up to 7 × 3 cm, petiole slender, about 1 cm long, blade with up to 7 veins on a side, these appressed puberulent above, much less so on under sides; racemes slender, slightly pilosulous, terminal and on small side branchlets, rachis 4-6 cm long, occasionally branched, bracts small, ovate, about 1 mm long, subtending pedicels 2-3 mm long, dilated upward, occurring opposite or subopposite moderately spaced along rachis, sepals narrowly lanceolate, 3-4 mm long, free almost to base, almost glabrous, sharply pointed; corolla about 2 cm long, curved, glabrous without, limb in bud 3-4 mm long (buds only seen), style and stamens about 3 cm long (only detached ones seen intact); fruit glabrous, about 2 cm, beak short; seed disk-like, margin scalloped, lobe at one end of scar

more prominent, faces conspicuously warty, gray-brown, 3-4 mm across.

This is quite distinct from *P. inclusum* Hosokawa in its leaf shape, more slender and lax inflorescences, much longer corollas, styles and stamens, and in scalloped warty seeds. It seems closest to Philippine plants commonly referred to *P. bicolor* (Schrank) Radlkofer, which have predominantly axillary cymes, linear subulate bracts and sepals, and entire-margined seeds. The Philippine plants do not seem to be the same as the cultivated species known as *P. bicolor* (Schrank) Radlkofer (see above).

SPECIMENS SEEN.—Caroline Islands: Palau: Peleliu Island, in forest, *Takamatsu 1768* (BISH, holotype); Babeldaob Island, Arekalong, in field, *Takamatsu 1681* (BISH).

RUBIACEAE

***Geophila* D. Don**

***Geophila repens* (L.) Johnston**

Geophila repens (L.) Johnston, *Sargentia*, 8:281, 1949.
Rondeletia repens L., *Syst. Nat.*, ed. 10:928, 1759.

***Geophila repens* var. *asiatica* (Chamisso & Schlechtendal) Fosberg, new combination**

Geophila veniformis var. *asiatica* [Rheede ex] Chamisso & Schlechtendal, *Linnaea*, 4:137, 1829.

The Old World populations of *Geophila repens* have pyrenes with flat inner faces, while the New World ones have them consistently curved or warped. Chamisso and Schlechtendal based their variety on a specimen collected by Chamisso on Guam, but also referred to Rheede, *Hortus* (1690:41, pl. 21). This seems to be the oldest varietal epithet applicable to the Old World variety.

***Hedyotis* L.**

***Hedyotis costata* (Roxburgh) Kurz**

Hedyotis costata (Roxburgh) Kurz, *Jour. Asiatic Soc. Bengal*, 45 (2):135, 1876.

Spermacoce costata Roxburgh, *Hort. Beng.*, 10, 1814 [nom. nud.]; *Fl. Ind.*, 1:376, 1820.

The typical form, var. *costata*, is not known from Micronesia (but see discussion below).

***Hedyotis costata* var. *lutescens* (Kanehira)
Fosberg, new combination, new status**

Hedyotis lutescens Kanehira, Trans. Nat. Hist. Soc. Formosa, 25:4, 1935.

This has been reduced outright to *Hedyotis costata* (Roxburgh) Kurz by Hatusima (1936:222), and by Kanehira, himself (1936:607). However, the much denser conspicuously yellow pubescence seems to justify retaining it as a variety. The type locality is Aimiriik, Babeldaob, Palau. We have not seen this specimen (Kanehira 1980), but *Takamatsu 1512* (BISH) is apparently the same. Some specimens from Hainan and Sumatra may belong here, though their habit is more open and the pubescence more sparse.

***Hedyotis kanehirae* (Hatusima)
Fosberg, new combination**

Leptopetalum kanehirae Hatusima, Trans. Nat. Hist. Soc. Formosa, 26:218, 1936.

Hedyotis kanehirae Hatusima, Trans. Nat. Hist. Soc. Formosa, 26:218, 1936 [in synonymy].

This species was placed in *Leptopetalum* Hooker and Arnott by Hatusima. That genus differs from *Hedyotis* L. only in its stamens being inserted at the base of the corolla tube, rather than part way or all the way up. This seems an inadequate basis for maintaining it as a separate genus, hence I (Fosberg) am transferring *L. kanehirae* to *Hedyotis* L. It is close to *Hedyotis foetida* var. *marianensis* (Merrill) Fosberg.

The combination *Hedyotis kanehirae* (Hatusima) Fosberg was inadvertently published by us (Fosberg, Falanruw, and Sachet, 1975:40) without its basionym. As a valid name it dates from the present publication.

***Hedyotis strigulosa* (Bartling ex de Candolle)
Fosberg, new combination**

Oldenlandia strigulosa Bartling ex de Candolle, Prodr., 4:427, 1830.

Hedyotis coreana Léveillé in Fedde, Repert. Sp. Nov., 11:64, 1912.

Oldenlandia albido-punctata Merrill, Phil. Jour. Sci. Bot. 9:147, 1914.

Hedyotis albido-punctata (Merrill) Fosberg, Lloydia, 3:123, 1940.

Bartling's name apparently applies to this common species of coastal limestone rocks in the western

Pacific. The type is from "Isl. Marianne, *Haenke*" (G, holotype). *Hedyotis coreana* Léveillé seems most probably the same, but is not described in detail.

***Psychotria* L.**

The genus *Amaracarpus* Blume was set up to accommodate species (e.g., *Amaracarpus muscosus*) with strikingly unique habit, but little technical difference from *Psychotria*. The inclusion in it of numerous species that do not share its distinctive character but have small or slender axillary inflorescences reduces to insignificance its difference from *Psychotria*. A series of these species were described from Micronesia by Valetton and by Japanese botanists who followed him. In 1940 I (Fosberg) failed to find reason to maintain *Amaracarpus* for the Micronesian plants, and failed, also, to see much justification for the plethora of Micronesian *Amaracarpus* species. I reduced them, summarily, to two species of *Psychotria*: *P. carolinensis* and *P. ponapensis*. Since then, I have been unable to see even two good species in the complex and have also found that two older binomials, *Psychotria malaspinae* Merrill (1914) and *Uragoga hombroniana* Baillon (1879) have been proposed for members of this complex. Field studies and comparison of many herbarium specimens indicated that, although many of the entities are discernible, they intergrade and are not very different at best. The solution, admittedly tentative, but closer to reality than the earlier alternatives, seems to be to recognize a number of varieties of the one species, *Psychotria hombroniana* (Baillon) Fosberg. Names are provided for these so that they can be referred to, pending the intensive study that will be necessary to elucidate a more final taxonomy of the group in Micronesia and to find its relationships elsewhere.

***Psychotria hombroniana* (Baillon) Fosberg**

Uragoga hombroniana Baillon, Adansonia, 12:333, 1879.

Psychotria hombroniana (Baillon) Fosberg, Phytologia, 5:291, 1955.

Found in several varieties throughout the Caroline and Marianas high islands. Coral atolls do not, apparently, provide suitable habitats for these plants. Synonyms will be listed under the appro-

appropriate varietal names. Descriptions and citation of the abundant specimens will be deferred until the treatment of the Rubiaceae in the Flora of Micronesia.

***Psychotria hombroniana* (Baillon)
Fosberg var. *hombroniana***

Uragoga hombroniana Baillon, *Adansonia*, 12:333, 1879.

Marianas Islands: known from Rota and Guam. Type from Guam, *Hombron* in 1841 (P, 2 sheets).

***Psychotria hombroniana* var. *hirtella* (Valeton)
Fosberg, new combination, new status**

Amaracarpus hirtellus Valeton, Bot. Jahrb., 63:320, 1930 [non *Psychotria hirtella* Oliver, 1887].

Psychotria ponapensis Fosberg, Bishop Mus. Occ. Pap., 15:224, 1940.

Psychotria macrophylla Valeton, Bot. Jahrb., 63:318, 1930.

Caroline Islands: Ponape and Truk.

***Psychotria hombroniana* var. *kusaiensis* (Kanehira)
Fosberg, new combination, new status**

Amaracarpus kusaiensis Kanehira, Bot. Mag. Tokyo, 49:276, fig. 26, 20 May 1935.

Amaracarpus kanehirae Hosokawa, Trans. Nat. Hist. Soc. Formosa, 25:35, April 1935 [non *Psychotria kanehirae* Merrill, 1916].

The two names in *Amaracarpus* are obviously synonymous and *A. kanehirae* is earlier. However, selection of the other epithet for transfer to varietal status seems less likely to be confusing.

Caroline Islands: Kusaie.

***Psychotria hombroniana* var. *malaspinae*
(Merrill) Fosberg, new combination, new status**

Psychotria malaspinae Merrill, Phil. Jour. Sci. Bot., 9:148-149, 1914.

Amaracarpus mariannensis Kanehira, Bot. Mag. Tokyo, 48:926, 1934.

Amaracarpus ladronicus Hosokawa, Trans. Nat. Hist. Soc. Formosa, 25: 269, 1935.

Amaracarpus malaspinae (Merrill) Kanehira & Hatusima, Bot. Mag. Tokyo, 50:607, 1936.

Amaracarpus rotensis Hosokawa, Trans. Nat. Hist. Soc. Formosa, 25:35, 1935.

Marianas Islands: Alamagan; Rota; Guam.

***Psychotria hombroniana* var. *squarrosa*
(Valeton) Fosberg, new combination**

Amaracarpus carolinensis var. *squarrosa* Valeton, Bot. Jahrb., 63:319, 1930.

Amaracarpus carolinensis Valeton, Bot. Jahrb., 63:319, 1930.

Amaracarpus kraemeri Valeton, Bot. Jahrb., 63:320, 1930.

Amaracarpus heteropoides Valeton, Bot. Jahrb., 63:320, 1930.

Psychotria carolinensis (Valeton) Fosberg, Bishop Mus. Occ. Pap. 15:224, 1940.

Caroline Islands: Palau, Truk, Ponape, Kusaie.

***Spermacoce* L.**

***Spermacoce ernstii* Fosberg & Powell, new species**

Planta herbacea diffusa vel erecta ramosa glabra vel sparse scabrida, foliis ellipticis acutis vel acuminatis, lobis calycis linearis 1-2 mm longis, corolla brevi lobis triangulo-ovatis, pauce barbata, antheris stigmatumque valde inclusis, capsula hispidula breve late cylindrica, semine late elliptico nitido castaneo reticulato sulco ventrali lato.

Type: Columbia: Huila, above Galilea, *Fosberg 19632* (US, holotype).

This taxon is published here to validate the name so that it can be used. A full treatment with other related species is to appear in the near future. This species has been introduced into Micronesia and has spread to a number of islands, in some of which it has become common.

SPECIMENS SEEN.—Marianas Islands: Saipan: E of Ogso Tapotchau, just N of Kannat Tadung Laulau, 170-190 m, *Fosberg 50545* (US). Rota: Road to Sabana area, 200-400 m, *Sachet 1808* (US); 150-250 m, *Evans 2123* (US). Guam: Dededo, 100 m, *Fosberg 35309* (US); Campanaya Bay, 20 m, *Fosberg 43415* (US); Trust Territory Compound, NAS, Agaña, 70 m, *Fosberg 46215* (US), *46216* (US); Andersen Air Force Base, *Moran 4463* (US). Caroline Islands: Palau: Kayangel, along trail in middle of main islet, *Cheatham 86* (US). Koror: NE corner of island along road to Airai Ferry dock, *Fosberg 50629* (US). Peliliu: around the N landing, 1-2 m, *Fosberg 31958* (US); N end, Akalokul at boat landing, 2 m, *Fosberg 47616* (US). Angaur, west of Lake D, 0.3 mi [0.5 km] NE of village, 2 m, *Canfield 150* (US).

***Spermacoce hispida* L.**

Spermacoce hispida L., Sp. Pl., 102, 1753.

Spermacoce articularis L.f., Suppl. Pl., 119-120, 1781.

Borreria hispida (L.) Schumann in Engler & Prantl, Die Natürlichen Pflanzenfamilien, 4(4):144, 1891.

Borreria rotundifolia Valeton, Bot. Jahrb., 63:323, 1930.

The identity of *Borreria rotundifolia* has been a problem ever since the study of Micronesian botany became active after World War II. There seemed little chance of solving it, however, since the type was probably destroyed in Berlin. The discovery of a partial set of duplicates of Ledermann's collection, the Micronesian portion of which was kindly loaned by the authorities of the Berlin Herbarium, has enabled us to resolve this and other similar difficulties. The Ledermann collection on which the species is based is clearly *Spermacoce hispida* L., an Asiatic species previously recorded from Micronesia from Yap Island on the basis of a Volkens specimen (no. 215). This specimen was also destroyed in the bombing of Berlin and was probably *Spermacoce repens*.

SPECIMEN SEEN.—Caroline Islands: Ponape. Pailapalap, *Ledermann 13899* (B, lectotype of *Borreria rotundifolia*).

***Spermacoce repens* (de Candolle) Fosberg & Powell,
new combination**

Borreria repens de Candolle, Prodr., 4:542, 1830.
Spermacoce ocyroides sensu auct. [non Burman f., Fl. Ind.,
34, 1768].

Type from Mauritius.

SPECIMENS SEEN.—Caroline Islands: Palau: Babeldaob Island, Me'ebe'nbul village, Ngatpang, *Fosberg 32403* (US). Garamiscan Colony, *Fosberg 25711* (US). Yap Island: Volkens 215 (not seen); Leuj (Luis) village, 10–15 m, *Fosberg 46604* (US, BISH). Ponape Island, *Glassman 2583* (US, BISH); Retau-nepiichi, *Hosokawa 5572* (BISH).

COMPOSITAE (= ASTERACEAE)

***Vernonia* Schreber**

***Vernonia patula* (Dryander) Merrill**

Vernonia patula (Dryander) Merrill, Phil. Jour. Sci. Bot., 3:439, 1908; 9:154, 1914.—Koster, Blumea, 1:433, 1935.—Stone, Micronesica, 1:129, 1964; 6:594, 1971.
Conyza patula Dryander in Aiton, Hort. Kew., 3:184, 1789.
Vernonia chinensis sensu Endlicher, Ann. Wien. Mus. Naturgesch., 1:168, 1835.—Schumann and Lauterbach, Fl. Süds., 595, 1901. [Non (L.) Lessing, Linnaea, 6:105, 1831].
Cyanopsis pubescens de Candolle, Prodr., 5:69, 1836.—Safford, Contr. U.S. Nat. Herb., 9:252, 1905 [as *Cyanopsis*].
Vernonia villosa (Blume) Wight in Safford, Contr. U.S. Nat. Herb., 9:396, 1905.—Stone, Micronesica, 1:129, 1964.
Vernonia patula var. *pubescens* (Blume) Koster, Blumea, 1:430–435, 1935.

Vernonia patula is an eastern Asiatic–New Guinea species which extends to Guam. There it is probably introduced, but was found by Haenke in 1792. It has been reported from Guam by a number of authors under several names, as shown by the above synonymy. The correct name is apparently *Vernonia patula*, though this has not been established with certainty until now. Its nomenclature has been somewhat confused, as it has been considered as synonymous with the earlier *Vernonia chinensis* (L.) Lessing. Thanks to information supplied by Dr. Kare Bremer (in litt., 1979), it can be reasonably established that the type of *Conyza chinensis* L., basionym of *V. chinensis*, is the specimen in the Linnean Herbarium, London, numbered 993:22. This is marked "Suratt," which is apparently equivalent to Surate, where Toren, the collector of the specimen cited by Linnaeus, spent some time collecting. From a microfiche photo of this specimen, we can determine positively that it is not the plant under discussion, though we are not certain what it is. This effectively removes *Vernonia chinensis* from consideration in the nomenclature of *Vernonia patula*, which thus remains the correct name for the plant found in Guam.

***Wollastonia* de Candolle ex Decaisne**

Wollastonia de Candolle ex Decaisne, Nouv. Ann. Mus. Paris, 3:414, 1834; Prodr., 5:546–549, 1836.
Wedelia sensu auct. plur. pro parte [non Jacquin, Enum. Pl. Carib., 8, 28, 1760].
Stemmodontia sensu auct. Micr. [non Cassini, Bull. Soc. Philom. Paris, 11, 1817].

Weak shrubs, suffrutescent herbs, and herbs with a resinous odor, leaves opposite, tending to be trinerved, exstipulate; inflorescences very open, terminal with 3–5 or more long-pedunculate heads or heads solitary; involucre of one principal whorl with a few smaller outer phyllaries; receptacular bracts strongly nerved, obtuse, sometimes apiculate, pubescent, enfolding achenes; ray florets mostly 6–10, yellow, limbs usually slightly 2- or 3-toothed at apex, disk corollas yellow or greenish yellow, 5-lobed; achenes thick, cuneiform, those of ray flowers 3-angled, of disk flowers 4-angled, those of ray flowers convex on outer face, all or mostly well developed, underdeveloped disk achenes scattered among fully developed ones, pappus of 1 short awn (or this absent) and summit of achenes blunt, strongly hirtellous, lower part glabrous.

The common Indo-Pacific strand plant usually called *Wedelia biflora* (L.) de Candolle ex Wight at first sign usually impresses botanists familiar with the Hawaiian flora as being a member of the Hawaiian genus *Lipochaeta* DC (e.g., Degener, in litt., 1942).

Since first seeing *W. biflora* in the field in Micronesia in 1946, I (Fosberg) have been convinced that *Lipochaeta* and *Wedelia biflora* were congeneric, but refrained from transferring the Hawaiian species to *Wedelia* because I was familiar with too few of the American and African species of *Wedelia*. It seemed possible that *Wedelia biflora* belonged in *Lipochaeta* but other *Wedelia* species might remain as a separate genus *Wedelia*.

In 1965, H. Wild (1965:4-5) transferred *Wedelia biflora* and most other African species of *Wedelia* to the genus *Melanthera* Rohr. This genus is typified by the American *Melanthera nivea* (L.) Small, pro parte, including Rohr's specimen (Strother, 1970:336-338), a plant with white ray flowers, and not too close to the Pacific species under discussion except as all species in the *Wedelia* relationship are similar. The basis for uniting them with *Melanthera* was the angular achenes characteristic of most African species. The exception, *Wedelia trilobata*, was left by Wild as the only African representative of *Wedelia* sensu stricto. He does not characterize *Wedelia* proper, but in correspondence he mentions flat achenes. Actually the disk achenes of *W. trilobata* when fertile and developed are somewhat compressed-clavate, rather than flat. *Wedelia biflora* seems far closer to *Lipochaeta* than to either *Melanthera nivea* or *Wedelia trilobata*, or to what material I have seen of *Wedelia fruticosa* Jacquin, type of *Wedelia*.

Many of the genera related to or segregated from *Verbesina* L. seem so close to each other that perhaps the logical course would be to lump them all into a single large genus. However, the limits of such a genus would likely be as hard to establish as are those of the segregates, and only a major revision of the large number of species in this assemblage might give any satisfactory delimitation.

A number of people are working on parts of this complex, and when their results are in and the parts of the puzzle are compared on a tropics-wide basis, logical and recognizable generic lines may emerge.

Regardless of this, the disposition of *Wedelia*

biflora vis-à-vis *Lipochaeta* remains a problem in the Pacific Islands. It seems desirable to fit the Indo-Pacific species under discussion into the present generic arrangement more convincingly than where it is now, as a *Wedelia*.

Our examination of mature capitula of *Wedelia biflora* shows that while it has plump, angular achenes, it does not fit *Melanthera* in that its ray flowers do produce mature achenes. Flowers that do not mature achenes occur randomly in the heads, but the rays are characteristically fertile unlike those of *Melanthera* in Wild's key (1965:1).

Wedelia as typified by *Wedelia fruticosa* Jacquin has plump, but slightly compressed, non-angular disk achenes. *Wedelia trilobata* has only part of the disk achenes fertile. *Wedelia biflora* has thick, angular achenes, those of the ray florets with pubescence on and near the summits. In this character, as well as in its fertile rays and its general appearance, it resembled *Lipochaeta*. However, in the latter, the sterile florets are in the center of the disk, rather than scattered through it.

Lipochaeta has been recently revised by R. C. Gardner (1976b) who admits 25 species showing great diversity, especially in vegetative characters, and falling into two groups on the basis of four vs. five disk corolla lobes, correlated with a chromosome difference. In a published paper, Gardner (1976a:384) indicates that the closest relatives of *Lipochaeta* are in the genus *Wedelia*, especially *Wedelia biflora*, and that *Lipochaeta* might have arisen from "an ancestor of *W. biflora*."

Dissection of heads of *Wedelia biflora* var. *canescens* (Gaudichaud) Fosberg shows a strong similarity to *Lipochaeta* in the involucre of one principal series of phyllaries, not sharply distinct from receptacular bracts (chaff), with a few gradually shorter ones forming an outer whorl (*Melanthera* has a 2-3 serate involucre according to Wild, 1965:48). The ray florets produce fully developed achenes that are thick and 3- (or 4-)angled and rather truncate and hirtellous at the top, as in *Lipochaeta*. Most of the disk florets produce well-developed angular achenes, but some are sterile, sporadically distributed in the head and tending to be rather peripheral rather than centrally concentrated as in *Lipochaeta*. The pappus consists of a single short but prominent awn (sometimes absent), as in some species of *Lipochaeta*.

Thus, *Wedelia biflora* seems very close to *Lipo-*

chaeta and, if the difference between fertile and sterile ray florets is important, less close to *Melanthera*, and if thick angular achenes versus plump but somewhat compressed ones is significant, less close also to *Wedelia*. Lumping the three genera into a single large genus would seem a not unreasonable possibility. However, at least until the several other Pacific island plants generally referred to *Wedelia* can be carefully studied, a more conservative course might be to transfer *Wedelia biflora* to *Lipochaeta*, which it strongly resembles, thus vastly extending the range of this genus usually considered endemic to Hawaii.

De Candolle, however, placed *Verbesina biflora* L. in his genus *Wollastonia*, an earlier genus of a small number of Old World species. This, though usually combined with *Wedelia*, seems altogether too close to *Lipochaeta* de Candolle. We do not find that a type has been designated for *Wollastonia* de Candolle in Decaisne. The genus was published by Decaisne in his account of Timor plants, ascribed to de Candolle as in the forthcoming volume of the *Prodromus* and briefly distinguished from *Wedelia* with just enough description to effect valid publication. Three species were listed, two of them briefly characterized, the other, *Wollastonia scabriuscula* de Candolle ex Decaisne, described in detail, and the "Observation" where the name *Wollastonia* is validated accompanies this species. It seems clear enough that this was the species that Decaisne principally had in mind and it is here designated lectotype of the genus. It must be noted, however, that Decaisne cited *Verbesina biflora* Blume (by indirect reference *Verbesina biflora* L.) in the synonymy of *Wollastonia scabriuscula*, making the latter nomenclaturally, as well as taxonomically, a synonym of *Wollastonia biflora* (L.) de Candolle.

Wollastonia scabriuscula is maintained by de Candolle in his *Prodromus* treatment, but reported from the Marianas, as well as from Timor, India, and several places in southeast Asia. The Marianas record certainly must have been based on the plant treated below as *Wollastonia biflora* var. *canescens*. This variety differs from var. *biflora* in its strongly canescent to almost sericeous foliage and shorter achenes. It was originally described by Gaudichaud as *Wollastonia canescens* and again as *Wollastonia argentea*.

In the de Candolle *Prodromus* Herbarium at Geneva are four sheets from Asia and two from

Timor labeled *Wollastonia scabriuscula* (Gaudichaud) de Candolle. All are exactly the plant generally known as *Wedelia biflora* (L.) de Candolle. The Timor material in the de Candolle herbarium must be regarded as syntypes of *Wollastonia scabriuscula*, since the first publication, by Decaisne, was in his account of Timor plants, except that by automatic typification (ICBN Art. 7, 63) the type must be that of *Verbesina biflora* L. As a result, *Wollastonia* de Candolle (1834), typified by the plant now usually called *Wedelia biflora* (L.) de Candolle, has two years priority over *Lipochaeta* de Candolle (1836). *Wedelia biflora* (L.) de Candolle (= *Wollastonia biflora* (L.) de Candolle) cannot be transferred to *Lipochaeta* de Candolle. Any transfer must be in the other direction if the two genera are combined.

Our object here is to establish the name of the widespread Indo-Pacific strand plant, so common in Micronesia. It seems better not to transfer the species of *Lipochaeta* to *Wollastonia* until Gardner's monograph is published. Then only the species that seem good in the light of his work need to be transferred. We are satisfied that, as the genera of the Helianthae are now delimited, at least part, and probably all, of *Lipochaeta* is congeneric with *Wollastonia*.

Wollastonia biflora (L.) de Candolle

Wollastonia biflora (L.) de Candolle, *Prodromus*, 5:546, 1836.
Verbesina biflora L., *Sp. Pl.*, ed. 2, 1272, 1763.

Widely distributed on strand and in lowlands in the Indo-Pacific region from East Africa to the Marshall Islands, Samoa, Tahiti, and the Cook Islands; also found in Rurutu and Rapa, where possible it is introduced.

Micronesian synonymy and references under var. *biflora*.

The species is quite variable but mostly in such superficial characters as density of pubescence, size and shape of leaves, toothed margins, number of heads in an inflorescence, and toothed ray apices. The achenes vary in size and shape; the size difference between the Marianas populations and those of the rest of Micronesia seems significant, especially when supported by the striking difference in pubescence. Hence we are recognizing two varieties of Micronesia, probably others occur in other parts of the vast range of the species.

Wollastonia biflora* (L.) de Candolle var. *biflora

Wedelia biflora (L.) de Candolle ex Wight, Contr. Bot. Ind., 18, 1834.

Wedelia aristata Lessing, Linnaea, 6:160, 1831.

Wollastonia scabriuscula de Candolle ex Decaisne, Nouv. Ann. Mus. Paris, 3:414, 1834; Prodr. 5:547, 1836.

Verbesina strigulosa Gaudichaud, Bot. Voy. Uranie, 463, 1826 [1829].

Wollastonia strigulosa (Gaudichaud) de Candolle ex Decaisne, Nouv. Ann. Mus. Hist. Nat., 3:414, 1834.

Wedelia strigulosa (de Candolle) Schumann, Bot. Jahrb., 9:223, 1888 (preprint 1887?) [de Candolle cited in error].

Stemmodontia biflora (L.) W. F. Wight in Safford, Contr. U.S. Nat. Herb., 9:377, 1905 [non sensu Wight].

Large sprawling, tangled or even loosely mat-forming herbs or plants slightly woody below, stems glabrous to hispidulous or shortly sparsely hirsute, irregularly sulcate when dry, strongly resinous; leaves opposite, ovate to broadly ovate, bases acute to obtuse or subcordate, slightly decurrent, apices acuminate, margins serrate, teeth tending to be uneven, main veins few, 3–5 plinerved appearing palmately 3-nerved from just above the base of blade, branch nerves anastomosing, network finer and finer, both surfaces finely strigose especially on veins, upper less so, general appearance green, petioles long, rather slender, leaves of sterile shoots often much larger and subcordate to cordate; heads in loose irregularly corymbiform panicles of several to 20 or more, about 2 cm across, phyllaries in 2 series, ovate or ovate-lanceolate, outer subfoliaceous; rays yellow, 6–10 or more, subentire or slightly toothed at apex, disk corollas with short tube, limb funnelform-campanulate to prismatic-campanulate, lobes deltoid, ray flowers with deeply bifid styles, disk becoming globose at maturity, achenes 2.5–4 mm long, those of the ray-flowers 3-angled, depressed in the center of the top, those of the disk cuneoid, 4-angled.

Known in Micronesia. From the Carolines: Palau, Sonsoral, Yap, Ulithi, Fais, Eauripik, Woleai, Faraulap, Ifaluk, Lamotrek, Satawal, Puluwat, Namonuito, Murilo, Nomwin, Truk, Nama, Losap, Namoluk, Etal, Lukunor, Satawan, Nukuoro, Kapingamarangi, Ant, Ponape, Mokil, Pingelap, Kusaie. From the Marshalls: Eniwetok, Bikini, Ailinginae, Rongelap, Ujelang, Ujae, Wotho, Lae, Kwajalein, Ailuk, Likiap, Aur, Ailinglapalap, Majuro, Arno, Namorik, Jaluit. From the Gilberts: Abaiang.

Detailed citation of Micronesian specimens as

well as ethnobotanical information will appear in the Flora of Micronesia treatment of the Compositae (Fosberg and Sacht, in press).

***Wollastonia biflora* var. *canescens* (Gaudichaud) Fosberg, new combination**

Verbesina canescens Gaudichaud, Bot. Voy. Uranie, 463, 1826 [1829].—Safford, Contr. U.S. Nat. Herb., 9:395, 1905.

Verbesina argentea Gaudichaud, Bot. Voy. Uranie, 463, 1826 [1829].

Wollastonia canescens (Gaudichaud) de Candolle, Prodr., 5:547, 1836.

Stemmodontia canescens (Gaudichaud) W. F. Wight in Safford, Contr. U.S. Nat. Herb., 9:377, 1905.

Wedelia canescens (Gaudichaud) Merrill, Phil. Jour. Sci. Bot., 9:155, 1914.

Wedelia argentea (Gaudichaud) Merrill, Phil. Jour. Sci. Bot., 9:155, 1914.

Wedelia biflora var. *canescens* (Gaudichaud) Fosberg, Phytologia, 5:291, 1955.—Fosberg, Falanruw, and Sacht, Smithsonian Contr. Bot., 22:43, 1975.

Stemmodontia biflora sensu Safford, Contr. U.S. Nat. Herb., 9:377, 1905 [non (L.) W. F. Wight in Safford, Contr. U.S. Nat. Herb., 9:377, 1905].

Verbesina biflora sensu Safford, Contr. U.S. Nat. Herb., 9:395, 1905 [non L., Sp. Pl. ed. 2, 1272, 1763].

Wedelia biflora sensu Safford, Contr. U.S. Nat. Herb., 9:398, 1905 [non (L.) de Candolle in Wight, Contr. Bot. Ind., 18 1834].

Wollastonia biflora sensu Safford, Contr. U.S. Nat. Herb., 9:399, 1905 [non (L.) de Candolle ex Wight, Contr. Bot. Ind., 18, 1834].

Differs from var. *biflora* in being vegetatively much more densely strigose and in its shorter, 1.5–2 (–3) mm long achenes. The density of the pubescence varies considerably. Actually, specimens can be selected exhibiting all degrees of hairiness from the silvery strigose plant described as *Verbesina argentea* Gaudichaud to the greenest extreme of var. *biflora*, perhaps a specimen (*St. John & Maireau 15464* (US)) from Rapa, at the southern extreme of the range of the species. However, in general, the Marianas populations are more densely strigose and all that we have studied in detail have small achenes, so we are continuing to maintain this variety. Examination of three collections from the Bonin Islands, kindly sent by Prof. Momiyama, Hahajima (*Sohma et al. 715173* (MAK); *Ono & Kobayashi* in 1971 (MAK); *Momiyama et al.* in 1972 (MAK)), shows that, though they are not conspicuously more hairy, the one mature achene present is 2.5 mm long. These plants, should probably

be associated with var. *canescens*. Far to the south, on the island of Rarotonga, Cook Islands, a specimen (Stoddart 2019 (US)) has likewise very small achenes, about 2 mm long, though vegetatively the plant is not unusually hairy. Further mature fruiting material is needed to make a firm disposition of this population. Flowering specimens seem to have unusually short ray florets.

In addition, two collections from Palau (Babeldaob, Hosokawa 7026 (BISH) and Angaur, Fosberg 25917 (US, BISH)) seem to belong here, as they are

markedly canescent and have rather small achenes. A further discussion of var. *canescens* may be found in Fosberg (1955:291).

Known in Micronesia. From the Marianas: Maug, Agrigan, Pagan, Alamagan, Guguan, Sarigan, Anatahan, Medinilla, Saipan, Tinian, Rota, Guam. From the Carolines: Palau: Babeldaob and Angaur.

Detailed citation of specimens and ethnobotanical information will appear in the Flora of Micronesia treatment of the Compositae (Fosberg and Sachet, in press).

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