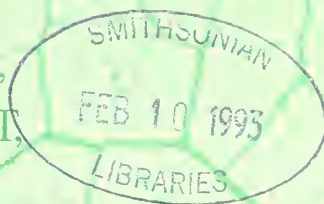


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Flora of Micronesia, 5: Bignoniaceae-Rubiaceae

RAYMOND E. FOSBERG,
MARIE-HÉLÈNE SACHET,
and
ROYCE E. OLIVER



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Flora of Micronesia, 5:
Bignoniaceae–Rubiaceae

*F. Raymond Fosberg, Marie-Hélène Sacht
and Royce L. Oliver*



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ABSTRACT

Fosberg, F. Raymond, Marie-Hélène Sacht, and Royce L. Oliver. Flora of Micronesia, 5: Bignoniaceae–Rubiaceae. *Smithsonian Contributions to Botany*, number 81, 135 pages, 1 figure, 1993.—The fifth installment of the Flora of Micronesia includes a brief introduction with acknowledgments and references to previously published parts of the flora. A floristic taxonomic account of the Bignoniaceae, Pedaliaceae, Gesneriaceae, Lentibulariaceae, Acanthaceae, Myoporaceae, Plantaginaceae, and Rubiaceae of Micronesia is given with descriptions, keys, synonymy, ethnobotany (including vernacular names and uses), and citations of geographic records and herbarium specimens.

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Flora of Micronesia, 5: Bignoniaceae–Rubiaceae

*F. Raymond Fosberg, Marie-Hélène Sachet,
and Royce L. Oliver*

Introduction

The fifth installment of the Flora of Micronesia treats eight families in the Engler system from the Bignoniaceae through the Rubiaceae. Of the families treated here, two, Pedaliaceae and Plantaginaceae, are entirely introduced, 1 species each. Bignoniaceae are represented by 16 genera, all introduced ornamentals, except one native species; Gesneriaceae by 4 genera, one native with 3 endemic species, and 3 introduced ornamental genera with one or two species each; Lentibulariaceae with a single genus in Micronesia with 4 probably native but widespread species; Acanthaceae with 14 genera, five of them with one or more native species, all but one of them also with ornamental or weedy species; Myoporaceae with one genus in Micronesia with a native but not endemic species; and Rubiaceae with 28 genera, 21 native, seven introduced, 17 exotic species, and many native, mostly endemic taxa.

This installment follows essentially the format of the first four (Smithsonian Contributions to Botany 20, 24, 36, and 46). Further and more complete bibliographic detail may be found in Sachet and Fosberg, *Island Bibliographies* (1955) and its supplement (1971), with annotations and a complete list of serial abbreviations.

For details of the history and circumstances of the present Flora of Micronesia, as well as an explanation of its scope and arrangement, reference may be made to the introductory pages of the first installment.

In specimen citations, the collector's name and number are italicized and the herbaria where they are deposited are indicated only if the specimen has been examined by the authors. Herbarium symbols are according to the 7th edition of *Index Herbariorum*, Part I, compiled by Holmgren and Keuken,

1981. These are in parentheses after the collection numbers, or, lacking numbers, the dates. The abbreviations "s. l.," "s. coll.," and "s. n." are used to indicate lack of collection locality, collector's name, or collector's number, respectively. We wish to thank again, the authorities of the various herbaria where we have studied or borrowed material, for the privilege of using their collections and for their hospitality.

As mentioned in the first installment, we cannot list all of the many persons who have helped us in the field, the herbaria, and in the office, and who have sent us specimens and information. We must, however, express our special appreciation to Mrs. Lenore Smith for typing first drafts of most of the manuscript from difficult handwritten copy, on a strictly volunteer basis. The untimely death of one of us, Dr. Sachet, in the middle of preparation of this installment, has slowed down the appearance of the work, and lowered the precision of references and proof-reading very seriously, though we have tried to live up to her standards as best we could.

We must acknowledge indebtedness for taxonomic help from the monumental *Flora Malesiana*, of Professor C.G.G.J. van Steenis, and from many revisions and monographs of difficult groups published in the journal *Blumea* under his editorship. We also have continued to benefit from the bibliographic work of Mrs. M.-J. van Steenis-Kruseman and William T. Stearn (1954), F.A. Stafleu (1967), F.A. Stafleu and R.S. Cowan (1976 et seq.), and also the *Flora Malesiana Bulletin*. In these works exact dates of publication of a great many works are established, interpreted, or clarified. Dr. Alwyn Gentry kindly looked over the manuscript of Bignoniaceae and made valuable suggestions.

Besides our own field work, the greater part of our information on the morphology, occurrence, distribution, and ethnobotany has come from herbarium specimens and their labels. Too seldom is appreciation expressed to the numerous collectors who have provided this vast store of data for use by their successors. We are glad to offer our thanks to them.

F. Raymond Fosberg, Marie-Hélène Sachet (deceased), and Royce L. Oliver, Department of Botany, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560

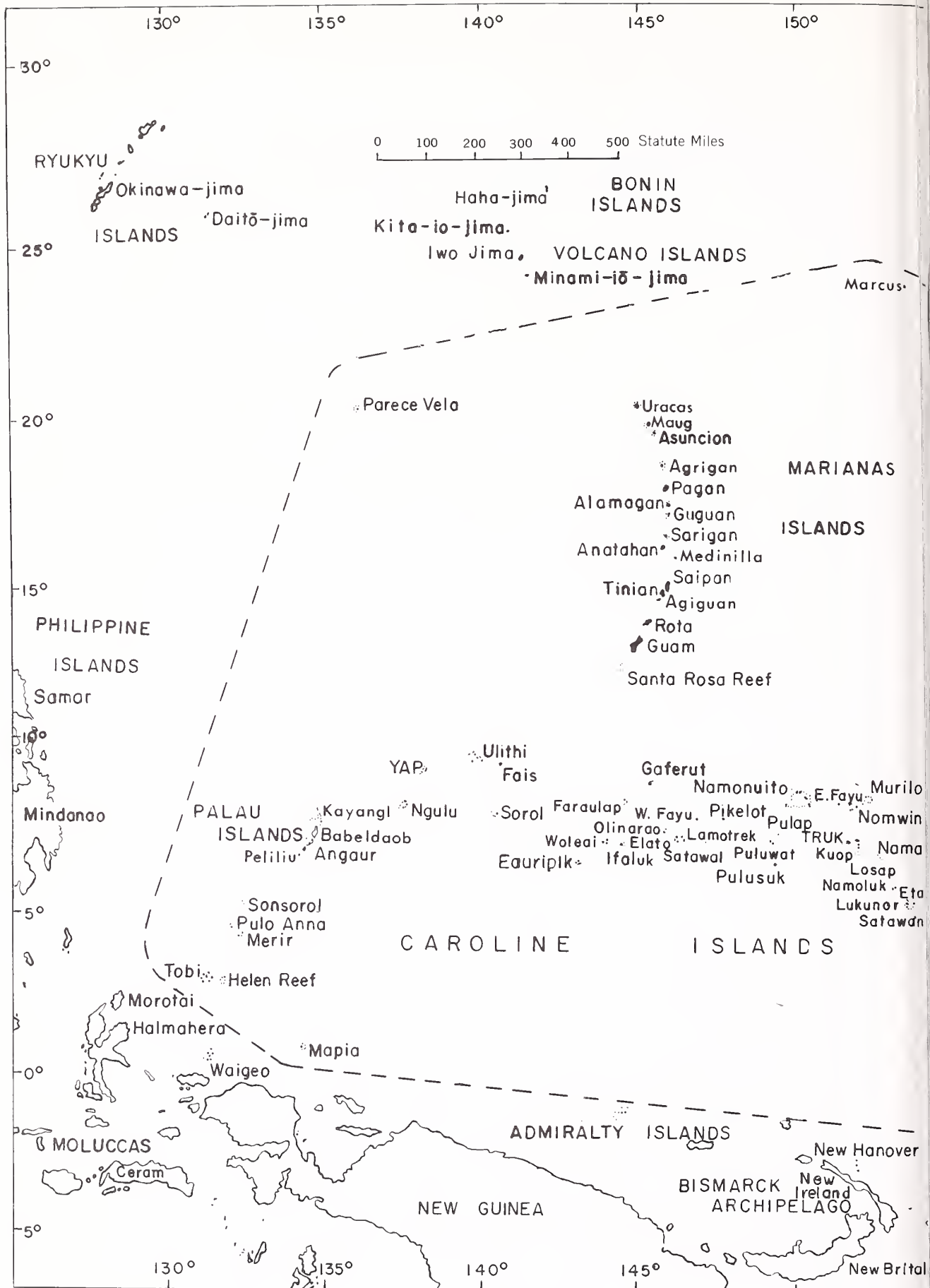
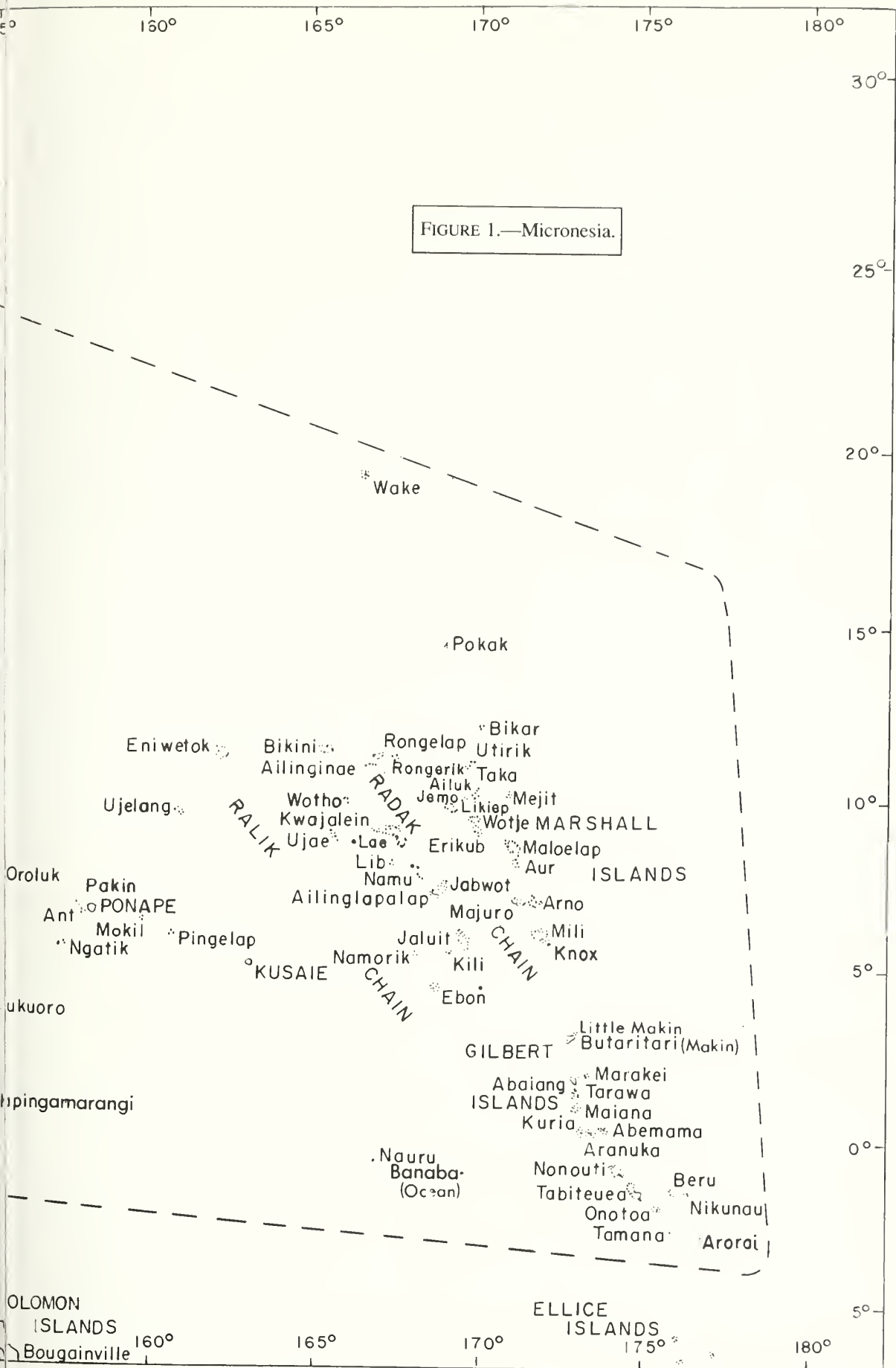
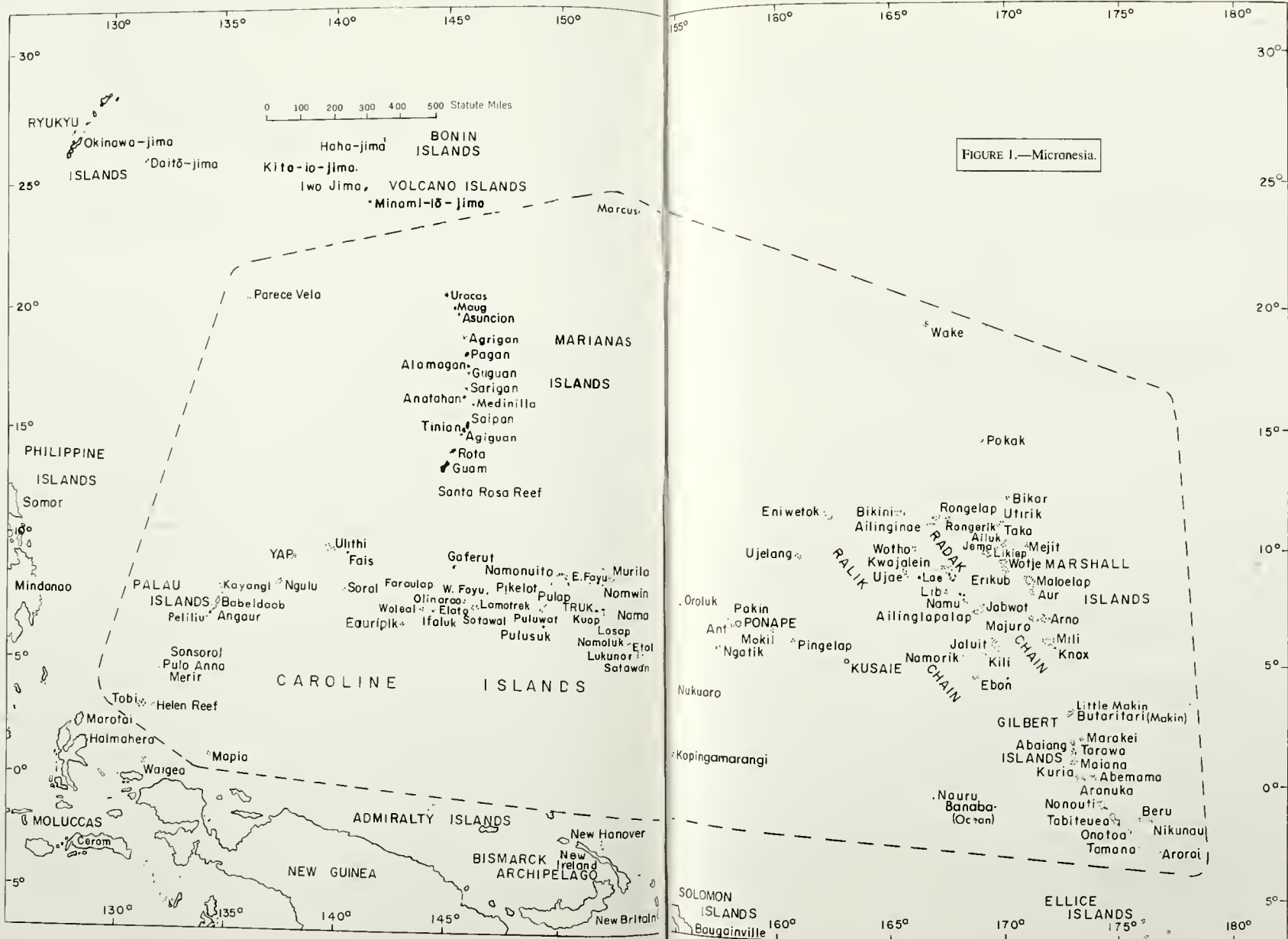


FIGURE 1.—Micronesia.





In the paragraph headed "Uses" under the various species, we have, where the material was not too verbose, copied more or less verbatim from field labels, field notes, published articles and books, but have used quotation marks only where they seem useful to clarify the source of the information. The sources are always provided, except in cases where the information is from our own personal knowledge.

Vernacular names are copied exactly from published sources, herbarium labels, and field notes, as we realize that many are different renderings of the same names, as heard by people of different linguistic backgrounds and experience. This necessarily results in more repetition. Sources are always given, and specimens cited where possible, but the interpretation is left to the reader, who may understand such things better than we can.

BIGNONIACEAE

Trees, shrubs, and lianas, rarely herbaceous; leaves opposite or whorled, rarely alternate, compound or rarely simple or unifoliolate, exstipulate but often with stipule-like prophylls

called pseudostipules; inflorescence cymose or racemose, rarely much reduced and then borne on trunk or larger branches; calyx gamosepalous; corolla gamopetalous, usually zygomorphic and bilabiate, usually 5-lobed, lobes usually imbricate in bud; stamens usually 4 with one staminode, inserted on corolla, rarely 2, with or without 3 staminodes, anthers usually 2-celled, the cells often one above the other; ovary superior, 1- or usually 2-celled, placentation axile or, in unilocular ovaries, parietal, style 1, stigma bilobed; fruit a 2-valved capsule or indehiscent, then large and fleshy or hard with fleshy pulp; seeds often winged.

A large, mostly tropical family with many ornamental cultivated genera.

The climbing genera are taxonomically difficult, some of them based on what seem to be very inconsequential or inconstant characters. Possibly too many genera are maintained. We are not prepared to rearrange them, however, and are generally following the identifications by Dr. Alwyn Gentry in various papers and in herbaria. Our key to these genera has been greatly improved by suggestions from Dr. Gentry.

Key to Micronesian Genera of Bignoniaceae

1. Trees or shrubs, leaves simple or compound, seldom trifoliolate (sometimes cross-shaped, with winged petiole), lacking special climbing apparatus, fruit various 2
2. Leaves simple 3
3. Leaves spatulate, in lateral fascicles, blades decurrent to base, flowers green, cylindric, foetid, fruit a large hard-shelled berry borne laterally on trunk or branches *Crescentia*
3. Leaves ovate to elliptic, petiolate, opposite or ternate, flowers white or pinkish, fragrant, fruit a linear capsule *Catalpa*
2. Leaves compound 4
4. Leaves cross-shaped with winged petiole, one or rarely two pairs of divaricate sessile leaflets, forming a single or double cross, a pair of reduced leaves at base of petiole, fruit a hard-shelled berry *Crescentia*
4. Leaves variously compound, petioles (except in *Parmentiera*) and rhachis not winged 5
5. Leaves palmately compound *Tabebuia*
5. Leaves trifoliolate or pinnately or bipinnately compound 6
6. Leaves bipinnate, leaflets about 1 cm or less long flowers purple, capsule at least half as wide as long *Jacaranda*
6. Leaves once pinnate or trifoliolate, flowers various, capsule much longer than wide 7
7. Leaves trifoliolate, flowers with spathe-like calyx, fruit fleshy, elongate, 1-2.5 cm thick *Parmentiera*
7. Leaves pinnate 8
8. Inflorescence long-pendent, corolla reddish brown, abruptly curved, broadened and campanulate just above tube, fruit indehiscent, fibrous-fleshy, sausage-shaped *Kigelia*
8. Not as above 9

9. Calyx several cm long, splitting and becoming spathe-like; leaflets entire, corolla large, if tubular-funnelform, then white 10
10. Corolla broadly campanulate, strongly curved, scarlet; fruit lanceolate, splitting down one side *Spathodea*
10. Corolla tubular-funnelform, white; fruit cylindrical; slightly compressed, splitting along two sutures . . . *Dolichandrone*
9. Calyx much smaller, not spathe-like, leaflets serrate, corolla not more than 4-5 cm 11
11. Leaflets, broadly ovate to orbicular, 1.5-2 cm long, corolla red, narrowly tubular-funnelform, curved, stamens and pistil well-exserted *Tecomaria*
11. Leaflets lanceolate, acuminate, several cm long, corolla bright yellow, straight, narrowly campanulate, lobes broadly flaring, stamens and pistil included *Tecoma*
1. Lianas or vine-like, leaves pinnate or trifoliolate, often with one or more leaflets modified for climbing, fruit capsular 12
12. Leaves pinnately compound *Tecomaria*
12. Leaves trifoliolate or bifoliolate 13
13. One foliole modified into claw-like hooks, flowers yellow, corolla tube broad *Macfadyena*
13. Claw-like hooks lacking, corolla not yellow 14
14. Leaflet ovate, acute or acuminate, tendril usually present and obviously trifid, corolla narrowly tubular-funnelform, lobes narrow, ovate, valvate 2; stamens exserted, fruit valves costate *Pyrostegia*
14. Leaflets various, tendril if present simple or inconspicuously trifid, corolla tubular-campanulate with rounded lobes, not orange, stamens included, capsule valves usually ecostate 15
15. Leaflets 2 or leaves simple, a tiny bromeliad-like group of pseudostipules or bud-scales around bases of some internodes, especially peduncles, capsule short, usually not over twice as long as wide, spiny *Clytostoma*
15. Leaflets 2 or 3, pseudostipules, if present, not as above, capsule linear or linear-oblong, smooth 16
16. Fruit valves costate, acuminate, plant with garlic odor when bruised or broken, calyx-limb flaring, corolla lavender *Mansoa*
16. Fruit valves not notably costate, odor when broken not alliaceous, calyx-limb not notably flaring 17
17. Inflorescence a twice or more trichotomous cymose panicle, leaflet bases rounded or broadly cuneate, pseudostipules inconspicuous or early caducous, tendril often present and conspicuous, limb whitish to pink or lavender *Cydista*
17. Inflorescence a few-flowered panicle; leaflet-bases narrowly cuneate, pseudostipules conspicuous, foliaceous, tendril, if present, not conspicuous corolla lobes magenta or rose-pink *Saritaea*

Catalpa Scopoli

Catalpa Scopoli, Intro., 170, 1777.

Trees deciduous or evergreen, leaves simple, opposite or ternate, petiolate; racemes or panicles terminal; corolla campa-

nulate, 2-lipped (or 5-lobed); stamens 2; style filiform, with 2 flat stigmatic lobes; fruit a linear capsule, dehiscent; seeds with a tuft of hairs at each end or villous all over.

About 13 species mostly in north temperate zone, Asia and North America, several West Indian species, one widely

planted as an ornamental in the tropics, occasional in the Marianas.

Catalpa longissima (Jacquin) Dumont de Courset

Catalpa longissima (Jacquin) Dumont de Courset, Bot. Cult., 2:190, 1802; Sims, Bot. Mag., t. 1094, 1808.—Stone, Micronesica, 6:529, 1971.—Souder, In Guam Gardens, 62, 1974.—Fosberg, Sachet, and Oliver, Micronesica, 15:251, 1979.

Bignonia longissima Jacquin, Enum. Fl. Carib., 25, 1760.

Small to medium tree, bark light gray, said to be occasionally deciduous in dry periods; leaves opposite and ternate, simple, petiolate, blades ovate or elliptic-lanceolate, obtuse to acuminate, 5–11 × 2–4 cm, margins entire, veins rather widely spaced, network fine and clear, inflorescence a small panicle, with a slender rhachis and branches, pedicels slender, 1–1.5 cm long, few flowers open at a time; calyx membranous, globose in bud, apiculate, splitting almost to base into 2 concave lobes; corolla white to pinkish, tube very short, throat 1.5 cm long, campanulate, purple and yellow lined within, limb very deeply lobed, lobes rounded; stamens and pistil included; capsule very slender, almost wire-like, to 60 cm long, valves thin but rather stiff, seeds thin, broadly linear acute at both ends, surface long villous.

Native of Antilles, widely planted, locally seen in Marianas, sparingly naturalized in Rota. English name "yokewood."

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Saipan: Garapan (planted?), 2 m, Fosberg 31782 (US, BISH, POM, NY, L); Capitol Hill, 150 m, Sachet 1814 (US).

Rota: NW coast road near Tatchog Pt., 3–4 m, Fosberg & Moore 58287 (US, BISH).

Guam: Andersen Field, 160 m, cult., Fosberg 35391 (US); SW side Barrigada Hill, Stone 4172 (GUAM); Mangilao, Teraoka & Sagawa 388 (BISH).

Clytostoma Miers ex Bureau

Clytostoma Miers ex Bureau, Adansonia, 8:353, 1868.

Woody vines with opposite branching, younger stems often ribbed or angled; leaves opposite simple, unijugate or trifoliolate with one leaflet represented by a tendril; flowers in umbels, racemes, or singly on short lateral branches; often bracteate; calyx cup-shaped or campanulate, tending to be 5-toothed; corolla large, showy, usually campanulate or tubular-funnelform, zygomorphic, lobes rounded, flaring, fruit oblong or oval, more or less compressed, covered with long stiff spines.

A Central and South American genus of lianes with showy flowers, one species sparingly cultivated pantropically as an ornamental.

Clytostoma callistegioides (Chamisso) Bureau ex Grisebach

Clytostoma callistegioides (Chamisso) Bureau ex Grisebach, Symb. Fl. Argent., 257, 1874.—Souder, In Guam Gardens, 53, 1974.

Bignonia callistegioides Chamisso, Linnaea, 7:712, 1882.

Vine with pale bark, stems 4-striate; leaves rarely simple and sub-sessile, usually a petiole, articulate to 2 petiolules, these articulate to elliptic to obovate blades, with a long tendril between them from summit of petiole; flowers large, lavender, showy, in few flowered racemes or long-pedicelled pairs terminally on short lateral branchlets, calyx with 5 linear teeth; corollas narrowly campanulate, throat quite variable in length, five large rounded spreading lobes.

A native of southern tropical America, occasionally cultivated, said to be planted in Guam, but we have not seen it.

Crescentia L.

Crescentia L., Gen. Pl., ed. 5, 274, 1754; Sp. Pl., 626, 1753.

Small bushy trees; leaves in fascicles, these alternate; flowers axillary, solitary or in clusters on trunk and branches; calyx 2-parted (or 5-lobed), corolla zygomorphic, tubular; stamens 4, didynamous; ovary 1-loculed; fruit globose, baccate with hard indehiscent rind; large seeds embedded in soft pulp.

A small tropical American genus, two species widely planted in the tropics, both in Micronesia.

Key to Micronesian Species of *Crescentia*

Leaves simple spatulate, gradually narrowed to base, sessile or subsessile *C. cujete*

Leaves compound, trifoliolate, cruciform (or rarely bijugate or simple), petiolate, petiole broadly winged *C. alata*

Crescentia alata Humboldt, Bonpland, & Kunth

Crescentia alata Humboldt, Bonpland, & Kunth, Nov. Gen. and Sp., 3:158, 1818.—Gaudichaud, Bot. Voy. Uranie, 70, 1826.—Safford, Contr. U.S. Nat. Herb., 9:250, 1905.—Merrill, Philip. Journ. Sci. Bot., 9:141, 1914.—Stone, Micronesica, 6:529–530, 1971.—Souder, In Guam Gardens, 66, 1974.—Fosberg, Sachet, and Oliver, Micronesica, 15:251, 1979.

Crescentia trifolia Blanco, Fl. Phil., ed. 1, 489, 1847.

Parmentiera alata (Humboldt, Bonpland, & Kunth) Miers, Trans. Linn. Soc., 26:166, 1868.

Small tree with slender, wand-like branches, very pale brownish; leaf arrangement unusual, basically alternate, but at most nodes 3 or more leaves, fasciculate, center one compound, trifoliolate (rarely pinnately 5-foliolate) with 3 spatulate leaflets from summit of a long alate narrowly spatulate petiole, the whole forming a cross, at the base of the petiole are two small stipule-like obovate entire leaves, these rarely replaced by diminutive trifoliolate leaves similar to the larger central ones, rarely mixed fascicles of both kinds (*Roszel s. n.*); rarely

the leaflets are acuminate rather than rounded at apex (*Evans 2300*); cauliflorous, flowers solitary, from trunk or larger branches, shortly pedicellate, calyx "2-parted," corolla campanulate, to 6–7 cm long, 2 cm wide, shortly lobed brownish to purplish, ill-scented; stamens 4, didynamous, staminode 1.5 cm long; fruit globose, with hard seeds in pulpy placenta.

Native of Mexico and Central America, occasional in cultivation in tropical countries; rarely planted in the Marianas as a curiosity, rarely apparently spontaneous. A tree of this species growing in the Bishop's yard in Agaña, was, by some, regarded as of religious significance because of its cross-shaped leaves.

VERNACULAR NAMES.—

cross tree (English: Souder, 1974)

cross tree (Guam: *Fosberg 43477*)

hekara (Guam: Safford, 1905)

hikara (Guam: *Whiting B1*)

jicama (Guam: *Safford & Seale 1012*)

jouaca (Guam: *Marche 287*)

kara (Guam: Gaudichaud, 1826; Merrill, 1914)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Saipan: Navy Hill, 250 m, *Evans 2300* (US, BISH, POM, NY).

Guam: Merrill, 1914:141; s. l., *G.E.S. 64* (US); *Marche 287* (P, POM); *Whiting B1* (US, POM); hill above Agaña, *Rodin 821* (US); Agaña Heights, planted in garden, 50 m, *Fosberg 43477* (US, BISH); *Safford & Seale 1012* (US); from Bishop's house grounds, *Roszel* in 1970 (US); Agaña Heights, *Smith 3* (US) in small gully near two roads down Manengon River in savanna, *Rhinehart (Raulerson's) 18542* (US, GUAM).

Crescentia cujete L.

Crescentia cujete L., Sp. Pl., 626, 1753.—Souder, In Guam Gardens, 66, 1974.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:251, 1979.—Fosberg et al., *Vascular Pl. Palau*, 39, 1980.

Small tree with long curved thick, nodose, unbranched branches coming out in different directions from a short trunk; leaves 15 × 3 cm (rarely 4) simple, oblanceolate with acute apices and long cuneate bases, nerves pinnate at a wide angle to midrib, occurring in fascicles of 1–7 leaves from tops of prominent alternately disposed nodes (possibly extremely reduced branchlets), bases among very small scale-like bractlets; flowers solitary or 2–3 on very short recurved pedicels emerging from tops of nodes on trunk and branches, buds globose, becoming broadly cylindrical, flowers reflexed, calyx 2.0–2.5 cm long 1.5 cm wide, splitting vertically into 2 strongly concave or gibbous lips, upper part faintly plicate or grooved and with sharply distinct dark sunken glands in linear patterns, corolla about 6 cm long, 2.5 cm wide, 1.5 cm thick, tubular-campanulate tube arched above, sharply cross-pleated

or gibbous, 1–8 mm above base on lower side, irregularly plicate longitudinally on each side and on lower side, externally abundantly sprinkled with white granule-like glands, light green lined with light maroon, sinuses 5, very prominently projecting, lobes erect, lacinate into several crispate lanceolate processes; stamens in 2 unequal pairs, anthers white, broad, V-shaped, the separate anther sacs pendent from summit of the strong filament; style subequal with corolla, stigma lobes 2, flat broadly elliptic, held erect face to face, exerted, white; fruits tending to develop on trunk and larger branches, very large, globose, becoming 15–25 cm in diameter.

Native of northern tropical America especially in semi-dry open areas. Known from Guam and Palau in Micronesia; cultivated as a curiosity and an ornamental; 2 or 3 trees known.

VERNACULAR NAMES.—

Calabash tree (English)

hikara (Guam: *Whiting B1*)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: Agaña Hts., *Whiting B1* (US, BISH); Agaña, planted ornamental, *Fosberg 59614* (US, POM, BISH); Agaña, 10 m, *Scully 195* (US).

CAROLINE ISLANDS.—Palau: Koror: *Blackburn E-86* (US, BISH); *Otobed 49* (US); *Cheatham 90* (US, BISH).

Cydista Miers

Cydista Miers, Proc. Roy. Hort. Soc. London, 3:191, 1863.

Vines or climbing shrubs; leaves opposite, leaflets 2, often with an unbranched tendril between them, inflorescence a terminal compound thyrsoid-dichasial panicle; calyx cup-shaped, truncate or slightly toothed margin; corolla narrowly funnelform campanulate, fruit a large, stiff, linear, dehiscent capsule without a longitudinal ridge or midrib.

Cydista aequinoctialis (L.) Miers

Cydista aequinoctialis (L.) Miers, Proc. Roy. Hort. Soc., 3:191, 1863.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:251, 1979. *Bignonia aequinoctialis* L., Sp. Pl., 623, 1753.

Extensive vine, lacking garlic odor, leaflets large, ovate, tendril simple often much exceeding leaflets; inflorescence a twice or more trichotomous terminal panicle; flowers funnelform, throat yellow within, brownish outside, lobes lavender or pink or whitish with purple markings; fruit a large stiff brown dehiscent strap-shaped pod; seed body small, wings extending several times its width.

Tropical American, cultivated in the tropics; said to have been planted in Guam, but probably only based on a misidentification of *Mansoa alliacea*, though *Cydista* may also have been introduced.

***Dolichandrone* (Fenzl) B. Seemann**

Dolichandrone (Fenzl) B. Seemann, Ann. Mag. Nat. Hist., series 3, 10:31, 1862; Journ. Bot., 1:226, 1863; 8:379, 1970 [nom. cons.].

Trees; leaves pinnate or unifoliolate, opposite, whorled or alternate; calyx spathe-like, clavate, splitting down one side, corolla large, tubular-funnelform, stamens 4 fertile, one staminode; capsule elongate terete or flattened, eventually dehiscent, septum narrow, false-septum wide parallel to capsule valves; seeds winged.

Nine species in Old World tropics, Africa to western Pacific, one widespread, mangrove-associated, reaching western Carolines.

***Dolichandrone spathacea* (L. f.) K. Schumann**

Dolichandrone spathacea (L. f.) K. Schumann, Fl. Kaiser Wilh., 123, 1889.—Volkens, Bot. Jahrb., 31:475, 1901.—Kanehira, Fl. Micr., 346, 1933; Enum. Micr. Pl., 411, 1935.—Hosokawa, Bull. Biogeogr. Soc. Jap., 7:200, 1937.—Okabe, Nankyo, 2:48, 1943.—van Steenis, Pacific Plant Areas, 1: map 1, 1963; Fl. Malesiana, 8:142, 1977.—Fosberg, Sachet, and Oliver, Micronesica, 15:252, 1979.—Fosberg et al., Vascular Pl. Palau, 39, 1980.

Bignonia spathacea L. f., Suppl. 283, 1781.

Tree to 10 m; leaves opposite, leaflets 7–9, glabrous, variably ovate, even or uneven at base, strongly acuminate, petiolulate; inflorescence a terminal very short decussate few-flowered raceme, becoming woody and thick at fruiting; calyx cylindrical or clavate, 3–6 cm long, obtuse and glandular at apex (in Micronesian specimens, and some from other areas beaked), splitting distally and becoming spathe-like as corolla elongates; circumscissile caducous at base; corolla white, 12–20 cm long tubular funnelform, tube to 12 cm long, about 1 cm thick, flaring to funnel-form, in distal 10–12 cm, the 5 rounded crispate lobes spreading to 10 cm; stamens included; style with stigma somewhat exserted; fruit cylindrical, somewhat compressed, 22–75 × 2–3 cm, hard, valves and pseudoseptum stiff; seeds rectangular the wings stiff and square at ends, the whole to at least 7–20 mm, body of seed about 5 × 10 mm, one side notched, the other obtuse, flat, the combined stiff wings encircling the whole.

Found throughout Malesia, extending westward to India and Ceylon, the east Bengal coast and southern Indo-China, and eastward to Palau and Yap, Solomon Islands, New Hebrides and New Caledonia. It occurs around the back of the mangrove swamp and up to 6–8 m elevation. Its seeds seem adapted to both wind and water dispersal.

The only indigenous member of the Bignoniaceae in Micronesia.

USES.—Red capsules used for chewing, mixed with lime (Koror: *Kanehira* 132). Leaf and fruit used as substitute for *Piper betle* in chewing betel nut (Koror: *Fosberg* 32104). For framboesia: Bark of “ririu” and young stem and flower-stalk of “gatung” (*Croton* sp.) are squeezed together, the sap put into

heated coconut oil, which is applied when cooled to the affected part (Yap: Okabe, 1943).

VERNACULAR NAMES.—

narin (Koror: *Fosberg* 32104)
riu (Palau: Kanehira, 1935)
ririu (Palau: Fosberg et al., 1980)
ririu (Yap: Okabe, 1943)
riyou (Yap: *Cushing* 634)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Babeldaob: Arekalong, *Takamatsu* 1694 (BISH); Ngardok (or Garudoppu), *Takamatsu* 1319 (BISH); Melekiok, *Takamatsu* 1384 (BISH); Marikyoku, *Kanehira* 380 (FU), 2032 (FU); Arumonogui, near Arumaten, *Hosokawa* 6742 (US). Koror: *Emmons* 9 (US); *Kanehira* 132 (FU); Madmoduk Islet, W of Koror, *Stone* 1288 (GUAM). Ngerabe'ed, *Fosberg* 32104 (US, BISH, POM, NY); Iubukle, *Fisher* 50 (US).

Yap: Map, *Takamatsu* 1896 (BISH); Guror, *Stemmermann* 3178A (BISH, 2 sheets); strand forest, *Kanehira* 1191 (FU, 2 sheets); *Kanehira & Hatusima* 4321 (FU); Tomil I., 25 ft [7 m], *Hosaka* 3272 (US, BISH, POM, NY, L); clay soil 15 ft [4 m], *Wong* 499 (US); Moloai, *Hosokawa* 8994 (US); Mer Peninsula, E of Yap, sea level, *Cushing* 634 (US); 15 ft [4 m], *Wong* 499 (US).

***Jacaranda* Jussieu**

Jacaranda Jussieu, Gen. Pl., 138, 1789.

Trees, evergreen or deciduous; leaves opposite, usually bipinnately compound, leaflets many, small; flowers paniculate mauve; panicles axillary or terminal; corolla small, campanulate; capsules broadly oval, orbicular or oblong, woody, dehiscent, 2-celled; seeds many, winged.

A widespread tropical American genus commonly planted in tropics and subtropics as an ornamental.

***Jacaranda mimosaeifolia* D. Don**

Jacaranda mimosaeifolia D. Don, Bot. Reg., t. 631, 1822.

Jacaranda filicifolia D. Don, Edinb. Phil. Journ., 266, 1823.—Fosberg and Sachet, Atoll Res. Bull., 92:34, 1962.—Fosberg, Sachet, and Oliver, Micronesica, 15:252, 1979.

Jacaranda acutifolia sensu auct. [non Humboldt & Bonpland, Pl. Aequin., 1:59, t.7, 1806].

Tree to 15 m, evergreen or briefly deciduous; leaves with 12–15 more pairs of pinnae, each with many elliptic to obliquely ovate or oblong small sharply acuminate or aristate leaflets; flowers in much-branched terminal panicles, calyx small, cup-shaped, 5-toothed; corolla narrowly campanulate, 3–6 cm long, somewhat ventricose on one side, densely and finely puberulent without, 5 lobed, lower lobe densely woolly pilose within; larger capsule to 6 cm across, apex rounded or

subtruncate, seeds many, with 2 transparent wings.

In Micronesia known only from a report of a plant in the garden on Jaluit, and from a collection from a Forest Department planting on Guam.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: Cotal, planted, seeds said to be from Palau (probably in error), *Fosberg 59715* (US).

MARSHALL ISLANDS.—Jaluit: *Fosberg & Sachet*, reported as seen by Mackenzie (pers. comm., 1962).

Kigelia de Candolle

Kigelia de Candolle, *Bibl. Univ. Geneve*, series 2, 17:135, 1838.—Steenis, *Fl. Males.*, 1, 8, 183, 1977.

Trees, leaves opposite or 3 at a node, imparipinnate, leaflets large, inflorescence a long peduncled open panicle, pendulous; flowers large, calyx 2(-5) lobed, 5 ribbed, campanulate; corolla bilabiate, tube short, throat campanulate, curved, leathery, glabrous; upper lip 2-lobed, lower 3-lobed deflexed, lobes somewhat obovate; stamens 4, didynamous, staminode 1; disk 5-lobed, thick; ovary 1-loculed, 2 parietal placentae; fruit more or less cylindrical or ellipsoid, large, indehiscent, a fibrous pulp within; seeds thick, wingless, embedded in pulp, testa woody.

As many as 18 species have been described in this widespread African genus. Various authors disagree on how many there are and how they are distinguished. At least two species exist, one maroon- and one yellow-flowered (fide Gentry in litt.). The widespread cultivated species has been called *K. africana* and *K. pinnata*. Perhaps two species are involved, as different looking individuals are seen in cultivation, but the maroon-flowered plants show no taxonomically recognizable differences in Africa (fide Gentry). Most herbarium specimens are too poor to help much. Van Steenis (loc. cit.), has concluded that the genus has only one variable species. Until more reliable information is available, we choose to follow him and call the famous "sausage tree" *Kigelia africana*.

It is said to have been planted in Guam, but we have seen no specimens from there. It will doubtless be planted in Micronesia if it has not already been.

Kigelia africana (Lamarck) Benth

Kigelia africana (Lamarck) Benth in Hooker, *Niger Fl.*, 463, 1849.—Steenis, *Fl. Males.*, 1, 8:183, 1977.

Bignonia africana Lamarck, *Encycl. Meth.*, 1:424, 1785.

Crescentia pinnata Jacquin, *Coll.*, 3:203, t. 18, 1791.

Kigelia pinnata (Jacquin) de Candolle, *Biblioth. Universalle Geneve*, II, 17:135, 1838; *Prodr.*, 9:247, 1845.

Spreading tree with large pinnate leaves, large oblong-

elliptic leaflets, rounded, subserrate at apex; panicles hanging as long as 60 cm loose; flowers dark maroon-red; fruit hanging vertically, to 40 cm or more long, cylindrical with rounded ends, a rough somewhat scabby surface.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

MARIANAS ISLANDS.—Guam: former Dededo Arboretum, *Scully & Null 158* (US).

Macfadyena A. de Candolle

Macfadyena A. de Candolle, *Prodr.*, 9:179, 1845.

Doxantha Miers, *Proc. Roy. Hort. Soc.*, 3:188-190, 1863.

Woody vines; roots tuberiferous; leaves opposite, leaflets 2, a 3rd represented by a 3-clawed organ ("uncate tendril"), much smaller in juvenile slender plants, which are closely appressed to tree trunk or other sub-stratum; "pseudostipules" small, ovate or lanceolate; inflorescence a much reduced axillary cyme; calyx membranous, campanulate, corolla glabrous, tubular-campanulate, limb bilabiate, 5-lobed; fruit a linear strongly flattened capsule, valves parallel to septum, with slightly raised mid-nerve; seeds thin, winged, wings not sharply distinct from seed-body.

A small tropical American genus, one species widely planted as an ornamental, known in Micronesia at least from Guam and Truk. In the past usually called *Doxantha* Miers.

Macfadyena unguis-cati (L.) Gentry

Macfadyena unguis-cati (L.) Gentry, *Brittonia*, 25:236, 1973.

Bignonia unguis-cati L., *Sp. Pl.*, 623, 1753.

Doxantha unguis-cati (L.) Miers, *Emend. Rehder, Mitt. Deutsch. Dendrol. Ges.*, 1913:262, 1913.—Souder, *In Guam Gardens*, 53, 1974.

Much-branched tangled vine, clambering by its claw-like "tendrils," when young small-leaved and clinging close to substratum; rooting at nodes; mature leaflets ovate, acuminate, to 16 × 7 cm, usually smaller, membranous, uncate tendril 1-3 cm long, 3 arms stiff and hooked; axillary panicles reduced to 3 or even 1 flower; calyx membranous, margin sinuate; corolla tubular-campanulate, yellow, somewhat dorsiventrally flattened, plicate on lower side, lobes rounded; stamens didynamous; fruit an elongate linear flattened capsule, seeds several times as wide as long, wings membranous, blunt-ended.

Springily planted in Micronesia, does not ordinarily set fruit in cultivation. Reported from Guam, collected only on Truk.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

CAROLINE ISLANDS.—Truk: Moen: Moen village, *Fosberg 60330* (US, BISH, POM). A sterile juvenile collection.

Mansoa de Candolle

Mansoa de Candolle, *Bibl. Univ. Geneve.*, 17:128, 1838.

Pachyptera de Candolle ex Miesner, *Gen.*, 1:299, 2:207, 1840.

Pseudocalymma Sampaio and Kuhlmann in O. Campo, Rio de Janeiro, 4(11):15, 1933.

Woody vines with strong alliaceous odor, leaves opposite, with petiole articulated to 2 petiolules, which are articulated to large leaflets, on some leaves a branched tendril between leaflets, inflorescence racemose on small lateral branchlets; corolla narrowly campanulate, limb flaring; fruit linear, dehiscent, "midrib" or low keel or ridge, median lengthwise on each side.

A small tropical American genus of 15 species one widely cultivated.

Mansoa hymenaea (de Candolle) Gentry

Mansoa hymenaea (de Candolle) Gentry, Ann. Mo. Bot. Gard., 66:782, 1979 [1980].

Bignonia hymenaea de Candolle, Prodr., 9:158, 1845.

Pseudocalymma alliacea sensu auct. pl. non (Lamarck) Sandwith, Rec. Trav. Bot. Neerl., 34:210, 1937.—Fosberg, Sacht, and Oliver, Micronesica, 15:252, 1979.—Fosberg et al., Vascular Pl. Palau, 38, 1980.

Extensively climbing liana, bark pale; leaflets ovate to elliptic, tendril present or absent, blade thinly stiff-coriaceous; racemes on short lateral branchlets, loose or condensed, rarely somewhat branched, pedicels filiform 1 cm or shorter; calyx cup-shaped, distal third or half flaring, margin slightly sinuate, shortly ciliate; corolla 5–6 cm long, lavender, broadening upward, limb flaring to 4–5 cm wide, lobes round; ovary prismatic strongly ribbed; fruit flat, 15 × 1.5 cm, with a clear longitudinal rib, acuminate; seed thin, body trapezoidal about 8 × 8 mm, with a wide thin rounded wing on each side extending about 1 cm.

Local name "galick" or garlic vine, from its strong alliaceous odor when broken.

Originally from tropical America, but widely cultivated; known in Micronesia from Guam and Palau.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: Agaña Spring, 20 m, *Evans 1709* (US); Agaña Heights, 50 m, *Fosberg 43475* (US).

CAROLINE ISLANDS.—Palau: Koror: Ngerbeched, *Rekoi 2* (US).

Parmentiera de Candolle

Parmentiera de Candolle, Biblioth. Universelle Geneve, series 2, 17:135, 1838.

Trees; leaves opposite (to subopposite), palmately compound, leaflets 3–5, petiolulate; flowers solitary or fasciculate, mostly cauliflorous on old wood, calyx spathe-like, split ventrally; corolla white or greenish white, campanulate to funnel-form, usually transversally plicate across lower side of throat; stamens 4 sub-exserted; fruit indehiscent, cylindrical, fleshy; seeds small, wing vestigial.

A small tropical American genus, of eight species, one

widely cultivated, once found in Guam.

Parmentiera cereifera Seemann

Parmentiera cereifera Seemann, Bot. Voy. Herald, 182, t. 32, 1854.—Souder, In Guam Gardens, 69, 1974.

Small spineless tree; often with several trunks; leaves opposite or subopposite, rarely in whorls of 3 or 4, trifoliolate with slightly winged petiole, lateral leaflets elliptic to ovate, terminal elliptic to slightly obovate, apex acuminate, margins of both entire when tree is mature, when juvenile coarsely serrate; flowers solitary or 2 or 3 on dwarf branchlets on old wood or trunk, "cauliflorous," calyx spathe-like, 2–5 cm long; corolla white, tubular, 3.7–6.4 cm long, glabrous, lobes about 1 cm long; fruit elongate, subterete, indehiscent, waxy-glabrous, yellow, hanging vertically, to 1 m long, 1–2.5 cm thick; seeds 3–4 cm long and wide, narrowly winged.

Widely planted in the tropics, native of Panama; 1 or more trees persisting in the abandoned Dededo Arboretum on Guam. English common name "candle-tree."

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

MARIANAS ISLANDS.—Guam: Dededo Arboretum, 110 m, *Null & Scully 132* (US).

Pyrostegia K.B. Presl

Pyrostegia K.B. Presl, Abh. Konigl. Bohm. Ges. Wiss., series 5, 3:523, 1845.

Climbing shrubs or vines, stems 5–6 angled, leaves with 2 leaflets, with or without a central tendril, this often trifid; inflorescence paniculate; calyx cup-shaped, 5-denticulate, corolla narrowly tubular-funnelform; stamens with anthers exserted; ovary linear, 4-angled; fruit linear, compressed, valves parallel to septum, median nerve somewhat prominent; seeds thin, with 2 thin wings, margins hyaline.

A small South American genus; one species widely cultivated in the tropics as an ornamental, said to be planted in Guam.

Pyrostegia venusta (Ker-Gawler) Miers

Pyrostegia venusta (Ker-Gawler) Miers, Proc. Roy. Hort. Soc., 3:188, 1863.

Bignonia venusta Ker-Gawler, Bot. Register, pl. 249, 1818.

Bignonia ignea Vellozo, Fl. Flum., 244, 4, pl. 15, 1825.

Pyrostegia ignea (Vellozo) K. Presl, Bot. Bemerk., 93, 1844.—Souder, In Guam Gardens, 53, 1974.

Extensive vine; branchlets somewhat angled and puberulent; leaves opposite, with 2 ovate acuminate leaflets, sometimes with a tendril, between them, proximally straight, then strongly coiled, then trifid, the branches capillary; flowers in cymose panicles, terminal or on short lateral branches, pedicels slender, 5–15 mm long, often appearing longer, as node is inconspicu-

ous, panicle-branches have tiny bractlets; calyx cup-like, truncate or denticulate; corolla to 6.5 cm long, slender, narrowly funnelform, tending to be rectangular in transverse section, lobes bright reddish orange, small, ovate; anthers exserted, stigma also; capsule linear 25–30 × 1.5 cm; seeds about 1.2–1.4 cm long, 4–4.5 cm wide, prominently winged.

English common name "orange trumpet vine."

Present but not commonly planted in Guam.

Saritaea Dugand

Saritaea Dugand, *Caldasia*, 3:262, 1945.

Lianas, branchlets terete; "pseudostipules" foliaceous; leaves bifoliolate, often with a simple tendril; calyx cupular, truncate; corolla tubular-campanulate; ovary cylindrical, ovules 2-seriate in each locule; capsule linear, compressed, valves parallel to septum; seeds thin, bialate.

A genus of one species, native of Colombia, widely cultivated.

Saritaea magnifica (W. Bull) Dugand

Saritaea magnifica (W. Bull) Dugand, *Caldasia*, 3:263, 1945.

Bignonia magnifica W. Bull, *Gardn. Chron.*, 12:72–73, f.9, 1879.

Arrabidaea magnifica (W. Bull) Sprague ex v. Steenis, *Rec. Trav. Bot. Neerl.*, 24:830–831, 1927; in adnot. *Bull. Jard. Bot. Buitenz.*, series 3, 10:191, 1928.—Souder, *In Guam Gardens*, 53, 1974.

Scrambling to climbing woody liana, twigs subterete; leaflets 2, obovate, obtuse, base cuneate, blade 5–12 × 3–6 cm; inflorescence a few-flowered terminal cymose panicle; calyx truncate; corolla tubular-campanulate, 8–10 cm long, lobes very large, spreading, orbicular, to 3 cm long, bright rose-purple (or "lavender"); fruit linear, compressed, 10–22 × 1 cm, midrib not raised; seeds with membranous hyaline wings.

Said to be planted in Guam, but we have seen no specimens.

The parenthetical author of this name is usually cited as Sprague ex van Steenis. The basionym, *Bignonia magnifica* Bull., is not cited on *P 830* by van Steenis, but is added in a footnote on the next page. Therefore the parenthetical citation should be Bull. William Bull was a prominent English horticulturist and nurseryman.

Spathodea Beauvois

Spathodea Beauvois, *Fl. Oware*, 1:46, 1805.

Trees with opposite (rarely ternate) large odd-pinnately compound leaves, with oppositely disposed leaflets; inflorescence a crowded bracteate raceme, flowers on thick pedicels bearing 2 bractlets near the summits; calyx spathiform, completely united in bud, splitting dorsally from the apex to near the base; corolla very strongly zygomorphic, gibbous just above the short tube, 5-lobed, laterally compressed; stamens in 2 pairs, inserted at the summit of the corolla tube, one pair

slightly shorter and inserted just above the other, anther versatile, shortly exserted between the upper two lobes; disk entire, cup-shaped, closely surrounding the ovary; pistil with a small ovary, style somewhat exceeding stamens, stigma of two flat lobes; fruit a stiff lanceolate or narrowly oblong capsule somewhat flattened and splitting down one side; seeds thin, surrounded by a broad transparent thin membranous wing.

An African genus of one or two species, one (or both) are cultivated, planted in most tropical countries, becoming naturalized.

Spathodea campanulata Beauvois

Spathodea campanulata Beauvois, *Fl. Oware Afr.*, 1:47, 1804.—Glassman, *Bish. Mus. Bull.*, 209:102, 1952.—Stone, *Micronesica*, 6:530, 1971.—Randall and Tsuda et al., *Univ. Guam Mar. Lab. Tech. Rept.*, 12:24, 1974.—Souder, *In Guam Gardens*, 62, 1974.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:252, 1979.—Fosberg et al., *Vascular Pl. Palau*, 39, 1980.

Large tree with a stout, tapering often somewhat buttressed trunk, branches thickish, marked with small white lenticels, subglabrous to thinly puberulent; leaves usually opposite (rarely 3 at a node), very widely diverging, up to 50 cm long, (7–) 11–15 (–17) leaflets broadly elliptic or ovate, entire, to 15 × 7.5 cm, with 7–8 principal veins on each side, puberulent and prominent beneath, apex very slightly acuminate, base somewhat asymmetrically obtuse, lower leaflets tending to be reflexed, petiolule short, 2–3 mm, rachis nearly straight, brownish-puberulent, petiole up to 6 cm long, thickened at base; raceme 8–10 cm long on a peduncle of about the same length, with a pair of reduced leaves about halfway up, rachis and pedicels thick, brownish puberulent, bracts subtending pedicels lanceolate, curved, about 1 cm long, caducous, pair of bractlets near summit of pedicel similar, opposite; calyx strongly curved upward, asymmetric, about 5 cm long, tapering, somewhat ribbed, splitting at anthesis to within a few mm of base along dorsal curve, apex horn-like, blunt, exterior brownish sericeous puberulent; corolla bright vermilion or scarlet, 10–12 cm long, mouth of limb about 7 cm across, lobes about 3 cm long, obtuse, margins strongly crispate, orange-yellow; filaments about 5 cm long, dull orange anthers arcuate, linear, very dark brown, 15 mm long; style yellow, 8 cm long, stigma reddish; capsule lanceolate, slightly compressed, 17–25 × 3.5–7 cm.

Pantropical cultivated tree, native to West Africa; commonly planted in Micronesia, naturalized locally, its scarlet flower clusters very showy.

VERNACULAR NAMES.—

African tulip tree (English)

fireball (English)

tulipier du Gabon (French)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—s. 1., *Nelson 554* (BISH); Guam: NW of Barrigada Hill, *Stone 4179* (US, GUAM); Machanao, 150 m,

Evans 1764 (US, BISH, POM, NY, L); *Moran 4531* (UC, POM); Piti, *Winebrenner 69* (BISH).

CAROLINE ISLANDS.—Palau: Koror: Topside, *Emmons 39* (US, BISH); *Otobed 50* (US).

Truk: Moen: Near hotel, 50–100 m, *Evans 753* (US, BISH, POM, NY); administrative area, *Daniells 93* (US); Moen village, *Fosberg 60351* (US, BISH, POM); Gov. Hill area, 20 m, *Grimm 312* (US).

Ponape: Vicinity of Kolonia, sea level, *Glassman 2872* (US).

MARSHALL ISLANDS.—Kwajalein: Kwajalein I., 0–4 m, *Fosberg 48050* (US).

NAURU ISLAND.—Danigomodu, W side of island, *Fosberg 58682* (US, BISH).

Tabebuia Gomes ex de Candolle

Tabebuia Gomes ex de Candolle, Obs., 2:7, t. 2, 1803.

Cybastax Mart. ex Meissner, Pl. Vasc. Gen., 1:300; 2:208, 1840.

Roseodendron Miranda, Biol. Soc. Mex., 29:42, 1965.

Shrubs or more usually trees, reaching a very large size; leaves opposite, digitately compound with 3–7 leaflets, or sometimes unifoliolate, often lepidote; inflorescence a terminal panicle or raceme or reduced to a single flower, calyx variously cupulate, tubular or campanulate, truncate to lobed or bilabiate; corolla tubular-funnelform to narrowly campanulate; ovary linear-oblong, ovules 2-multiseriate; fruit a capsule, linear to oblong, dehiscent perpendicular to septum; seeds winged or not.

A large tropical American genus found in various habitats, prominent in dry forests. A number of species are cultivated as ornamentals and some are important timber species. Several have been reported from Micronesia, one of them quite widely planted.

Key to Micronesian Species of *Tabebuia*

1. Leaflets thin or chartaceous, acuminate, cordate at base, flowers bright yellow, in ample panicles, which are glandular puberulent *T. donnell-smithii*
1. Leaflets thinly coriaceous to coriaceous, mostly obtuse, flowers yellow or rose-purple, in relatively small glabrous panicles 2
2. Leaflets mostly 10 cm or more long, 5–7, petiolules thick, flowers yellow, in relatively few-flowered corymbiform panicles *T. aurea*
2. Leaflets mostly less than 10 cm long, mostly 2–5, on slender petiolules, flowers rose or purplish 3
3. Leaflets coriaceous, usually obtuse, varying to bluntly acute or rarely somewhat bluntly acuminate, base acute, not conspicuously jointed to petiolule *T. heterophylla*
3. Leaflets chartaceous to subcoriaceous, apices acuminate, petiolule appearing slightly dorsally at-

tached, extreme base of blade very shortly sulcate at attachment *T. rosea*

Tabebuia aurea (Manso) Bentham & Hooker ex Moore

Tabebuia aurea (Manso) Bentham & Hooker ex Moore, Tr. Linn. Soc. London, II, 4:423, 1895.

Bignonia aurea Manso, Enum. Subot. Braz., 49, 1836.

Tecoma aurea (Manso) de Candolle, Prodr., 9:222, 1845.

Tabebuia caraiba (Martius) Bureau, in Kongl. Vet. Sw. Acad., 112, 1893.

Tecoma caraiba Martius, Fl. Bras., 2:24, 1841.

Tabebuia argentea (Bureau and K. Schumann) Britton, Sci. Survey P.R. and Virgin Is., 6:197, 1925.—Souder, In Guam Gardens, 62, 1974.

Small to medium tree, bark pale; leaves opposite, palmately compound, leaflets 5–7, on long petiolules, oblong-lanceolate to broadly oblong or elliptic, apices obtuse, bases acute or obtuse to subcordate, blades coriaceous, pale green; flowers in terminal corymbiform thyrsoid panicles, 1–3 times branched, branches stout, strongly ascending; calyx 1–1.5 cm long, funnelform-campanulate, lobes rounded to obtuse, somewhat spreading; corolla narrowly funnelform, bright yellow, 6–8 cm long, limb 4–5 cm wide, lobes rounded, sinuses deep; stamens and style included; fruit a smooth narrowly fusiform strongly beaked capsule to 9 cm long, seeds winged, much wider than long, body compressed, plano-convex, irregularly oblong, about 1 × 1.5 cm, wings hyaline, membranous, ends rounded, about 10–12 mm long.

A planted ornamental, native of South America, reported from Guam, but no specimens seen by us.

Tabebuia donnell-smithii Rose

Tabebuia donnell-smithii Rose, Bot. Gaz., 17:418, pl. 26, 1892.—Souder, In Guam Gardens, 62, 1974.

Cybastax donnell-smithii (Rose) Seibert, Publ. Carnegie Inst. Wash., 522:392, 1940.

Roseodendron donnell-smithii (Rose) Miranda, Bol. Soc. Bot. Mex., 29:142, 1965.

Large tree, deciduous or semi-deciduous, trunk pale, leaves opposite, palmately compound, leaflets 4–7, long-petiolulate, blades broadly oblong, to 15 × 8 cm, apex acuminate, base cordate, margin subentire to subrepand, somewhat woolly at base of midrib; flowers in large glandular-pubescent panicles, bright golden yellow, calyx campanulate, somewhat irregular, to 2 cm long, tomentulose, margin unevenly lobed, longer on one side; corolla tubular, to 3 cm long, limb of 5 spreading rounded lobes, glandular puberulent, stamens in 2 connivent incurved pairs, about the length of narrow part of corolla tube; style subequal with stamens; fruit a longitudinally ribbed subterete capsule 15–25 cm long, dehiscent; seed small, surrounded on 3 sides by a broad extremely thin, membranous hyaline wing.

Reported as planted in Guam, but no Micronesian specimens seen.

VERNACULAR NAME.—Gold tree (English).

***Tabebuia heterophylla* (de Candolle) Britton**

Tabebuia heterophylla (de Candolle) Britton, Ann. Mo. Bot. Gard., 2:48, 1915.

Raputia heterophylla de Candolle, Mem. Mus. Par., 9:153, 1822.

Tabebuia pallida sensu auct.—Fosberg, Sachet, and Oliver, Micronesica, 15:252, 1979.—Fosberg et al., Vascular Pl. Palau, 39, 1980 [non (Lindley) Miers, Proc. Roy. Hort. Soc., 3:199, 1963].

Tabebuia pentaphylla sensu Stone, Micronesica, 6:530-531, 1971.—Souder, In Guam Gardens, 62, 1974 [non Hemsley, Biol. Cent. Am. Bot., 2:495, 1879 (1882)].

Tabebuia rosea sensu auct. Micronesia [non (Bertoloni) DC Prodr., 9:215, 1845].

Large shrub or small tree; leaves with 1-5 leaflets, most commonly 3 in material observed, lateral leaflets subsessile or very shortly petiolulate, central with petiolules 5-15 (-20) mm long, blades stiff, thinly subcoriaceous, elliptic to obovate, apices obtuse or rounded to more rarely acute or rather bluntly acuminate, venation obscure but usually visible; panicle usually much reduced, frequently to 1 or 2 pedicellate flowers, these often nodding; calyx somewhat bilabiate or oblique, obscurely lobed, finely lepidote or glandular punctate; corolla tubular to very narrowly funnelform, to 7 cm long, more usually 4-6 cm, tube yellow, lobes rose-purple, broadly rounded, spreading to 4-5 cm; capsule said to be linear-cylindric, attenuate at both ends, 7-15 cm long, lepidote; seeds winged, 7-9 mm long, 2-3 cm wide, wings sharply delineated from seed-body. Not seen fruiting in cultivation.

Very commonly planted in the tropics, and on most high islands in Micronesia.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Rota: Songsong village, 5-10 m, *Evans 2276* (US, BISH).

Guam: Agaña, *Stone 4752* (US, GUAM); Fonte (Com-Marianas) Hill, N of upper Fonte River, cult. *Fosberg 35582* (US); Tumon Bay, hotel grounds, *Fosberg 58349* (US); Yona, *Stone & Long 5061* (GUAM); Agaña, cult., *Fosberg 59785* (US, BISH, POM); Mangilao, University campus, planted, *Fosberg 59843* (US, BISH, POM).

CAROLINE ISLANDS.—Palau: *Otobed 51* (US). Koror: Hospital grounds, *Blackburn 153* (US).

Truk: Moen: Moen village, *Fosberg & Sared 60297* (US, BISH, POM); Nob Hill, 100-150 m, *Evans 1387* (US, BISH).

Ponape: Kolonia, *Fosberg 58453* (US, BISH).

MARSHALL ISLANDS.—Kwajalein: Kwajalein I., 1-3 m, *Fosberg 48030* (US, BISH).

***Tabebuia rosea* (Bertoloni) de Candolle**

Tabebuia rosea (Bertoloni) de Candolle, Prodr., 9:215, 1845.

Tecoma rosea Bertoloni, Flora Guatim. 425, 1840.

Trees with leaves mostly with 5 elliptic or oblong subcoreaceous to chartaceous, apices notably acuminate, bases with a subdorsal attachment to petiole, ventrally very shortly

sulcate, acute to rounded, glabrous; panicles few to many flowered; calyx narrowly campanulate, minutely but prominently lepidote, bilobed, lobes obtuse but minutely mucroulate or apiculate, apiculus tending to be reflexed; corolla narrowly funnelform-campanulate, to 2 cm long, limb spreading, rose-purple; fruit linear, tomentose, septum perpendicular to plane of compression of pod (usually not seen fruiting in cultivation).

Native of Central America, occasionally planted in the tropics (most plants seen under this name are *T. heterophylla*); one collection seen from Micronesia.

GEOGRAPHIC RECORD AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: Planted at Navy Station, Orote Peninsula, *Rhinehart LR 16490* (US).

Tecoma Jussieu

Tecoma Jussieu, Gen. Pl., 139, 1789.

Stenolobium D. Don, Edinb. Phil. Journ., 9:264, 1823.

Shrubs and trees, branching opposite; leaves pinnately compound (rarely simple?), opposite; inflorescences racemose, terminal; calyx 5-toothed; corolla tubular campanulate, 5-lobed, slightly zygomorphic; stamens 4, in 2 pairs, ovary 2-celled, ovules many; fruit a linear loculicidal capsule; seeds winged.

A small tropical American genus, one species pantropical in cultivation, widely naturalized.

***Tecoma stans* (L.) Jussieu ex Kunth**

Tecoma stans (L.) Jussieu ex Kunth in Humboldt, Bonpland, & Kunth, Nov.

Gen., 3:144, 1819.—Guillaumin, Bull. Soc. Bot. France, 99:22, 1952.—Catala, Atoll Res. Bull., 59:109, 1957.—Stone, Micronesica, 6:531, 1971.—Souder, In Guam Gardens, 57, 1974.—Fosberg, Sachet, and Oliver, Micronesica, 15:252, 1979.

Bignonia stans L., Sp. Pl., ed. 2, 871, 1763.

Stenolobium stans (L.) Seemann, Journ. Bot., 1:88, 1863.

Shrub or small tree, much branched, twigs tan or reddish tan, smooth, scarcely 4-sided; leaves opposite, pinnately compound, leaflets 1-9, usually 3-7, ovate-lanceolate, apex acuminate, base acute or obliquely acute, very shortly petiolate or subsessile, slightly hirsute on midrib and in vein axils beneath, margins irregularly serrate, leaves quite variable, rachis and petiole slender, glabrous; inflorescence an axillary or terminal raceme, pedicels short, irregularly curved or twisted, bracts reduced to minute scales, flowers rather few, calyx narrowly cylindrical-campanulate, 5-7 mm long, with 5 subequal acuminate teeth, glabrous; corolla bright yellow, narrowly campanulate, tube narrow, about 1 cm long, throat about 2.5 cm long, dorsiventrally compressed, with 2 longitudinal folds on ventral side, 5 subequal spreading orbicular lobes about 8 mm long, several faint diffuse reddish lines in throat; stamens 4, attached at summit of tube, in 2 unequal pairs, included,

filaments pilose at base, curved above, anthers versatile, linear, yellow, pilose, 6 mm long; sterile fifth stamen much reduced; pistil about equalling stamens, ovary narrowly cylindrical, about equalling calyx, style filiform, glabrous, stigma flat, elliptic; capsule linear, compressed, 10–20 cm long, 7–8 mm wide, brown when ripe, with raised line or suture lengthwise on each flat side, tardily dehiscent along suture, septum parallel with flat sides, firm, seeds flat, oblong, 7–8 × 4 mm, with a membranous transparent wing on each end, ends of wing erose, seeds entire including wing about 20 × 6 mm.

Widely distributed in tropical America, introduced as an ornamental and widely naturalized in Micronesia. Sometimes called yellow bells (English).

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Tinian: San Jose Valley, Village, Cult., *Fosberg 59929* (US, BISH, POM).

Rota: Songsong village, *Fosberg 58309* (US, BISH); Japanese Memorial S. of Sinapolo, N of quarry, *Raulerson 13257* (US); Japanese Memorial S of Sinapalo, N of Quarry, *Raulerson 19257* (US).

Guam: Fonte (Com-Marianas) Hill, N of upper Forte River, cult. 150 m, *Fosberg 35586* (US, BISH, POM, NY, L); Bangi Island in Agat Bay, *Raulerson 1861* (BISH).

CAROLINE ISLANDS.—Truk: Udot: Monowe, on hill back of village, *Fosberg 60232* (US, BISH, POM).

Nama: 0–3 m, *Evans 1297* (US).

NAURU ISLAND.—Lake Buada, *Fosberg 58656* (US, BISH, POM).

GILBERT ISLANDS.—Little Makin; *Catala 69* (P).

Tarawa: Betio, *Adair 75* (US); Betio, between the Japanese building and road to wharf, *Raulerson 3802* (US).

Tecomaria (Endlicher) Spach

Tecomaria (Endlicher) Spach, Hist. Nat. Veg. Phan., 9:137, 1840.

Shrubs, sometimes somewhat scandent, much branched; leaves pinnate, leaflets 5–9, variable in shape, ovate to elliptic or rhombic or ovate, serrate; flowers in racemes or racemose panicles; calyx narrowly cylindro-campanulate, lobed; corolla slenderly tubular dilated somewhat, distally, bilabiate; stamens 4, exerted, style more exerted; capsule linear, slightly carinate laterally, dehiscent perpendicularly to septum; seeds winged.

A small genus usually restricted to one or two species, endemic to Africa. However, several Andean American species usually referred to *Tecoma* strongly resemble the African plants and have been transferred to it. Examination of these tends to confirm the impression of similarity. If these are considered too close to *Tecoma*, then perhaps the African ones should go here, too. For the present we retain *Tecomaria* as a separate genus.

Tecomaria capensis (Thunberg) Spach

Tecomaria capensis (Thunberg) Spach, Hist. Veg. Phan., 9:137, 1840.

Bignonia capensis Thunberg, Pl. Cap., 105, 1807.

Tecoma capensis (Thunberg) Lindley, Bot. Reg., t. 1117, 1827.—Souder, In Guam Gardens, 57, 1974.

Shrub, sometimes subscandent, leaves opposite, small, once-pinnate, varying to rhombic, ovate, elliptic or orbicular, apex rounded to acuminate, coarsely crenate-dentate, shortly petiolulate; inflorescence racemose or narrowly somewhat paniculate, subglabrous or puberulent, to 5–6 cm long; calyx campanulate, 6 mm long, with 5 acute or apiculate lobes, finely puberulent, pale and thinner beneath sinuses; corolla bright red, tubular funnelliform more or less curved, 4–5 cm long, rather slender, bilabiate with 5 oblong lobes, these somewhat spreading; stamens in two pairs, one pair longer, both well exerted from tube subequal with corolla lobes, anthers with thecae divergent to reflexed; style much longer, stigma of 2 flat lobes, spreading; capsule smooth, linear, 7–15 cm long, ~6 mm wide, beaked; seeds flattened, depressed orbicular with a very thin transparent wing on each side 2–3 times as long as width of seed.

GEOGRAPHIC RECORD

MARIANAS ISLANDS.—Guam: Cult. Souder in litt., 1967; said by him to have been imported by the U.S. Navy in 1960. We have seen no specimens.

SYNONYMS AND MISAPPLIED NAMES OF BIGNONIACEAE

Arrabidaea magnifica (W. Bull) Sprague ex v. Steenis; see *Saritaea magnifica* (W. Bull) Dugand

Bignonia aequinoctialis L.; see *Cydista aequinoctialis* (L.) Miers

Bignonia alliacea Lamarck; see *Mansoa hymenaea* (de Candolle) Gentry

Bignonia aurea Manso; see *Tabebuia aurea* (Manso) Benthams & Hooker ex Moore

Bignonia callistigioides Chamisso; see *Clytostoma callistigioides* (Chamisso) Bureau ex Grisebach

Bignonia capensis Thunberg; see *Tecomaria capensis* (Thunberg) Spach

Bignonia ignea Vellozo; see *Pyrostegia ignea* (Vellozo) K.B. Presl

Bignonia magnifica W. Bull; see *Saritaea magnifica* (W. Bull) Dugand

Bignonia spathacea L. f.; see *Dolichandrone spathacea* (L. f.) K. Schumann

Bignonia stans L.; see *Tecoma stans* (L.) Jussieu ex Kunth
Crescentia pinnata Jacquin; see *Kigelia africana* (Lamarck) Benthams

Jacaranda filicifolia D. Don; see *Jacaranda mimosaefolia* D. Don

Pseudocalymma Sampaio & Kuhlmann; see *Mansoa* de Candolle

Pseudocalymma alliacea sensu auct.; see *Mansoa hymenaea* (de Candolle) Gentry

Raputia heterophylla de Candolle; see *Tabebuia heterophylla* (de Candolle) Britton

Tabebuia argentea (Bureau & K. Schumann) Britton; see *Tabebuia aurea* (Manso) Benth & Hooker ex S. Moore

Tabebuia caraiba (Martius) Bureau; see *Tabebuia aurea* (Manso) Benth & Hooker ex S. Moore

Tabebuia pallida sensu auct. non (Lindley) Miers; see *Tabebuia heterophylla* (de Candolle) Britton

Tabebuia pentaphylla sensu auct. non Hemsley; see *Tabebuia heterophylla* (de Candolle) Britton

Tecoma caraisensis (Thunberg) Lindley; see *Tecomera capensis* (Thunberg) Spach

Tecoma caraiba Martius; see *Tabebuia aurea* (Manso) Benth & Hooker ex Moore

Tecoma rosea Bertoloni; see *Tabebuia rosea* (Bertoloni) de Candolle

PEDALIACEAE

Herbs or rarely shrubby; leaves simple, opposite or alternate, stipules none, calyx of 5 or rarely 4 basally connate sepals; corolla gamopetalous, tube short, throat broadly tubular or somewhat campanulate, limb somewhat bilabiate with 5 short usually unequal lobes; stamens 4 (rarely 2) in pairs, inserted on corolla tube, anthers introrsely longitudinally dehiscent; pistil 1, style slender, stigmas 2, ovary usually superior, 2 or 4 celled, ovules 1-many, on axile placentae, these not fleshy or enlarged; fruit a loculicidal capsule or a nut; seed small, usually with thin endosperm.

A small Old World family; one species of *Sesamum* widely distributed as an economic plant, including Micronesia.

***Sesamum* L.**

Sesamum L., Sp. Pl., 634, 1753; Gen. Pl., ed. 5, 282, 1754 [= 1753].

Herbs with lower leaves opposite, entire to lobed or parted, upper alternate or subopposite; flowers solitary or fasciculate, axillary; calyx 5-parted; corolla tubular-campanulate, bilabiate; stamens 4, included; fruit a capsule, seeds numerous.

A small African and Asiatic genus; one species widely cultivated, occasional in Micronesia.

***Sesamum orientale* L.**

Sesamum orientale L., Sp. Pl., 634, 1753.—Safford, Contr. U.S. Nat. Herb., 209:372-373, 1905.—Merrill, Philip. Journ. Sci. Bot., 9:141, 1914.—de la Corte, Guam Record., 3:187, 1926.—Kanehira, Enum. Micr. Pl., 411, 1935.—Stone, Micronesica, 6:527, 1971.—Seegeler, Taxon, 38:656-659, 1989.

Sesamum indicum L., Sp. Pl., 634, 1753.—Fosberg, Sacht, and Oliver, Micronesica, 15:253, 1979.

Erect softly pubescent herbs, stem 4-sided with rounded angles, each side sulcate; leaves broadly triangular-ovate, with dentate margins or lobed, below, gradually narrower upward on

stem to lanceolate, acutish, almost glabrous or with a few scattered hairs above, puberulent beneath, petiolate; flowers subsessile, (fruit becoming shortly pedicellate); calyx lobes lanceolate, ciliate, persistent; corolla 2 cm or more long, campanulate, lower lip longest, white to pink or mauve, notably pubescent without, glabrous within, tending to be deflexed; filaments glabrous; ovary pubescent, style glabrous; capsule erect, oblong, 2-3 cm long, square in cross section, sides longitudinally sulcate, apex abruptly narrowed to a strong beak, the whole softly pubescent, dehiscence loculicidal from apex; seeds lenticular-obovate.

Occasionally planted or persisting from planting around gardens.

VERNACULAR NAMES.—

ahonholi (Guam: Safford, 1905)

mazer or mather (Yap: *Fosberg 25548*)

wel (Yap: *Fosberg 25548*)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: Merrill, 1914:141.

CAROLINE ISLANDS.—Yap: Mt. Matade, 160 m, persisting from cultivation, *Fosberg 25548* (US).

GESNERIACEAE

Herbs, shrubs, rarely small trees or lianas, stems tending to be soft or sub-fleshy; leaves opposite, one sometimes reduced or absent, rarely an acaulescent rosette, simple; inflorescences terminal or axillary or even from roots, flowers in cymes, pseudo-racemes, glomerate or solitary, almost always bisexual; calyx divided, parted or united; corolla gamopetalous, usually zygomorphic, 5-lobed, tending to be bilabiate, lower lip sometimes larger and elaborated; stamens 2 or 4, rarely 5, or with a staminode, anthers often connivent or even connate; disk present, pistil 1, ovary superior or partly or rarely wholly inferior, one-celled with parietal placentation or rarely falsely 2-celled, ovules many; fruit a capsule or berry; seeds many.

A large tropical family with many genera, one of them, *Cyrtandra* with many Pacific and a few Micronesian species. Several genera common in cultivation as ornamentals.

Key to Micronesian Genera of Gesneriaceae

- 1. Shrubs, fruit baccate, native species *Cyrtandra*
- 1. Herbs or subshrubs, fruit capsular, cultivated species . . 2
- 2. Fleshy rosette plants, corollas appearing rotate, stamens 2 *Saintpaulia*
- 2. Caulescent, stamens 4, corolla tubular 3
- 3. Stoloniferous herbs, fruit a fleshy bivalved capsule *Episcia*
- 3. Subshrubs, fruit an elongate linear capsule *Aeschynanthus*

***Aeschynanthus* Jack**

Aeschynanthus Jack, Trans. Linn. Soc. Lond., 14:42, 1823 [nom. cons.].
Trichosporum D. Don, Edinb. Phil. Journ., 7:84, 1822.

Subshrubs, branches slender; leaves opposite or whorled; inflorescence cymose, or of 1–2 flowers, terminal or axillary; calyx 5-lobed; corolla tubular-funnelform, curved 5-lobed; stamens 4, exerted, pistil exerted; fruit a linear cylindrical 2-valved loculicidal capsule; seeds numerous, with appendages or 1 or more hairs at ends.

An Asiatic genus, one species of which has been cultivated in Micronesia.

***Aeschynanthus radicans* Jack**

Aeschynanthus radicans Jack, Trans. Linn. Soc., 14:43, 1823.

Puberulent to glabrous subshrub; leaves opposite, ovate to obovate, 4–5 × 2.5 cm, entire or slightly dentate; flowers 2 at a node in upper axils, pedicellate; calyx tubular, flaring, lobes short, rounded, dark colored, pubescent; corolla bright red, ampliate upward, 5 cm long, pubescent; capsule very much elongate.

Native of Malaya and Java, sparingly cultivated on Guam.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

MARIANAS ISLANDS.—Guam: Agaña, *Fosberg 58346* (US).

***Cyrtandra* J.R. & G. Forster**

Cyrtandra J.R. & G. Forster, Charact. Gen., 5, 1775.

Protocyrtandra Hosokawa, Trans. Nat. Hist. Soc. Formosa, 24:202, 1934.

Shrubs, herbs, rarely small trees or vine-like, tending to be sub-fleshy and hairy; leaves basically opposite, less often whorled or pseudo-alternate, simple, petiolate or rarely sessile; stipules none; inflorescences cymose, open or congested, axillary or cauliflorous, or even rhiziflorous, bracteate; flowers usually bisexual with calyx basically 5 parted, but variously modified, even spathiform, variously caducous or persistent; corolla tubular, variously bilabiate, rarely actinomorphic, lobes imbricate or rarely valvate, thinly fleshy in texture, usually white, some species variously colored; stamens ordinarily 2, very rarely 4, or even 5 (–7), anthers usually coherent, less often free, attached in corolla throat; ovary with a nectariferous disk, style 1, stigma bifid; placentation parietal but placentae sometimes so intruded as to make them axile and the ovary then 2-celled; seeds many, small, embedded in the placenta.

A large Indo-Pacific genus, said to include over 600 species, four of them endemic in the Caroline Islands.

Key to Micronesian Species of *Cyrtandra*

1. Cymes sessile or very short-pedunculate, congested in axils, corolla actinomorphic 2

2. Plant vine-like, climbing, stamens 2, corolla lobes imbricate, calyx persistent . . . *Cyrtandra palawensis*
2. Plant an erect shrub, stamens 4 or more, corolla lobes valvate, calyx deciduous . . . *Cyrtandra todaiensis*
1. Cymes pedunculate, open, pedicels not obscured by bracts and calyces, corolla bilabiate 3
3. Pubescence 1 mm or more long, calyx 2–2.5 cm long, corolla 3 cm, fruit 2–2.5 cm long *Cyrtandra kusaimontana*
3. Pubescence 0.6 mm or less, calyx 1–1.4 cm, corolla 1.5–2 cm, fruit 1.5 cm *Cyrtandra urvillei*

***Cyrtandra kusaimontana* Hosokawa**

Cyrtandra kusaimontana Hosokawa, Trans. Nat. Hist. Soc. Formosa, 24:203, 1934.—Kanehira, Enum. Micr. Pl., 411, 1935 [as *C. kusaiana*].—Gillett, Journ. Arn. Arb., 54:108–109, 1973.—Fosberg, Sachet, and Oliver, Micronesica, 15:253, 1979.

Notably brown-woolly shrub to at least 1 m tall, young stems fleshy; leaves very large, to 40–53 cm × 14–23 cm, broadly elliptic to broadly ovate, 7–10 main veins on a side, lower surface woolly, upper surface sparsely hairy, margins shallowly, coarsely dentate to serrate, apices obtuse but slightly acuminate, bases equally or unequally obtuse and slightly decurrent on the long (up to 14 cm), petioles; cymes axillary, 2–6 (–8) flowers, dense at first, becoming open in fruit, densely brown woolly, on woolly peduncles 1–3 cm long; pedicels 7–20 mm long; calyx densely pubescent, without and within, cylindrical, 2–2.5 cm long, at first united about half-way, lobes lanceolate or linear lanceolate, acuminate with filiform tips, tardily separating almost to base, tardily deciduous; corolla to 3 cm long, curved, upper part somewhat campanulate glabrous except outside of throat and basal part of lobes pilosulous, upper lip bilobate, lower more shallowly trilobate; stamens 2, glabrous, staminodia 3, style sparsely pilose, somewhat hooked at tip; fruit fleshy, glabrous, ovoid 2–2.5 cm long, resting in the shallow disk, beak 2.5 mm long; seed coat coarsely reticulate.

Endemic in Kusaie, on high mountains in wet scrub and scrubby forest.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Kusaie: N ridge of Mt. Matanta (Buache), above Tafonshak village, *Fosberg 26601* (US, BISH, POM, E, L); summit ridge Mt. Matanta (Buache), 590–600 m, *Fosberg 26610* (US, HAW, POM, MO); *Townes 4* (US); Mt. Buache, *Hosokawa 6288a* (FU); Matante, *Kanehira 4233* (FU).

***Cyrtandra palawensis* Schlechter**

Cyrtandra palawensis Schlechter in Engler, Bot. Jahrb., 56:577, 1921.—Kanehira, Bot. Mag. Tokyo, 46:492, 1932; Fl. Micr., 348, 1933; Enum. Micr. Pl., 411, 1935.—Gillett, Journ. Arn. Arb., 54:106–107, 1973.—Fosberg, Sachet, and Oliver, Micronesica, 15:253, 1979.—Fosberg et al., Vascular Pl. Palau, 39, 1980.

Climbing shrub, scrambling in trees to 5–6 m, densely to moderately brown-pubescent, hairs to 1.5 mm long; leaves elliptic to oblong, to 24 × 9 cm, subentire, pilose on veins beneath and petioles, glabrous above, apices shortly but abruptly acuminate, bases contracted to obtuse or acute, 9–14 veins on a side, petioles 3.5–8 cm; cymes with very short (about 2 mm) axillary peduncles, congested, densely pubescent, 3–10 flowers on pedicels 2–5 mm long; calyx 8–12 mm long, cylindrical, with 5 narrowly triangular acute or acuminate lobes, reflexed or not, permanently investing corolla and fruit, not circumscissile at base, pilose to subglabrous; corolla white, 14–15 mm long, distal 6 mm campanulate, glabrous to thinly pilose above without, glabrous within, cleft 2–4 mm into 5 equal imbricate rounded short lobes, the exerted portion tending to curve downward; stamens 2, staminodes 3; disk cupular, entire, ovary and style glabrous; fruit to 15 mm long, ovoid, tapered at apex into a beak 3–4 mm long; seeds 0.5 mm long, surface longitudinally striate.

Endemic to the volcanic soils of Babeldaob, Palau.

VERNACULAR NAME.—melkii (Palau: Fosberg et al., 1980).

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Babeldaob: Aimiriik, *Kanehira* 1963 (FU, P, US), 2350 (FU), 274 (FU, 2 sheets); SW of Mt. Yekigaroto, 130 m, *Fosberg* 47684 (US); Ngetbelebel, Imeliik, *Hardy* 83 (US, BISH); Aimiliki, *Hosokawa* 7251 (US); "Garniscan Island," *Hosokawa* 9139 (A); "Airmiliki Island," *Hosokawa* 7251 (A); *Kanehira* & *Okamoto* 2 (FU); Imeliik, *Hardy* (& *Otobed*) 83 (US, BISH).

Cyrtandra todaiensis Kanehira

Cyrtandra todaiensis Kanehira, Fl. Micr., 349, f.181, 1933 [nomen nudum?]; Bot. Mag. Tokyo, 47:679, 1933.—Fosberg, Sachet, and Oliver, Micronesica, 15:253, 1979.—Fosberg et al., Vascular Pl. Palau, 39, 1980.

Protocyrtandra todaiensis (Kanehira) Hosokawa, Trans. Nat. Hist. Soc. Formosa, 24:202, 1934; Hosokawa in Yamamoto et al., Study of Fl. Form. and Mat. for Micr., 36, 1936.—Kanehira, Enum. Micr. Pl., 412, 1935.—Burr, Notes Bot. Gard. Edinb., 30:1–10, 1970.—Gillett, Journ. Arn. Arb., 51:241–246, 1970; 54:107, 1973.

Thick-stemmed shrub to 2–3 m tall, young stems fistulose, squarish, tawny tomentose or lanate, glabrate when older, to 3 cm thick when mature; leaves large, subentire, to 40 × 20 cm, petioles and veins beneath puberulent to tomentose to lanate, glabrate, petioles to 14 cm long, 7 mm thick, connate at bases; cymes sessile, congested, the 15–20 pedicels, 5–15 mm long, flowers bisexual, bracts lanceolate, 2 × 0.5 cm, deciduous; calyx to 12 mm long, irregularly cut about half-way into triangular acuminate lobes, densely pilose externally, glabrous within, only slightly accrescent, falling from maturing fruit; corolla white, about 15 mm long, funnellform, densely pilose without, throat pilose within, lobes 5, thick, ovate-triangular glabrous within, equal, about 1/4 the length of the corolla; stamens 3–7, anthers separate, all fertile; ovary glabrous, falsely 2-celled; fruit fleshy, white, broadly ovoid, 15 × 10 mm,

fleshy style-base persisting as a beak; seeds many, brown, broadly fusiform, foveolate.

Endemic to the limestone islands of Palau in wet forest, growing in crevices with very little soil.

The actinomorphic corolla and 4–7 free stamens led Hosokawa to propose the genus *Protocyrtandra* for this species, but because these characters appear separately in other unrelated species, this genus, though discussed, has not usually been accepted (Gillett, 1970). Although this species shares the unusual actinomorphic corolla with *C. palawensis*, the two do not seem closely related. The latter species has the usual androecium of 2 stamens with coherent anthers, plus 3 staminodes.

VERNACULAR NAME.—melkii ra chelebacheb (Palau: Fosberg et al., 1980).

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Koror: Todai-yama, 200 m, *Kanehira* 1854 (type, FU, 2 sheets, US, P); *Kanehira* & *Hatusima* 4663 (FU, US); Ngarmid, 30 m, *Fosberg* 47482 (US, BISH, POM, MO, E, L); Toirechuil, limestone island on S side of causeway between Koror and Malakal, 2 m, *Canfield* 295 (US); Toirechuil Island, *Emmons* 74 (US, HAW); Ulong, Toirechuil, 10 m, *Hardy* & *Otobed* in 1960 (US); Ulong, central part of island, 2 m, *Canfield* 482 (US). Aulupse'el: Ngarmalk, western part of island, 1–5 m, *Fosberg* 31946 (US, BISH, POM, MO, E, L). Urukthapel: *Hosokawa* 7514 (A).

Cyrtandra urvillei C.B. Clarke

Cyrtandra urvillei C.B. Clarke in de Candolle, Monogr. Phan., 3:251–252, 1883.—Kanehira, Bot. Mag. Tokyo, 46:492, 1932; Fl. Micr., 351, 1933; Enum. Micr. Pl., 412, 1935.—Glassman, Bish. Mus. Bull., 209:31, 101, 1952.—Fosberg, Sachet, and Oliver, Micronesica, 15:253, 1979.

Cyrtandra ponapensis Kanehira, Bot. Mag. Tokyo, 46:492, 1932; Fl. Micr., 348, 1933; Enum. Micr. Pl., 411–412, 1935.

Shrub or small tree, to 5 m tall, younger stems fistulose, young parts, petioles and inflorescences closely brown tomentose or slightly lanate, not pilose or heavily woolly; leaves opposite, blades ovate to elliptic, tending to be large, to 40 × 17 cm, obtusish to acute or slightly acuminate, 5–9 main veins on a side, lower surface densely puberulent or shortly soft-pubescent especially on veins, when young slightly woolly, upper surface essentially glabrous, margins subentire to very shallowly and bluntly serrate, petioles thick, 2–10 cm long; peduncles axillary, 1–2.5 cm long, bracteate, branched at summit into 2 or more short thick branches bearing slender pedicels to 10 mm long, flowers 10 to 15 with calyx to 14 mm long, cleft almost to base into narrowly lanceolate lobes, appressed pilose externally, glabrous or almost glabrous within, deciduous; corolla to 2 cm long, white, glabrous or almost so externally, within slightly glandular puberulent in throat, tube somewhat campanulate in upper part, limb deeply lobed, lobes unequal, rounded at apex; stamens 2, anthers

coherent, staminodes 3, 0.5–1 mm long; ovary and style glabrous; fruit ovoid, to 1.5 cm long, beaked, its base surrounded by the prominent cup-shaped disk; seeds ovoid-fusiform, longitudinally striate.

Found only in wet montane forests of Ponape and Kusaie, in the eastern Carolines.

Type of *C. urvillei* was collected on Kusaie by Dumont d'Urville, but we did not locate it in the de Candolle herbarium in Geneva in 1954; it is probably in Paris.

Kanehira cited his 831, 1606, 1642, and 1550, from Ponape, which would be syntypes of *C. ponapensis*. No lectotype has been chosen, We have seen 3 of these at FU.

VERNACULAR NAME.—Eetin-wohl (Ponape: Glassman, 1952).

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Ponape: Clarke, 1883, 251–252; Metaranium-Naanaraut-zan, *Kanehira* 4155 (FU); Naanaraut, 600 m, *Hatusima* 11044 (FU); above 600 m, *Kanehira* 1606 (FU, US, syntypes of *C. ponapensis*); above 500 m, *Kanehira* 1642 (FU); Mt. Niinani, 2300 ft [700 m], *Kanehira* 831 (FU, syntype of *C. ponapensis*); Mt. Tortom, above 600 m, *Kanehira* 1550 (FU, syntype of *C. ponapensis*); between Kolonia and Palkier Colony, in primary forest, 20 m, *Hatusima* 10799 (FU); summit of Mt. Nanalaut, 2300 ft [701 m], *Stone* 2020 (GUAM); Nunioanii, *Hosokawa* 5670 (US, A), 56876 (A), 8228 (A).

Kusaie: Matante, *Kanehira* 4232 (FU); Mt. Hinkolu, 600 m, *Kanehira* 1381, 1357 (FU, US, P); Hinkolu, *Kanehira* 4195 (FU); Mt. Maarem, 200 m, *Hatusima* 11146 (FU); N ridge of Mt. Matanta, above Tafonshak village, N side of island, *Fosberg* 26602 (US, BISH, POM, E); Utuwa-kyahon, *Hosokawa* 9374 (A); Mt. Buache, *Hosokawa* 6287 (A); Mt. Seletereh, 1900 ft [579 m], *Glassman* 2749 (US).

Episcia Martius

Episcia Martius, Nov. Gen., 3:39, 1829.

Herb, stoloniferous, creeping, hairy, rooting at nodes; leaves opposite, subequal, ovate to elliptic or lanceolate, shortly petiolate; flowers axillary, solitary, pedicellate, or in short, few-flowered cymes; zygomorphic, showy; sepals 5, free or shortly connate, pilose, lower lobe surrounding corolla spur; corolla salverform or campanulate, tube spurred, horizontal in calyx, variously colored, lobes spreading, minutely toothed or fimbriate at tips; stamens 4, didynamous, included; ovary superior, style included; fruit a bivalved fleshy capsule; seeds ellipsoid.

A small tropical American genus with several species cultivated as ornamentals and foliage plants, two in Micronesia.

Key to Species of *Episcia* Cultivated in Micronesia

Calyx lobes lanceolate, somewhat pointed, corolla tube 1.5–2

cm, somewhat curved, ampliate upward
 *Episcia cupreata*
 Calyx lobes oblong, somewhat rounded at apex, corolla tube
 2.5–3 cm long, cylindrical, straight *Episcia reptans*

Episcia cupreata (Hooker) Hanstein

Episcia cupreata (Hooker) Hanstein, Linnaea, 34:340–341, 1865.—Souder, In Guam Gardens, 46, 1974.—Fosberg, Sachet, and Oliver, Micronesica, 15:253, 1979.—Fosberg et al., Vascular Pl. Palau, 40, 1980.
Achimenes cupreata Hooker, Curtis Bot. Mag., 73: t.4312, 1847.

Leaves elliptic, appressed- to erect-hairy, coppery to clear green or variegated with silver, short petiolate, margins crenate; flowers in short cymes, 3–4 on pedicels to 4 cm, sepals linear or lanceolate, more or less pointed; corolla reddish or yellowish red, or yellow, tube 1.5–2 cm, somewhat ampliate upward, more or less curved, upper 2 lobes reflexed, lower 3 longer, spreading.

Native of northern South America; cultivated, usually as a pot plant, at least in Guam and Palau.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: Souder in letter, 1967; Souder, In Guam Gardens, 46, 1974.

CAROLINE ISLANDS.—Palau: Koror: *Otobed* 52 (US, BISH).

Episcia reptans Martius

Episcia reptans Martius, Nov. Gen. et sp., 3:39, t. 217, 1829.—Fosberg, Sachet, and Oliver, Micronesica, 15:254, 1979.

Leaves broadly elliptic, erect-hairy, dark green, pale green or silvery along midrib and veins; flowers in short to rather long cymes, 3–4 on pedicels 2.5 cm or shorter; sepals oblong, rounded at tips, tending to be recurved at apex; corolla tube straight, cylindrical usually 2.5–3 cm long, reddish, lobes bright red inside.

Native from Colombia to Brazil. In Micronesia cultivated at least on Guam.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

MARIANAS ISLANDS.—Guam: Tamuning, 15 m, cult., *Fosberg* 35362 (US).

Saintpaulia Wendland

Saintpaulia Wendland, Gartenflora, 42:321, 1893.

Subfleshy, acaulescent to caulescent herbs; leaves opposite to alternate, elliptic to orbicular, hairy, on fleshy petioles; flowers 1–several or more, on axillary peduncle; calyx 5-parted; corolla with very short tube, rotate saucer-shaped limb, this bilabiate, upper lip 2-lobed, lower 3-lobed; stamens 2, anthers yellow, coherent, opening by slits; ovary superior;

fruit a capsule.

An East African genus of which most species are in cultivation, and the subject of a fancy or hobby, with many cultivars.

Saintpaulia ionantha Wendland

Saintpaulia ionantha Wendland, Gartenflora, 42:321, 1893.—Souder, In Guam Gardens, 49, 1974.

An acaulescent rosette-plant; leaves ovate to usually orbicular, base cordate or subcordate; flowers 8–10 on a peduncle, this erect to spreading, usually exceeding leaves; corolla 2 cm or more across, blue to violet, or variously white, pink, or variegated in cultivars; capsule cylindrical.

Commonly cultivated as a pot-plant with many cultivars, color forms, double-flowered forms, etc. No Micronesian specimens seen, but a common house-plant.

LENTIBULARIACEAE

Herbs, sometimes rootless; leaves alternate, often only basal, simple but if aquatic, often finely divided, usually at least some bearing a mechanism of some sort for catching and digesting insects; stipules none; flowers bisexual, variously arranged, bracteate, usually bracteolate, zygomorphic, often strongly so; calyx 2–5 lobed, sepals united at least in lower part; corolla gamopetalous, bilabiate, the 5 lobes imbricate, lower lobe saccate or spurred; stamens 2, arising from base of corolla, staminodia 2 or none, anthers 1-celled; pistil 1, style commonly reduced and 2-lobed, or stigma sessile on the superior ovary, this 1-celled, placentation free-central, placenta often fleshy, ovules many, rarely only 2; fruit a capsule dehiscing variously; seed usually minute, without endosperm.

An almost cosmopolitan family of a few genera and many species, mostly of wet, often acid habitats, or aquatic. One genus, *Utricularia*, in Micronesia.

Utricularia L.

Utricularia L., Sp. Pl., 18, 1753; Gen. Pl., ed. 5, 11, 1754 [= 1753].—Stone, Micronesica, 6:528, 1971.—Taylor, Fl. Males., 1, 8:276–300, 1977

Aquatic and terrestrial herbs, stems weak and flexible or filiform, rarely creeping or stiffly erect, (said to be modified into organs functioning as rhizoids, stolons and foliar organs, but for our purposes these will be termed roots, stolons and leaves); roots (or root-like organs) if present flaccid, branched, bearing bladders (traps), fasciculate; “leaves” or “foliar organs” alternate, simple to variously lobed, branched or compound, bladder-like animal-traps born on different parts of plant, with opening and trigger mechanism; inflorescence a usually erect scapose raceme, bracteate and occasionally bracteolate; flowers with calyx 2-lobed, lobes free or connate at base, usually accrescent, equal or dissimilar; corolla gamopetalous, bilabiate,

lips entire or variously lobed, lower lip spurred or gibbous; stamens 2, inserted at base of upper lip, filaments usually short, often curved, or flattened and dilated, anthers dorsifixed; ovary globose or ovoid, ovules 2–many, on a free central placenta; style usually short, stigma unequally bifid; capsule globose or ovoid, dehiscing variously; seeds usually small, surface variously marked or sculptured.

A large cosmopolitan genus of 180 or more species, aquatic or terrestrial on moist, often sandy or acid soil. At least four species in Micronesia.

Key to Micronesian Species of *Utricularia*

1. Free-floating aquatics, stolons elongate, sparsely branched, foliar organs capillary, branched *U. exoleta*
1. Terrestrial or rooted aquatics, foliar organs with simple blades, stolons usually short, simple or branched 2
 2. Mature foliar organs spatulate or narrowly obovate to linear, uninervate, sessile or subsessile, scales and bracts peltately or medially attached *U. caerulea*
 2. Mature foliar organs linear or elliptic, petiolate, traps often attached on petioles or at base of blades, scales and bracts basally attached 3
 3. Foliar organs with branched venation when mature, pedicels short, 1.5–2 mm at flowering, not curved downward in fruit *U. uliginosa*
 3. Foliar organs uninervate even when mature, pedicels over 3 mm long, recurving in fruit *U. bifida*

Utricularia bifida L.

Utricularia bifida L., Sp. Pl., 18, 1753.—Merrill, Philip. Journ. Sci. Bot., 9:141, 1914.—Kanehira, Enum. Micr. Pl., 412, 1935.—Hosokawa, Trans. Nat. Hist. Soc. Formosa, 25:247, 1935.—Stone, Micronesica, 6:528, 1971.—Taylor, Fl. Males., 8:28–1282, 1977.—Fosberg, Sachet, and Oliver, Micronesica, 15:254, 1979.—Fosberg et al., Vascular Pl. Palau, 40, 1980.
Utricularia sp. Volkens, Bot. Jahrb., 31:474–475, 1901.—Stemmermann, Wetland Pl., 88–89, 1981.

Terrestrial, stolons few, branched, roots (rhizoids) capillary; foliar organs conspicuous (frequently not collected), on stolons, linear, 10–20 × 1 mm, 1-nerved, apex rounded; traps globose, 1 mm or less long; scapes erect, filiform, to 22 cm tall, including loose racemes 4–10 cm, scales 2–4 (–6), ovate, blunt to bluntly acuminate, bracts ovate, blunt to acuminate or aristate, bracteoles narrower, pedicels 1–10, 2–5 mm long, erect or ascending, elongating somewhat and becoming deflexed in fruit; flowers yellow, calyx lobes broadly ovate obtuse to acutish or even acuminate, accrescent, connate at base; corolla 6–10 mm long, upper lip narrowly oblong, tip rounded, lower lip orbicular, palate raised, spur exceeding lower lip, curved, subulate, strongly divergent from lower lip; ovary ovoid, style distinct but short; capsule membranous, dorsiventrally compressed, dehiscing by a single ventral longitudinal slit; seeds minute, curved, coarsely elongate

reticulate.

Widespread; south and east Asia, Malesia to Palau, Yap, Marianas and Australia; in moist soil or shallow standing water.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: Merrill, 1914, 141; Manengon, near "Tarzan Falls" of upper Ylig River, *Stone 3821* (GUAM); between Ylig and Sigua Valley, 300–400 ft [91–122 m], *Steere 62* (US); 2 mi [3 km] E Mt. Tenjo, 900 ft [274 m], *Moore 317* (US); Manengon Conservation area, S escarpment of Ylig River Valley, *Fosberg 50553* (US); Manengon, 75–150 m, *Evans 1563* (US); s. l., *G.E.S. 244* (US); *McGregor 380* (US).

CAROLINE ISLANDS.—Palau: Babeldaob: Nekken, *Fosberg 50606a* (US); *Cheatham 120* (US); Ngardmau Munic., 0.3 mi [0.5 km] S of Ngardmau; 5 m, *Canfield 387*; E side of Ngardok Lake, 25 m, *Canfield & Bright 283* (US); Ngetpang, *Otobed P-10144* (US). Koror: 1/2 mi [0.8 km] from Sansaro on Babeldaob Road, *Salsedo 8* (US).

Yap: Volkens, 1901:31; near Fanaalily, on airport road, *Fosberg 60084* (US, BISH); airport, *Stemmermann 3138* (BISH), *3139* (BISH).

Utricularia caerulea L.

Utricularia caerulea L., Sp. Pl., 18, 1753.—Taylor, Fl. Males., 8:287–289, 1977.—Fosberg et al., Vascular Pl. Palau, 40, 1980.

Utricularia nivea Vahl, Enum., 1:203, 1804.—Merrill, Philip. Journ. Sci. Bot., 9:141, 1914.—Hosokawa, Trans. Nat. Hist. Soc. Formosa, 25:246, 1935.—Stone, Micronesica, 6:528, 1971.—Stemmermann, Wetland Pl., 88–89, 1981.

Utricularia racemosa Wallich, Cat., 1496, 1828.—de Candolle, Prodr., 8:21, 1844.—Hosokawa, Trans. Nat. Hist. Soc. Formosa, 25(142):246, 1935.—Fosberg, Sachet, and Oliver, Micronesica, 15:254, 1979.

Stolons few, sparsely branched, "roots" (rhizoids) capillary, simple; foliar organs basal, spatulate to narrowly obovate, sessile to sub-petiolate, to 7 × 1.5 mm, apex rounded, single nerve; traps ovoid, dimorphic, glandular, up to 1.5 mm long, beaked; scape slender to filiform, to 30 cm tall, occasionally branched, scales similar to bracts, elliptic, attached in middle, up to about 10 in number; racemes to 6 cm long, 1–6 (to 20 elsewhere) flowered, pedicels very short, bracts similar to scales, very acute at both ends, bracteoles similar, lower limb very short; calyx lobes unequal, upper broadly ovate, cucullate, lower smaller very broad, rounded, both glandular; corolla white to pink, purplish or bluish, 4–10 mm long, upper lip ovate-oblong, truncatish, exceeding upper calyx-lobe, lower lip with elevated palate, reflexed limb orbicular, retuse, spur narrowly conical, straight to curved, parallel with lip; ovary ovoid, style usually distinct; capsule firm, globose, 2 mm long, opaque, dehiscing by a ventral longitudinal slit; seed broadly ellipsoidal, minute, papillate and obscurely reticulate.

Widespread in south and east Asia and Australia on wet volcanic soil or shallow standing water.

The Micronesian plants, so far as known, are white-flowered, or white marked with purple, the flowers glandular papillate. This species has usually been known as *U. nivea* Vahl.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: Merrill, 1914:141; s. l., *McGregor 382* (US); Manengon, volcanic hills under *Dimeria*, *Stone 4533* (GUAM); between Ylig and Sigua Valleys, 300–400 ft [91–122 m] *Steere 61* (US); Manengon Conservation Area, S escarpment of Ylig River Valley, *Fosberg 50554* (US).

CAROLINE ISLANDS.—Palau: Babeldaob: Ibobang, 10 m, *Raulerson 6049* (US); Ngetpang, *Otobed P-10150* (US); Ngatpang Munic., 1/2 mi [0.8 km] NE of Nekkeng forestry station, 5 m, *Canfield 338* (US); Ngatpang Bay, road to forestry station, Nekken, *Stemmermann 3275A* (BISH).

Utricularia exoleta R. Brown

Utricularia exoleta R. Brown, Prodr., 430, 1810.—Taylor, Fl. Males., 1, 8:294–295, 1977.—Stemmermann, Wetland Pl., 88, 1981.

Aquatic, stolons filiform, elongate very sparsely branched, "roots" (rhizoids) capillary, tangled; foliar organs capillary, sparsely but many times branched, elongate, exceedingly fine, not sharply distinct from branching stolons; traps ovoid, on very short slender stalks, with an apical collar and 2 very finely branched appendages protruding; scapes filiform, to 15 cm long, scales 1–2, suborbicular; racemes 2 or 3 (or more?) flowered, pedicels filiform, 2–12 mm long, bracts basifixed very small, sub-orbicular to broadly oblong, truncate clasping pedicel base; calyx lobes subequal, suborbicular to broadly obovate, apices rounded, accrescent; corolla yellow, 4–8 mm long, upper lip orbicular or broadly ovate, erect, twice as long as upper calyx lobe, lower with very prominent hemispherical palate, reflexed ovate limb, spur shortly conic, parallel with corolla lobe, externally very sparsely glandular; ovary globose, style very short; capsule globose, firm, splitting laterally lengthwise; seed lenticular, peltate, broadly winged.

Very widely distributed in Old World Tropics, Africa to Australia, known from lakes and reservoirs on Babeldaob, Palau, but very seldom collected. Material available very inadequate

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

CAROLINE ISLANDS.—Palau: Babeldaob: Airai Reservoir, 50 m, *Vann A-07* (US); reservoir near Airai Airport, *Stemmermann 2236* (BISH).

Utricularia uliginosa Vahl

Utricularia uliginosa Vahl, Enum., 1:203, 1804.—Taylor, Fl. Malas., 8:282–283, 1977.—Fosberg, Sachet, and Oliver, Micronesica, 15:254, 1979.—Fosberg et al., Vascular Pl. Palau, 40, 1980.—Fosberg and Canfield, Micronesica, 16:198, 1980.

Aquatic (species said to be terrestrial), stolons elongate, much branched, papillate (rhizoids said to be branched and papillate, but not seen); foliar organs broadly lanceolate or narrowly elliptic, rounded at apex, "petiolate," blade with branching nerves when mature; traps stalked, borne on stolons and bases of foliar organs, opening near base, with 2 subulate appendages; scape erect, to 30 cm, filiform, scales few, broadly ovate, flowers 2-10, pedicels short, 1.5-2 mm, elongating in fruit to 3 mm, bracts broadly ovate, trinerved, acuminate, bracteoles subulate, half as long as bracts; calyx lobes subequal, broadly ovate to almost orbicular, 11-nerved, surface papillose, margin minutely denticulate, 2.5 mm long in flower, accrescent to 5 mm in fruit, corolla blue or purple to white, 3-7 mm long, upper lip orbicular, scarcely exceeding calyx, lower lip orbicular, entire to obscurely 3 lobed, palate raised, spur conic-subulate, widely divergent from limb; filaments curved; ovary ovoid, style short but distinct; capsule membranous, broadly ellipsoid, dehiscing by dorsal and ventral longitudinal slits; seeds minute, globose or subglobose, conspicuously reticulate.

Widely distributed, India to Japan, Malesia and Australia; if this material is correctly identified (by Peter Taylor), to Palau also.

The specimens are sterile and rooted aquatic. Description of inflorescence, flowers, capsule and seeds are from Taylor's description and drawings in *Flora Malesiana*.

1.5 mi [2.4 km] due N of airfield, 5 m, *Canfield 262* (US); 1.5 mi [2.4 km] N of airfield on Ngerkil River, 5 m, *Canfield & Bright 599* (US).

ACANTHACEAE

Shrubs, vines and herbs, rarely small trees, sometimes spiny, in herbaceous species stems often geniculate, nodes often prominent; leaves simple, opposite, decussate, rarely whorled; stipules none (if present called "interpetiolar bracts"); inflorescence cymose, paniculate or racemose, or flowers solitary, axillary or verticillate; flowers commonly bracteate (bracts often showy), bracteolate, bracteoles above bracts on axes, rarely showy (in *Thunbergia*), bisexual, subregular to usually strongly zygomorphic, 4-5 merous; calyx deeply 4-5 lobed or parted, usually appearing polysepalous, rarely reduced; corolla gamopetalous, 4-5 lobed, usually bilabiate; stamens 4, or 2, rarely 5, inserted on corolla tube, frequently paired, (in some genera one pair reduced to staminodes or lacking, anthers 2-(1-) celled; nectariferous disk present; pistil 1, style 1 with 2 stigmas in some genera, or stigma bilobed, or one lobe vestigial, ovary superior, 2-loculed, ovules 2 or more in each locule; fruit usually a capsule, rarely a drupe, 2-celled, usually loculicidal, often pseudostipitate, often flattened parallel to septum, usually elastically dehiscent, usually equipped with strong hook-like "retinacula" or indurated funicles; seeds 2 or few, often disk-like.

A large principally tropical family with many widely planted ornamental species. Several genera with a few native species, as well as many introduced ornamentals occur in Micronesia.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Babeldaob: Airai waterfalls,

Key to Micronesian Genera of Acanthaceae

1. Flowers in conspicuously bracteate inflorescences or enclosed between 2 large, showy bracts 2
2. Bracteoles enlarged and showy, enclosing flowers, bracts strongly reduced or suppressed, vines or shrubs, capsule globose or nearly so strongly beaked *Thunbergia*
2. Bracteoles inconspicuous, bracts large, foliaceous, often showy, often imbricate 3
3. Flowers axillary, each between 2 foliaceous bracts about 1 cm long, plant an herb, not vine-like *Ruellia*
3. Flowers in conspicuously bracteate spike-like or raceme-like thyrsoid inflorescences or in axils of foliage leaves 4
4. Herbs, at most slightly suffrutescent 5
 5. Flowers in axils of leaves, leaves of sterile shoots often much divided *Hygrophila*
 5. Flowers in racemes, thyrses, or pseudo-spikes 6
 6. Fertile stamens 2 7
 7. Depressed herbs, leaves with conspicuous white, red or purple veins *Fittonia*
 7. Erect or ascending herbs, leaf veins not conspicuously different in color from blade *Justicia*

6. Fertile stamens 4 8
8. Bracts broadly ovate, corolla not or scarcely exerted
 *Blechnum*
8. Bracts lanceolate to narrowly obovate or spatulate, corolla well-
 exerted *Hemigraphis*
4. Shrubs, definitely woody 9
9. Plants spiny if spines weakly developed, alternate sepals bract-like,
 enlarged, ornate, conspicuously reticulate-veined, margins spinulose-
 ciliate *Barleria*
9. Plants not spiny 10
10. Corolla 6–7 cm long, stamens long- exerted, bracts green, about 1 cm
 long *Aphelandra*
10. Corolla much shorter 11
11. Bracts green-veined on a white background, glabrous, corolla blue,
 stamens and style exerted *Eranthemum*
11. Bracts green, glandular-pubescent, corolla orange, stamens and style
 included *Crossandra*
1. Flowers in leaf axils or in inflorescences with reduced linear or scale-like bracts . .
 12
12. Herbs, at most slightly suffrutescent 13
13. Flowers small, about 1 cm long, in many-flowered cymose panicles
 *Andographis*
13. Flowers larger, not in many-flowered panicles 14
14. Inflorescence a raceme-like thyse, corolla red, tube narrow . *Odontonema*
14. Inflorescence cymose (or racemose ?) 15
15. Aestivation of corolla-lobes in bud imbricate but not contorted, capsule
 strongly stipitate, 4-seeded *Asystasia*
15. Aestivation contorted, capsule usually not stipitate, usually more than
 4-seeded *Ruellia*
12. Shrubs 16
16. Leaves usually spinose-tipped, often with coarse triangular spine-tipped lobes,
 corolla with upper lip suppressed, lower broad, 3-lobed, capsule not stipitate,
 4-seeded *Acanthus*
16. Not with above combination of characters 17
17. Corolla strongly bilabiate, leaves purplish with a pale central area
 *Graptophyllum*
17. Corolla weakly or not bilabiate 18
18. Corolla red, lobes much shorter than tube, calyx divided about half-way
 to base *Odontonema*
18. Corolla purplish spotted, lavender, or white, rather than red, lobes nearly
 as long as tube, at least not much shorter, calyx divided nearly to base
 *Pseuderanthemum*

***Acanthus* L.**

Acanthus L., Sp. Pl., 639, 1753; Gen. Pl., ed. 5, 286, 1754 [1753].

Shrubs, sometimes somewhat scandent, rarely coarse caulescent herbs; leaves usually coriaceous, usually lobed, to pinnatifid, or entire, apex and lobes may be spine-tipped, or not; flowers in spikes, bracteate, these bracts may be deciduous; calyx-lobes 4, unequal; corolla with short tube, upper lip absent, lower enlarged, trilobate; stamens 4, anthers 1-celled, hairy; ovules 2 in a locule; capsule ovoid-oblong, firm, glossy, seeds 2–4, retinacula strong.

An Old-World tropical and subtropical genus, with one Micronesian species.

***Acanthus ilicifolius* L.**

A. ilicifolius L., Sp. Pl., 634, 1753.

***Acanthus ilicifolius* L. var. *ebracteatus* (Vahl)
F.M. Williams**

Acanthus ilicifolius var. *ebracteatus* (Vahl) F.M. Williams, Bull. Herb. Boissier, II, 5:436, 1905.—Benoist in La Comte, Fl. Gen. Indochine, 4:697, 1935.

Acanthus ebracteatus Vahl, Symb. Bot., 2:75, t. 50, 1791.—Kanehira, Enum. Micr. Pl., 412, 1935.—Okabe, Nankyo, 2:21, 1943.—Stemmermann, Inv. Wetlands Veg. Caroline Is., 2:191–192, fig. 33, 1978.—Fosberg, Sachet, and Oliver, Micronesica, 15:254, 1979.—Fosberg, et al., Vascular Pl. Palau, 40, 1980.—Stemmermann, Wetlands Pl., 75, 1981.

Glabrous shrub or suffrutescent herb to 2 m tall, branched; leaves elliptic and entire or oblong and coarsely lobed with broad triangular spiny lobes, apex acute spine-tipped, narrowed at base to short petiole, both types of leaves, and occasional intermediates somewhat lobed near base, may be found on same plant; spikes terminal on branches, ebracteate, 6–15 (–20) cm long, shortly pedunculate, flowers many, buds crowded distally, lower flowers more separated, a few flowers open at once, corolla lip white, brownish toward base; capsule oblong-ovoid, rounded at apex, up to 2 × 1 cm, seed flat, prominently scabrous.

In Micronesia found only in Palau, common locally at edge of mangrove along estuarine channels.

VERNACULAR NAME.—kollil (Palau: Fosberg et al., 1980).

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Babeldaob: s. l., *Ledermann 14346* (K, B); s. l., *Richardson 86* (US); Melekiok, *Salsedo 125* (US); Aimeliik, *Hosokawa 7196* (A, BISH); Imeliik, *Imul, Hardy 77* (US, BISH, POM); Marikyoku, *Kanehira 2037* (FU); Garamiscan, *Kanehira 553* (FU); Aimiriik, *Kanehira and Hatusima 4504* (FU); Garamiscan Colony, Garamiscan River, partially submerged at high tide, *Fosberg 25748* (US, BISH, POM, NY, L); Ngerdmau, *Bowden-Kerby 604* (US); W coast Itau, first estuary S of Me'ebe'ubul, in mangrove flat, 1 m, *Fosberg 32405* (US, BISH, POM, NY, L). Koror: *Kanehira 187* (FU).

Andrographis Wallich ex Nees

Andrographis Wallich ex Nees in Wallich, Pl. As. Rar., 3:77, 116, 1832.

Herb, variously branched, erect or prostrate, stems sharply 4-angled, tissues containing cystoliths; leaves with entire margins, sessile or shortly petiolate; inflorescence an often secund axillary cyme, these sometimes branched, may be mainly in upper axils, or may form a terminal panicle with or without cymes in upper leaf axils, or may even be reduced to solitary pedicellate axillary flowers; flowers usually (or always?) pedicellate, calyx lobes 5; corolla distinctly bilabiate, imbricate in aestivation, not contorted, fertile stamens 2, anthers basally connate, cells at equal levels, without appendages; ovary cells with 4 or more ovules, style curved at apex; fruit erect, lanceolate, compressed contrary to septum, not stipitate, with distinct retinacula; seed glabrous, 3–7 per valve.

A small tropical Asiatic genus with one or two species widely introduced in warm countries, one in Micronesia.

Andrographis paniculata (Burm. f.) Wallich ex Nees

Andrographis paniculata (Burm. f.) Wallich ex Nees in Wallich, Pl. As.

Rar., 3:116, 1832.—Fosberg, Sachet, and Oliver, Micronesica, 15:254, 1979.—Fosberg et al., Vascular Pl. Palau, 40, 1980.

Justicia paniculata Burmann f., Fl. Ind., 9, 1768.

Erect herbs, subglabrous except glandular pubescent distally in inflorescence, stem angles sharp, stems swollen at and just above nodes; leaves lanceolate to narrowly elliptic, 2.5–10 (–12) × 1–2 (–3) cm, apex acute to somewhat bluntly acuminate, base gradually narrowed to a slight petiole; cymes elongate, ascending gently curved or straight, sparsely flowered, racemiform, secund, open paniculate above, pedicels 3–7 mm long, puberulent to glandular villous distally; calyx 3 (–4) mm long, glandular, villous, lobes stiffly lanceolate, very sharply acute or acuminate; corolla white, yellowish distally, tube straight, to 6 mm long, limb strongly bilabiate, upper lip oblong, of 2 connate lobes, lower cuneate, 3-lobed, purplish marked; style hirsute; capsule 15–17 mm long, thinly glandular villous, valves slightly curved after dehiscence.

A weedy plant, collected once in Palau.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

CAROLINE ISLANDS.—Palau: Koror: *Hosokawa 9829* (A, US).

Aphelandra R. Brown

Aphelandra R. Brown, Prodr., 475, 1810.—Wasshausen, Smith. Contr. Bot., 18:7, 1975:7–8.

Shrubs or suffrutescent herbs, cystoliths none, stems usually erect, terete or quadrangular, leaves usually opposite, usually large, petiolate, margins entire to variously toothed or even spinulose; inflorescence a terminal bracteate spike, flowers subtended by bracts and usually bracteoles; calyx divided nearly to base into 5 subequal segments; corolla with erect or oblique tube, limb usually bilabiate, upper lip erect, entire or bilobed, lower lip 3-lobed, reflexed-spreading, middle lobe often longer; stamens 4, “filaments epipetalous,” flat, anthers 1-celled, staminode rarely present; ovary cylindrical, 2 ovules in each locule, style filiform, stigma funnel-like; capsule ovoid or cylindrical, usually shortly stipitate, 4-seeded, valves recurved after dehiscence; retinacula cucullate at tip; seed somewhat flattened, almost orbicular, sculptured. (Description condensed from Wasshausen, 1975.)

A large tropical American genus with one species cultivated in Micronesia.

Aphelandra tetragona (Vahl) Nees

Aphelandra tetragona (Vahl) Nees in de Candolle, Prodr., 11:295, 1847.—Stone, Micronesica, 6:532–533, 1971.—Souder, In Guam Gardens, 57, 1974.—Fosberg, Sachet, and Oliver, Micronesica, 15:255, 1979.

Justicia tetragona Vahl, Symb. Bot., 3:5, 1794.

Shrub to 3 m tall, stems subglabrous, thick, somewhat quadrangular above, internodes quite varied in length, leaves

opposite, large, blades up to 29 × 19 cm, subglabrous, broadly ovate or elliptic, apex shortly acuminate, main veins 9–12 on a side, alternately disposed, petiole up to 17 cm; spikes 1–5, terminal, to about 10 cm long, 1 cm thick, quadrangular, rachis densely white-woolly, bracts somewhat imbricate, stiff, appressed, narrowly ovate, about 1 cm long, apex acute, bracteoles lanceolate, acute, carinate, keel white villous; calyx about 11–12 mm long, unequal in width, acute; corolla pink to deep red, 6–7 cm long, somewhat falcate, gradually ampliate upward from 2 to 8 mm, limb about 2 cm long, upper lip erect, bifid, lower lip erect to spreading or recurved, 3-lobed, middle lobe greatly exceeding lateral ones; stamens strongly exerted, anthers 6 mm long; capsule not seen.

Native of Venezuela, rather widely cultivated as an ornamental.

In Micronesia known only from Guam.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

MARIANAS ISLANDS.—Guam: Mangilao, cult. around dwellings, 65 m, *Fosberg 35611* (US).

Asystasia Blume

Asystasia Blume, *Bijdr.*, 796, 1825 [1826].

Perennial herbs, procumbent or decumbent, branches ascending, rarely tending to climb, supported by other vegetation, sometimes somewhat woody below, usually pubescent; leaves opposite, ovate; flowers in usually secund racemes or racemoid cymes; bracts small, triangular to lanceolate or linear, bracteoles very small; calyx-lobes 5, narrow, subequal; corolla with a rather short tube, throat somewhat flattened funnelliform-campanulate or subcylindric, palate usually notably reticulate, limb almost regular to usually somewhat bilabiate, imbricate in bud; stamens in 2 pairs or one pair and a pair of staminodia, anthers 2-celled; ovary with 2 ovules per cell, style filiform with a small subcapitate or slightly bilobed stigma; capsule with contracted or stipitate base, retinacula 4, subulate; seed 2 in a cell, flattened, ovate to orbicular, sculptured, glabrous.

A genus of quite a few species, not well understood, native of the Old World tropics, one species cultivated and widely naturalized in warm regions, including Micronesia, where there is also one native species.

Key to Micronesian Species of *Asystasia*

- Calyx glabrous, corolla funnelliform, narrow, 2–2.5 cm long, capsule 1.5–2 cm long *A. blumei*
 Calyx thinly pilose, corolla campanulate, flaring, 3–4 cm long, capsule 3 cm long *A. gangetica*

Asystasia blumei Nees

Asystasia blumei Nees in de Candolle, *Prodr.*, 11:167, 1847.—Kanehira, *Enum. Micr. Pl.*, 435, 1935.—Hosokawa, *Trans. Nat. Hist. Soc. Formosa*, 25:247,

1935.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:255, 1979.—Fosberg et al., *Vascular Pl. Palau*, 40, 1980.

Sprawling herb, slightly woody near the base, to 1 m or more long, branching abundantly above, with prominent nodes, somewhat sericeous in lines on internodes; leaves thin, ovate, to 9 × 3.5 cm, usually much smaller, acuminate, margins undulate, petioles slender, much shorter than blades, 1–4 cm long, dot-like white cystoliths abundant; racemes not conspicuously secund, becoming about 5 cm long, slightly puberulent, pedicels about 1–2 mm long, bracts and bracteoles minute, to about 1 mm, acuminate; calyx-lobes lanceolate, glabrous, about 3 mm long; corolla lavender, 2–2.5 cm long, funnelliform, subglabrous, throat narrow, not sharply differentiated from tube, lobes about 3 mm long, obtuse to rounded, subequal; capsule 1.5–2 cm long, stipe half of this, fertile part somewhat 2-lobed; seed blackish, with a very short stipe-like part, distal margin somewhat scalloped, sides prominently papillate.

Found in Malaya and Java, and in Micronesia only in Palau, where it is fairly common, with tendency to become weedy in both open and shaded places.

VERNACULAR NAME.—meringel (Palau: *Fosberg 32609*, possibly misapplied).

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: s. l., *Nisida 42* (FU); *Richardson 103* (US). Kayangel: Ngajangel I., *Gressitt 26* (US). Babeldaob: Akoru-Kaigan (near Akor), *Hosokawa 7092* (BISH); E coast, hill between Melekiok and Lake Ngardok, 2 m, *Fosberg 32609* (US, BISH); Melekiok, *Salsedo 124* (US). Koror: *Cheatham 60* (US). Peleliu: *Hosokawa 9204* (US, BISH, A); *Hatusima 4795* (FU). Angaur: *Kanehira 589* (FU); NW coast, edge of secondary woods on ridge top, 30 m, *Fosberg 25926* (US, BISH, POM, NY, L); W coast, S of phosphate works, 3 m, *Fosberg 31964* (US, BISH, POM, NY, L); along rd. NE of Lake A, 13 m, *Canfield 238* (US); Garangoai Cove, 2 m, *Canfield 702* (US).

Asystasia gangetica (L.) T. Anderson

Asystasia gangetica (L.) T. Anderson in Thwaites, *Enum. Pl. Zeyl.*, 235, 1859–64 [1860].—Kanehira, *Enum. Micr. Pl.*, 412, 1935.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:255, 1979.—Fosberg et al., *Vascular Pl. Palau*, 40, 1980.

Justicia gangetica L., *Amoen. Acad.*, 4:299, 1759; *Sp. Pl.*, ed. 2:24, 1762.

Asystasia coromandeliana Nees in Wall, *Pl. As. Rar.*, 3:89, 1832.—Souder, *In Guam Gardens*, 46, 1974.

Decumbent herb, tending to be bushy sometimes slightly woody below, stems geniculate below, branches ascending or erect, irregularly appressed puberulent, especially at or near nodes, stems somewhat angular or striate; leaves thin, ovate to almost orbicular, apex acuminate, base obtuse to subcordate, margins entire, few pairs of veins; stipules none; racemes terminal, strongly one-sided or secund (cymose?), becoming elongate, pedicels slightly curved, distally very short, 1–3 mm,

bracts and bracteoles triangular acuminate, 1–2 mm long; calyx-lobes lanceolate-acuminate, 5–7 mm long, hairy; corolla 3–4 cm long, purple to yellow or white, tube 0.5–1 cm long, tending to be slightly curved, throat narrowly campanulate, slightly compressed dorsiventrally, lobes suborbicular, slightly flaring, obtuse to rounded, throat and lobes very thinly puberulent outside; capsule about 3 cm long, basal stipe-like part 1.5 cm, distal, fertile part irregularly ellipsoidal or ovoid, acuminate; seed irregularly disk-shaped, pale, margin irregularly scalloped, sides rugose.

Native of southern Asia.

Occasionally planted, not seen naturalized in Micronesia, but becoming established and common elsewhere. An attractive ornamental.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Saipan: Japanese Peace Memorial, *Herbst & Falanruw 6920* (US).

Tinian: San Jose village, planted, *Fosberg 59919* (US), *59920* (US).

Rota: Songsong Village, 5–10 m, planted, *Evans 2289* (US), *1999* (US, BISH, POM, B).

Guam: Yigo, Souder letter, 1967; Souder, 1974:46.

MARSHALL ISLANDS.—Kwajalein: Fosberg, growing in pot, 1956, 1958.

NAURU ISLAND.—Anibare district, N of Menen Hotel, sea level, *Scully 127N* (US).

GILBERT ISLANDS.—Tarawa: Betio, *Adair 60* (US).

Asystasia sp.

Herb to 0.4 m tall, stems and leaf-veins prominently strigose, several stems from base, branched above; leaves ovate or rhombic, up to 5 × 2 cm, thin, apex prominently acuminate, base strongly contracted to slender densely strigose petiole about 5–12 mm long; flowers in a secund raceme up to 13 cm long, rarely branching near base, rather loosely flowered, rachis thinly strigose puberulent, pedicels about 2 mm long, subtended by a triangular acuminate bract about 2 mm long and 2 similar but smaller bracteoles, another bract opposite the subtending one, flower-opposed; calyx about 6 mm long, divided almost to base into 5 linear-lanceolate somewhat acuminate or attenuate-aristate lobes, these minutely puberulent; corolla dull dark purple within, pale mauve without, 3.5 cm long, tube slender, 1 cm, throat campanulate, 15–18 mm long, slightly compressed dorsiventrally, lobes ovate erect to somewhat spreading, the whole minutely and sparsely puberulent without with glandular hairs; stamens 4, attached at top of tube, filaments slender 1/3 to 1/2 the length of the tube, anthers 1.5 mm long, apiculate; ovary fusiform 2.5–3 mm long, glabrous except at summit, style filiform, about 2 cm long, hispidulous in lower half, stigma minute, subcapitate, bilobed, glabrous; fruit not seen.

An ornamental of unknown origin, planted in garden in

Nauru. We have not been able to identify this species.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

NAURU ISLAND.—Denigomodu, *Fosberg 58702* (US).

Barleria L.

Barleria L., Sp. Pl., 636, 1753; Gen. Pl., ed. 5, 283, 1754 [1753].

Shrubs, often spiny; leaves entire, with short linear cystoliths; flowers sessile or subsessile, axillary and bracteolate and/or in bracteate terminal spikes, these sometimes secund; calyx deeply 4-parted, segments subequal or usually unequal, two broad, two small; corolla somewhat funnel-shaped, lobes 5, usually spreading; stamens in two pairs borne on base of corolla tube; fruit a 2 or 4-seeded capsule; seed flat, hairy.

A large pan-tropical genus, a few cultivated, 2 known from Micronesia, but not native.

Key to Micronesian Species of *Barleria*

- Stems unarmed, calyx lobes strongly unequal, outer ones hyaline prominently reticulate-veined, strongly ciliate; seeds 2 in a locule *B. cristata*
- Stems with clusters of spines in axils, calyx lobes sub-equal, green, neither reticulate veined nor ciliate; seeds 1 in a locule *B. prionitis*

Barleria cristata L.

Barleria cristata L., Sp. Pl., 636, 1753.—Merrill, Philip. Journ. Sci. Bot., 9:141, 1914.—Kanehira, Enum. Micr. Pl., 413, 1935.—Okabe, Journ. Jap. For. Soc., 23:270, 1941.—Glassman, Bish. Mus. Bull., 209:102, 1952.—Fosberg and Sachet, Atoll Res. Bull., 92:34, 1962.—Stone, Micronesica, 6:533, 1971.—Souder, In Guam Gardens, 54, 1974.—Fosberg, Sachet, and Oliver, Micronesica, 15:255, 1979.—Fosberg et al., Vascular Pl. Palau, 40, 1980.

Shrubs, unarmed, stems square, antrorsely hirsute or hirtellous; leaves decussate, ovate-elliptic to elliptic, to 10 × 3 cm, apex acute, base acute to slightly decurrent on very short petiole, petiole and veins antrorse-hirsute below, midrib very slightly so above; flowers axillary, subsessile, subtended and enclosed between two linear-lanceolate, sparsely hispid ciliate bracteoles; calyx of 2 broad ovate, hyaline, reticulate-veined, conspicuously ciliate and two much shorter lanceolate, eciliate sepals, corolla purple or white, zygomorphic, trumpet-shaped, 7 cm long, tube about 2.5 cm, throat 2–4 cm, flaring, lobes about 2.5 × 2 cm, obovate-orbicular; stamens 4, attached near top of tube, two 2.5 cm long, filaments straight, anthers 2 mm long, sagittate, other pair 6–7 mm long, slightly curved, anthers reniform-sagittate about 0.5 mm; pistil 5 cm long, ovary ovoid, 2–3 mm long, style filiform, subequal with corolla-tube and throat, stigma about 1 mm long, cylindric, slightly bilobed; fruit not setting, at least in cultivated material available. Fruit of wild specimen from Burma (*White 289*, US), narrowly oblong,

slightly compressed parallel to septum, tapering base and apex compressed contrary to this, not stipitate, valves straight, 16 mm long, retinacula 4, curved shortly subulate from a broad base; seed flat, thin, about 4–5 mm across, irregularly broadly cuneate-orbicular, sides curiously tightly sinuate-fibrous-appressed-hairy in about 10 bands, dull brownish gray.

Native from India to China; widely cultivated in several color-forms throughout the tropics.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Saipan: *Kanehira 1079*. (FU); near Kagman Field, 60 m, *Fosberg 31921* (US, BISH, POM, NY, L).

Tinian: *Okatani 51* (FU).

Rota: Sonson (Rota) and vicinity, persisting from cultivation, 1–10 m, *Fosberg 24963* (US, BISH, POM, NY, L).

Guam: Merrill, 1914:141; s. l. *Nelson 74* (BISH); *G.E.S 268* (BISH, US); “cult and escaped,” *Stone 4982* (US, GUAM); 1½ mi [2.4 km], NE of Agaña, *Glassman 123* (US, POM); Mt. Santa Rosa, 240 m, *Evans 1752* (US); Mangilao, Univ. Campus, *Fosberg 60152* (US, BISH, POM).

CAROLINE ISLANDS.—Palau: Koror: Maryknoll Convent, *Emmons 42* (US); Ngerebe’ed, 10 m, *Fosberg 32310* (US, BISH, POM, NY, L).

Murilo: Ruo I., *Evans 1144* (US).

Truk: Moen: Moen Village, cult., *Fosberg 60209* (US, BISH), *60210* (US, BISH).

Namoluk: Namoluk I., 1.8 m, *Marshall 57* (US).

Ponape: Mipit, *Takamatsu 890* (BISH); Ponsakir village, *Salomon and George 5* (US); Kolonia, cult., *Kanehira 1579* (FU).

MARSHALL ISLANDS.—Kwajalein; seen by Fosberg, growing in pot, 1956.

Jaluit: Fosberg and Sachet, 1962:34 (citing Okabe, 1941:270).

NAURU ISLANDS.—Buada Lagoon, *Fosberg 58797* (US).

Barleria prionitis L.

Barleria prionitis L., Sp. Pl., 636, 1753.

Shrubs about 1 m tall, much branched, nearly glabrous, with a much reduced branchlet bearing 2–4 (or more) stiff sharp divergent spines in each leaf axil at most nodes, the developed branches superimposed over these, the spines varying from 0.5 to 1.5 cm in length; leaves ovate to elliptic, up to 10 × 4 cm, with 4–6 veins on a side, margins slightly hirsute-ciliate, apex acute to slightly acuminate, base tapering gradually into a petiole about 1–1.5 cm long, flowers axillary and in few-flowered decussate terminal spikes, subtending leaves gradually reduced to elliptic mucronulate bracts, bracteoles narrowly lanceolate, spinescent-subulate; calyx lobes ovate, not reticulate, subequal in length or slightly unequal, about 1 cm long, inner pair somewhat narrower, corolla light orange, 3–3.5 cm

long, funnellform, lobes ovate, obtuse to acutish; longer pair of stamens subequal to somewhat exerted from corolla, anthers oblong or elliptic, about 3 mm long; style capillary, about 3 cm long, stigma about 1 mm or less long, slightly thickened, obscurely bifid, one lobe much shorter; capsule about 1.5 cm long, ovate acuminate, apical part hard, woody, solid, locules 2, retinacula 2, subulate, curved, seeds 2, flat, ovate, about 1 × 0.5 cm, apex obtuse, base rounded, sides fibrous-appressed-hairy, hairs not at all sinuate. (Capsule and seeds described from *Proctor 17288* from Grenada Island.)

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

NAURU ISLAND.—Aiwo, persisting, perhaps naturalized ornamental in brushy roadside, 10 m, *Fosberg 58772* (US).

Blechum P. Browne

Blechum P. Browne, Civ. Nat. Hist. Jamaica, 261, 1756.

Herbs; leaves opposite; stipules none; flowers in bracteate spikes or subracemose, bracts imbricate; calyx deeply 5-parted, segments lanceolate to linear-subulate; corolla funnellform, tube slender, limb 5-lobed, lobes subequal, contorted in bud; stamens in two pairs, included, inserted at middle of tube, anthers 2-celled; style filiform, stigma subulate, with a small posterior lobe, ovules few per locule; capsule short-stipitate, septum breaking away, retinacula acute; seeds orbicular, compressed, hairy, mucilaginous when wet.

A small tropical American genus with one species widely naturalized in the Old World, including Micronesia. Similar to and probably related to *Ruellia*.

Blechum brownei Jussieu

Blechum brownei Jussieu, Ann. Mus. Par., 9:270, 1807.

Forma *brownei* not known from Micronesia.

Blechum brownei f. puberulum Leonard

Blechum brownei f. puberulum Leonard, Journ. Wash. Acad. Sci., 32:184, 1942.—Fosberg and Sachet, Atoll Res. Bull., 92:35, 1962.—Stone, Micronesica, 6:533, 1971.—Fosberg, Falanruw, and Sachet, Smith. Contr. Bot., 22:40, 1975.—Fosberg, Sachet, and Oliver, Micronesica, 15:255, 1979.—Fosberg et al., Vascular Pl. Palau, 40, 1980.

Blechum brownei sensu Volkens, Bot. Jahrb., 31:475, 1901.—Merrill, Phillip. Journ. Sci., 9:141–142, 1914.—Glassman, Bish. Mus. Bull., 209:102, 1952.—Stemmerman, Inv. Wetlands Veg. Caroline Is., 2:193, 1978 [non Jussieu, Ann. Mus. Par., 9:270, 1817].

Blechum pyramidatum (Lamarck) Urban, Fedde Rep., 15:323, 1918.—Kanehira, Enum. Micr. Pl., 413, 1935.—Hosokawa, Bull. Biogeogr. Soc. Jap., 7:200, 1937.—Okabe, Journ. Jap. For. Sci., 23:279, 1941; Nankyo, 2:46, 1943.

Decumbent herb, rooting at nodes, stems ascending to 0.6 m, puberulent, hairs appressed or curved often in lines on internodes; leaves ovate to rarely lanceolate or elliptic, to 10 ×

5 cm, usually acuminate, tip often rounded or blunt, base acute to attenuate, veins somewhat pilosulous, blades appearing so because of abundant linear white raphid bundles or cystoliths, petiole slender 1-several cm long, often with decurrent blade; spikes terminal on erect branches, to 15 or more cm long, usually 5–10 cm, appearing square because of rows of decussate imbricate bracts, these leaf-like, broadly ovate, 1–2 × 1–1.5 cm, apex slightly acuminate, base rounded shortly petiolate to sessile, notably ciliate (in Micronesian specimens); calyx lobes lanceolate with subulate apex, hairy; corolla not or scarcely exerted from bracts, falling very readily, scarcely seen on herbarium specimens, white to lavender, almost regular, apices rounded; capsule pale straw-color, thin, ovoid, acuminate, 6–7 mm long, puberulent; seeds several in a cell, flat, black, with very narrow pale margins.

A common plant of semi-shady weedy places, found on most islands of Micronesia excepting dry ones. All Micronesian specimens seem to belong to *B. brownei* f. *puberulum* Leonard, characterized by strongly ciliate bracts.

Considered by Merrill (1914:142) to have come from Mexico to the Philippines and back to Guam on the Manila galleons.

USES.—Various parts are used as medicine against framboesia (yaws). Stems and leaves of “malai” are squeezed and sap applied to affected part, wrapped with leaf of “magarwelk” (*Morinda citrifolia*) and then heated (Yap: Okabe, 1943).

VERNACULAR NAMES.—

yetbas babney (Alamagan: *Falanruw* 1887)
 lasaga (Saipan: *Hosaka* 3007)
 yetbas babui (Saipan: *Lange* 44; Guam: *Whiting* x7; Guam: *Falanruw* and Payne, 1976)
 zetbas babui (Guam: *Evans* 1504)
 gacel (Yap: *Wong* 467)
 malai (Yap: Okabe, 1943)
 melai (Yap: Volkens, 1901)
 ligakoka (Faraulap: *Fosberg & Evans* 47326)
 atait (Satawal: *Fosberg & Evans* 46921)
 auowra (Nomwin: *Evans* 1059)
 ererion (Truk: *Fosberg* 24679)
 fetinin namocels (Truk: *Wong* 241)
 namochuk (Lukunor: *Anderson* 2098)
 merangarang (Satawan: *Anderson* 1094)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Asuncion: Lower southwest slope, 150 ft [45 m] *Falanruw* 2268 (US), 2258 (US).

Agrigan: Village, *Fosberg* 31423 (US, BISH, POM, NY).

Alamagan: Partido Village, *Fosberg* 31672 (US, BISH, POM, NY, L); coast, 350 ft [110 m], *Falanruw* 1887 (US).

Guguan: SW part of I., 175 ft [55 m], *Falanruw* 1845 (US); western slope, 175 m, *Falanruw* 3122 (US).

Sarigan: NW coast above anchorage 200 ft [60 m], *Falanruw* 1771 (US); coconut grove near village, 10–100 m, *Evans* 2342

(US, UH, POM, K).

Anatahan: NW corner of I., 200–300 ft [60–90 m], *Falanruw* 1616 (US); W coast below 200 m, *Falanruw* 1702 (US).

Saipan: s. l., *Kanehira* 939 (FU); *Kanehira and Hatusima* 4289 (FU); *Lange* 44 (BISH); Fanuchuluyan Bay, *Fosberg* 31339 (US, BISH, POM, NY, L); Charan-Tarhoho, 200 ft (60 m), *Hosaka* 3007 (US, BISH, POM, NY).

Tinian: s. l., *Hosokawa* 7743 (US); *Okatani* 70 (FU); “Yellow Beach” E of Mt. Lasso, 1–10 m, *Fosberg* 24915 (US, BISH); terrace on SE coast, N of Carolinas Lalo Pt., 60–80 m, *Fosberg* 24832 (US, BISH, POM).

Rota: Songsong Village and vicinity, 5–10 m, *Evans* 2029 (US).

Guam: Merrill, 1914, 141–142; s. l., *G.E.S.* 242 (BISH); *McGregor* 356 (BISH); summit of Mt. Lamlam, *Anderson* 133 (US, BISH, POM, NY); Ritidian Pt., 1.5 km inland, *Necker* 156 (US); Agaña Bay area, *Moore* 1 (US); Barrigada-Harmon Road near NCS towers, *Stone* 3980 (Guam); Ritidian pt., Bryan in 1936 (BISH); Laguina, Kondo in 1952 (BISH); Mangilao, along Tenerio road below University of Guam campus, 75 ft [25 m], *Falanruw, George, and Salomon* 879 (US); Inarajan, home of Rose Martinez, 100 m, *Evans* 1504 (US, BISH, POM); Lujuna, just off rt. 15, 10–50 m, *Evans* 1596 (US, BISH, POM, NY); Chalan Pago, *Whiting* XY (US); Pago valley, near bank of Pago River, ~1 mi [1.6 km] inland, *Falanruw* 1420 (GUAM).

CAROLINE ISLANDS.—Palau: Babeldaob: Melekiok, *Salsedo* 128 (US). Koror: *Kanehira* 213 (FU, BISH). Angaur: W of Lake D, 0.3 mi [500 m], NE of village, 2 m, *Canfield* 152 (US); NW corner of I., 25 m, *Fosberg* 25906 (US, BISH, POM, NY, L).

Sonsorol: Village area, *Salsedo* 399 (US).

Yap: s. l., *Wong* 467 (US, BISH); near agriculture station, *Blackburn* 258 (US); Malay village, S Yap, *Cushing* 528 (US); Colonia, *Fosberg* 59974 (US).

Ulithi: Mogmog I., around dwellings in village, 1–2 m, *Fosberg and Evans* 46377 (POM); Mogmog, *Fosberg and Wong* 25515 (US, BISH, POM, NY, L); Falalap I., in taro pit, *Fosberg* 46640 (POM).

Fais: In coconut plantation on plateau, 15 m, *Fosberg* 46684 (POM).

Faraulap: Faraulap I., seaward end of islet, 2 m, *Fosberg and Evans* 47326 (US).

Satawal: Interior of island, 2 m, *Fosberg and Evans* 46921 (US).

Namonuito: Onari I., 5 m, *Evans* 988 (US); Ono I., village and vicinity, 0–3 m, *Evans* 1010 (US).

Murilo: Murilo I., 3–5 m, *Evans* 1245 (US).

Nomwin: Nomwin I., village and vicinity, 0–3 m, *Evans* 1059 (US).

Truk: *Wong* 241 (US, BISH) 125 ft [40 m]. Moen: Uoala, *Moore* 126 (US); Leue Village, *Anderson* 749 (US, BISH, POM). Dublon (Natsushima): *Takamatsu* 281 (BISH). Udot: Manowe, coastal flat, *Fosberg* 60234 (US, BISH, POM, NY,

L). Pis: Common in undergrowth, 1–2 m, *Fosberg 24679* (US, BISH, POM, NY, L), 3 m, *Evans 821* (US).

Nama: 3–5 m, *Evans 1311* (US); *Anderson 905* (US, BISH, POM, NY, L).

Lukunor: Oneop I., *Anderson 2098* (US, BISH, POM, NY); Lukunor I., *Anderson 2147* (US, BISH, POM, NY).

Satawan: Satawan I., *Anderson 1094* (US, BISH, POM).

Kapingamarangi: *Niering 668* (US).

Ponape: s. l., *Lederman 13969* (B), vicinity of Kolonia, sea level, Saputik Islet, *Glassman 2779* (US, BISH); Kolonia, *Kanehira 864* (FU, BISH); Anapeng-pa, *Takamatsu 763* (BISH); mission Oa, *Hallier 5 × 03* (HBG, US); Ronkiti, SW corner of I., *Fosberg 26398* (US, BISH, POM).

Kusaie: Sea level, *Glassman 2669* (US, BISH).

MARSHALL ISLANDS.—Jaluit: Jaluit I., Jabor, *Fosberg 39472* (US).

Crossandra Salisbury

Crossandra Salisbury, *Parad. Lond.*, t. 12, 1806.

Shrubs or herbs; leaves opposite or whorled, entire or toothed; flowers in dense terminal or axillary spikes with imbricate bracts, showy; calyx lobes 5, unequal; corolla with slender tube, limb abruptly expanded and 5-lobed, often somewhat reflexed; stamens 4, attached in 2 pairs in upper part of tube; ovary with 2 ovules in each cell; style bifid; capsule somewhat 4-angled, seeds 2 or 4, flat, scaly.

A small mostly African genus with several ornamental species; one has been planted in Guam.

Crossandra infundibuliformis (L.) R. Brown

Crossandra infundibuliformis (L.) R. Brown, *Prodr.*, 477, 1810.—Nees in Wallich, *Pl. As. Rar.*, 3:98, 1832.—Souder, *In Guam Gardens*, 46, 1974.—Fosberg, Sachet, and Oliver, *Micronesia*, 15:256, 1979.

Justicia infundibuliformis L., *Syst.*, ed. 10, 59, 1759.

Small shrub, to 1 m, glabrous or minutely puberulent above; leaves thin to 15 × 6 cm, opposite or usually 3–4 in a whorl or pseudo-whorl, acute to slightly acuminate at apex, narrowed to base and slightly decurrent on the petiole, subentire or entire, glabrous or very slightly pubescent, veins somewhat conspicuous beneath, petiole 1–4 cm long; spikes in upper axils, shortly or long-pedunculate, to 5–6 × 1–1.5 cm, outer bracts closely imbricate to subspreading in age, 1.5 cm long, ovate-elliptic, densely long-villous on margins, veins visible without, conspicuous within, apex subulate-mucronate, bracteoles stiff, linear, sepals thin, papery, ovate, about 1 cm long, acuminate; corolla tube about 15–25 mm long, slender, curved, limb quickly dilated, to 3 cm across, orange, lobes oblong, rounded or emarginate at apex, very thin; stamens and stigma included, stigma entire or slightly bifid; fruit lanceolate in outline, 4-sided, apex acute, septum thick, 2 curved retinacula and 1–2 seed in a cell, suborbicular, curved with imbricate sub-lanceolate

scales.

Said to be native of India, widely planted in tropical gardens. Uncommon on Guam and Tinian.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: Mayo Nursery, cult., *Stone s.n.* (GUAM).

Tinian: San Jose village, *Fosberg 59927* (US).

Eranthemum L.

Eranthemum L., *Sp. Pl.*, 9, 1753; *Gen. Pl.*, ed. 5, 9, 1754 [1753].—Bremekamp, *Ned. Akad. Wet. Verh.*, 11, 45:33–35, 1948.

Shrubs or suffruticose herbs; leaves simple, petiolate, opposite; flowers in conspicuously bracteate spikes, terminal or rarely in upper axils, bracts longer than calyx, strongly nerved, bracteoles shorter than calyx; calyx equally (or unequally) 5-lobed, lobes separate from part way down to almost completely; corolla hypocrateriform, blue to rose, tube slender, quite long, sometimes dilated at throat so as to be somewhat funnellform, lobes 5, subequal, broad, patent; fertile stamens 2, inserted slightly below mouth of tube, anthers oblong, staminodia 2, filiform or clavate; ovary seated on a small disk, each locule with 2 ovules, style glabrous or hirtellous, stigma with one lobe much shorter; capsule beaked, stipitate, with 2 seeds in a locule, on strong retinacula, seeds covered by mucilaginous hairs (description adapted from Bremekamp's).

A small genus found from India and Ceylon eastward to China and the Lesser Sunda Islands. Many species have been described but most of them belong to *Pseuderanthemum*. *Eranthemum pulchellum* is widely planted as an ornamental.

Eranthemum pulchellum Andrews

Eranthemum pulchellum Andrews, *Bot. Rep.*, 2: t. 88, 1800.—Fosberg and Sachet, *Taxon*, 2:135–136, 1953 [for nomenclatural history].—Fosberg, Sachet, and Oliver, *Micronesia*, 15:256, 1979.

Eranthemum nervosum (Vahl) R. Brown ex Roemer and Schultes, *Syst.*, 1:174, 1817.—Souder, *In Guam Gardens*, 58, 1974.

Shrub or herb to 2.5 m tall, somewhat roughish pubescent to glabrous or almost so, stems tending to be square, somewhat geniculate and nodose; leaves ovate, somewhat acuminate, base decurrent on upper part of petiole, 10–12 or more cm long, strongly nerved, tertiary veins forming a ladder-like pattern between the secondary ones, petioles up to 3 cm or more long; spikes terminal, in upper axils, and on small axillary branches, tending to form conspicuous panicles, bracts ovate to obovate, strongly imbricate, conspicuously green on a white background, with abundant whitish short linear cystoliths; bracteoles and calyx small, white, calyx lobes apparently unequal; corolla salverform, bright blue (to violet), tube slender, about 2 cm long, limb abruptly spreading; anthers about 3 mm long, curved, exserted; style filiform, glabrous,

longer lobe of stigma linear-lanceolate, sparsely pilosulous, exerted; capsule prominently sulcate, broadly stipitate, 1-1.5 cm long, more or less subequal with subtending bract, beak very short and broad.

VERNACULAR NAME.—Blue eranthemum.

GEOGRAPHIC RECORD

MARIANAS ISLANDS.—Guam: Souder in letter, 1967, Souder, 1974. No Micronesian specimens seen.

Fittonia E. Coemans

Fittonia E. Coemans, Fl. des Serres, 15:185 (1433), 1862-1865.

Herbs, prostrate or erect and shrub-like, usually with somewhat or strongly veined leaves, marked by short linear cystoliths; flowers in terminal, pedunculate, bracteate spikes; bracts herbaceous, imbricate, ciliate; calyx deeply divided into 5 subulate lobes; corolla yellow, tubular, throat narrowly funnellform, limb strongly bilabiate; stamens 2, attached near middle of tube, anthers without appendages; disk bowl-shaped, ovary with 2 ovules in a locule, stigma shortly 2-lobed; capsule ovoid, seeds 2 in a cell, lenticular, bordered, rough.

A tiny genus of three species, two of which are so close as to be possibly nothing but color forms of one, these widely cultivated as pot plants, Native of South America. Both of the prostrate species are planted in Guam.

Key to Micronesian Species of *Fittonia*

- Leaf veins white, filaments hairy *F. argyroneura*
- Leaf veins red or purple, filaments glabrous
- *F. verschaffeltii*

Fittonia argyroneura E. Coemans

Fittonia argyroneura E. Coemans, Fl. des Serres, 16:103, 1865-67.—Stone, Micronesica, 6:534, 1971.—Souder, In Guam Gardens, 45, 1974.—Fosberg, Sachet, and Oliver, Micronesica, 15:256, 1979.

Prostrate herb, stems densely pilose or somewhat tomentose; leaves oblong-oval, both ends rounded, upper surface nearly or quite glabrous, with a conspicuous network of white veins, contrasting with the green background, veins on lower surface pilose, blades up to 10-12 x 6-7 cm, petiole 2-3 cm long, pilose; spikes terminal, bracts obovate, up to 1 cm long, ciliate and somewhat pilose, obtuse, and somewhat apiculate, overlapping in four rows, making the spike look 4-sided; peduncle up to 6 cm, pilose, fertile portion to 5 cm, bracteoles hidden by bracts, lanceolate subulate; calyx lobes subulate, puberulent, to 4 mm long; corolla to 12-13 mm long, tube slender below ampliate to 2 mm or so at throat, lobes about 2.5 mm long, upper lip not bifid, lower lip 3-lobed; anthers exerted, 2.5 mm long, on pubescent filaments; style 12-13 mm long, stigma

minutely bilobed; fruit not seen. Grown in nursery and as a potted plant. Possibly only a color form of *F. verschaffeltii*.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

MARIANAS ISLANDS.—Guam: Mangilao, cult. in nurseries, 65 m, Fosberg 35919 (US).

Fittonia verschaffeltii (Lemaire) E. Coemans

Fittonia verschaffeltii (Lemaire) E. Coemans, Fl. des Serres, 15:185 (1433), 1862-1865.—Souder, in Guam Gardens, 45, 1974. *Gymnostachyum verschaffeltii* Lemaire, Illustr. Horticole, 10: t. 372, 1863; Fl. des Serres, 15:153, 1862-1865.

Creeping to ascending herb, pilosity of stems tending to be in strips; leaves oval to broadly ovate, up to 10 x 6 cm, apex obtuse to rounded, base cordate or subcordate, upper surface glabrous, said to be papillate when living, marked by a network of red or purplish veins, petiole pilose, 2-5 cm, rarely to 9 cm long; spikes on pilose peduncles up to 12 cm long, usually shorter, fertile portion 5-12 cm, bracts oval, up to 13 mm long, pilose and ciliate, apex rounded, 11 sometimes slightly apiculate, erect to squarrose; corolla yellow, about 15 mm long, tube ampliate upward, lip about 5 mm long, upper erect, narrow, lower deeply trilobed, curved downward; anthers 2.5 mm long, broadly linear or oblong, exerted on glabrous filaments; style filiform, glabrous; stigma minutely bilobed, ovary hirsute; fruit not seen.

Native of Andean South America at low to moderate elevations; said to be cultivated in Guam.

Graptophyllum Nees

Graptophyllum Nees in Wallich, Pl. As. Rar., 3:76, 102, 1832.

Shrubs, leaves simple, usually (or always?) entire; flowers in cymules, these either in a raceme-like terminal panicle or axillary, bracts usually reduced and scale-like, rarely one or two foliaceous ones at main nodes of terminal inflorescences; calyx 5-merous, divided to near base; corolla large, bilabiate, upper lip bilobed, lower trilobed; stamens 2, anthers 2-celled, staminodes 2; style filiform, stigma minute, shortly subulate; capsule clavate, seeds 2-4.

A small genus of the Old World Tropics, including one species widely cultivated as an ornamental.

Graptophyllum pictum (L.) Griffith

Graptophyllum pictum (L.) Griffith, Notul., 4:139, 1854.—Safford, Contr. U.S. Nat. Herb., 9:285-286, 1905.—Merrill, Philip. Journ. Sci. Bot., 9:142, 1914.—Kanehira, Fl. Micr., 352, 1933.—Glassman, Bish. Mus. Bull., 209:102, 1952.—Stone, Micronesica, 6:534, 1971.—Fosberg, Sachet, and Oliver, Micronesica, 15:256, 1979.—Fosberg et al., Vascular Pl. Palau, 40, 1980.

Justicia picta L., Sp. Pl., ed. 2, 21, 1762.

Graptophyllum hortense Nees in Wallich, Pl. As. Rar., 3:102, 1832.

Shrub to 2–3 m (wild plants in New Guinea said to belong here, reach tree size, 5–7 m), glabrous, lenticels if present very small, stems pale tan or buff color, slightly quadrangular; leaves elliptic often with a prominent blunt acumen, base acute, shortly petiolate, blade dark green or dark purplish above, often (usually in cultivated forms) with large pale blotches along midrib, up to 12 cm (to 18 cm on sterile shoots) long; panicles terminal 5–10 cm long, rarely a few cymules in upper leaf axils, cymules subsessile or lowest very shortly pedunculate, some cymules reduced to single flowers, scale-like bracts triangular-acuminate, margins scaberulous, pedicels up to 6 mm long; calyx lobes lanceolate, acute, 2–3 mm long, erect; corolla 3.5–4 cm long, tube narrow at base, somewhat compressed, gradually ampliate into a slightly curved, somewhat ventricose throat, deep maroon or purple to dull deep magenta, limb 10–15 mm long, upper lip slightly curved outward, narrowed to a shortly bifid apex, extending to slightly beyond the anthers, lower lip deeply 3-lobed, lobes blunt, narrowly ovate, strongly reflexed, glandular within; filaments strong, straight, glabrous, anthers oblong, rounded at apex, becoming somewhat curved; style filiform, about 3–4 cm long, curved near apex; fruit not seen, cultivated clone possibly sterile.

Possibly native of the Moluccas, no material from there seen; New Guinea specimens seen, determined as *G. pictum*, are not identical with the cultivated plant, nor are they uniform. Plant cultivated in Philippines said to have been brought from Ternate, in the Moluccas.

In Micronesia occasionally planted as an ornamental; when sterile easily confused with *Pseuderanthemum carruthersii* var. *atropurpureum*, but distinguishable by the pale stems not marked by conspicuous white lenticels, and usually by the pale blotching along the midrib of the leaf blade.

VERNACULAR NAMES.—

caricature plant (Guam)

San Francisco (Guam: Safford, 1905)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Tinian: 1 mi [1.6 km], N of Tinian village, cult. in garden, 250 ft [75 m], *Fosberg 24723* (US, BISH, POM, NY, L).

Guam: s. l., *G.E.S 367* (US), *352* (US, BISH), *312* (US, BISH); *Nelson 166* (BISH); Mangilao, cult. around dwellings, 65 m, *Fosberg 35601* (US, BISH, POM), *35602* (US, BISH, POM, NY); Agaña, cult., *Wade 34* (GUAM).

CAROLINE ISLANDS.—Palau: Koror: cult., *Kanehira* and *Okuya* in 1933 (FU); Ngerebe'ed, 5–10 m, *Fosberg 32270* (US).

Yap: Malai Village, *Cushing 510* (US); Colonia, possibly planted, *Fosberg 59989* (US, BISH).

Truk: Moen: Near hotel, 50–100 m, *Evans 755* (US, BISH, POM, L).

Lukunor: Lukunor I., *Anderson 2141* (US, BISH, POM,

NY, L).

Satawan: (Anderson, seen but not collected.)

Nukuoro: Nukuoro (Matakana) I., *Fosberg 26202* (US, BISH, POM, NY, L).

Ponape: Tonomai, *Takamatsu 989* (BISH, US); Tolotom, *Takamatsu 1050* (BISH); Wone, *Takamatsu 1027* (BISH); Mataranium, cult. *Kanehira 790* (FU).

MARSHALL ISLANDS.—Likiep: Likeip I., *Fosberg 27023* (US, BISH).

Hemigraphis Nees

Hemigraphis Nees in de Candolle, Prodr., 11:722, 1847.

Herbs (or shrubs), creeping or erect, stems tending to be geniculate; leaves toothed, crenate or entire margined; flowers in terminal or pseudoaxillary bracteate spikes, bracts foliaceous but not very showy, imbricate or not, bracteoles small; calyx 5-parted almost to base, lobes subequal; corolla falling very readily, nearly regular, not bilabiate, tube slender, throat campanulate, lobes subequal, contorted in bud; stamens 4, in two pairs, anthers 2-celled; disk scarcely developed, style filiform, smaller stigma-lobe obsolete; capsule narrowly elliptic, elastically dehiscent, retinacula curved, pointed, flat, disk-like, 3–8 seeds in a cell.

A medium-sized genus native to China, South Asia, Indonesia to Australia and western Pacific Islands; one species cultivated as an ornamental; at least three native or introduced species in Micronesia.

Key to Micronesian Species of *Hemigraphis*

1. Leaves narrowly elliptic-lanceolate *H. palauana*
1. Leaves elliptic or oblong to suborbicular or ovate-cordate 2
 2. Leaves broadly ovate-cordate, tending to be bullate, bluish or metallic above, deep purple beneath, bracts ovate, somewhat imbricate *H. alternata*
 2. Leaves orbicular to oblong or elliptic, scarcely or usually not cordate, green, bracts spatulate or clawed, not imbricate *H. reptans*

Hemigraphis alternata (Burm. f.) T. Anderson

Hemigraphis alternata (Burm. f.) T. Anderson, Journ. Linn. Soc., 7:114, 1864.—Stone, Micronesia, 6:534–535, 1971.—Souder, In Guam Gardens, 45, 1974.—Fosberg, Sachet, and Oliver, Micronesica, 15:256, 1979.

Ruellia alternata Burmann f., Fl. Ind., 135, 1768.

Hemigraphis colorata (Blume) Hallier f., Nov. Act. Acad. Natur. Cur., 70:199, 1897.—Merrill, Philip. Journ. Sci. Bot., 9:142, 1914.

Prostrate pubescent herbs, rooting at nodes; leaves broadly ovate-cordate, to 9 × 5 cm, apex very slightly blunt acuminate, base rounded to subcordate or usually cordate, margin crenate

or crenate-serrate, blade bluish or metallic green above, deep purple beneath, very sparsely pubescent, ciliate, with abundant linear cystoliths, petiole 1.5–4 cm, pubescent; spikes pedunculate, 2–5 cm or more long, densely flowered or looser toward base, rarely branched at base, bracts imbricate except sometimes in basal part, ovate-acute in outline but apex rounded, to 12 × 5 mm, margin ciliate; calyx lobes linear-attenuate, 9–10 mm long, sparsely long-ciliate; corolla 15–20 mm long, campanulate-funnelform, lobes rounded, somewhat spreading; stamens well-included; fruit unknown.

Probably a native of south Asia.

Ornamental, planted at least in Guam and Palau.

VERNACULAR NAME.—metal leaf (Guam: Souder, 1974).

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: *G.E.S. 343* (BISH, K, US); Titalao Housing, Orote Pt., *Cone* in 1964 (GUAM).

CAROLINE ISLANDS.—Palau: Babeldaob: Ngeremtengel, 1 m, *Fosberg 32445* (US, BISH, POM).

Hemigraphis palauana Hosokawa

Hemigraphis palauana Hosokawa, Trans. Nat. Hist. Soc. Formosa, 25:(140)127, 1935.—Kanehira, Enum. Micr. Pl., 413, 1935.

Hemigraphis angustifolia sensu Fosberg, Sachet, and Oliver, Micronesica, 15:257, 1979.—Fosberg et al., Vascular Pl. Palau, 40, 1980 [non Hallier f., Nov. Act. Acad. Natur. Cur., 70:203, t. 10, 1897].

Herb to 2 dm tall, slightly decumbent at base, rooting at lowest nodes, leaves somewhat crowded at base of plant, stems retrorse pubescent rarely densely so and “tomentulose”; leaves narrowly elliptic or elliptic-lanceolate, to 10 × 1.5 cm, apex bluntly acute or slightly acuminate, base acute, margin undulate, blade sparsely pubescent above and beneath, with abundant linear cystoliths above, main veins about 5 on a side, network obscure, petiole slender, 5–12 mm long; spikes (racemes) slender, 1–8 cm long, sparsely flowered, 2 flowers in most bract axils, bracts linear-lanceolate or lanceolate, mostly about 1 cm long, lowest to 1.5 cm, apex blunt, not at all imbricate; flowers shortly pedicellate to almost sessile; calyx lobes tending to be coherent at first in lower half, narrowly lanceolate-attenuate, about 7–8 (–10) mm long, subglabrous, margins somewhat scarious; corolla about 12–15 mm long, funnel form, white with maroon spot in throat, lobes somewhat spreading, orbicular-obovate; stamens well included; capsule narrowly fusiform, 7–8 (–12) mm long, containing 6–8 (–15?) seeds, these 1 mm diam., dark brownish.

Apparently endemic to Palau, judging by the the rather uniform series of specimens from there. This was at first referred by us to *H. angustifolia* Hallier f., on the basis of similarity to the Amboina specimen so determined by Merrill. Comparison with Hallier's illustration, however, shows that it differs in leaf outline, in the lax inflorescence and in the linear bracts. It is closer to, but not identical with, Hallier's

illustration of his *H. stenophylla*, of Celebes.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: s. l., *Ledermann 14124* (K, B). Babeldaob: Mt. Galasumao, *Hosokawa 7179* (BISH, A, isotypes); Ngaraard Munic., Chol, 5 m, *Canfield 315* (US); Ngarrard, *Otobed PW-10170* (US). Koror: *Kanehira and Okuya 39* (FU); *Kanehira and Hatusima 4437* (FU).

Hemigraphis reptans (Forster f.) T. Anderson

Hemigraphis reptans (Forster f.) T. Anderson in Hemsley, Challenger Rep. Bot., 1(3):173, 1885.—Koidzumi, Bot. Mag. Tokyo, 29:245, 1915.—D. Anderson, Atoll Res. Bull., 7:1–4, 1951.—St. John, Pac. Sci., 5:285, 1951.—Fosberg and Sachet, Atoll Res. Bull., 92:35, 1962.—Fosberg, Sachet, and Oliver, Micronesica, 15:257, 1979.—Fosberg et al., Vascular Pl. Palau, 40, 1980.

Ruellia reptans Forster f., Prodr., 44, no. 242, 1781.

Hemigraphis pacifica Hosokawa, Trans. Nat. Hist. Soc. Formosa, 25:(140)127, 1935.—Kanehira, Enum. Micr. Pl., 413, 1935.—Fosberg, Sachet, and Oliver, Micronesica, 15:257, 1979.—Fosberg et al., Vascular Pl. Palau, 40, 1980.

Herb with decumbent stems, rooting at lower nodes, distal parts ascending, somewhat to strongly pubescent; leaves up to 8 × 4 cm, usually much smaller, from suborbicular to broadly ovate, oblong, or elliptic, extremely variable even on same plant, apex rounded to obtuse, or bluntly acute, base acute to rounded or even subcordate, margins sub-entire or undulate to crenate, blade with abundant linear cystoliths, from almost glabrous to sparsely pubescent, more densely so beneath, petioles usually more or less pilose, 1–3 (–4.5) cm long; spikes pedunculate, usually 2–5 cm, but reaching 9 cm, fertile part 1–5 cm, rarely branched, loosely flowered, bracts longer at lower nodes, up to 1.5 (–2?) cm long, these petiolate, clawed or spatulate, blade ovate to obovate, decurrent on petiole, upper ones less to not at all petiolate, ciliate; flowers 1 or usually 2 in the axil of a bract, if 2, appearing to be one outside the other on the petiole base, which is at 90° to the rachis, then curved abruptly upward; calyx lobes lightly coherent in basal half, separating, narrowly lanceolate long attenuate at apex, 7–10 (–13) mm long, almost glabrous or very slightly strigose or ciliate in free distal part to sparsely but conspicuously ciliate with long spreading hairs; corolla tubular at base, funnelform, about 15 mm long, lobes somewhat spreading, round or obovate, minutely puberulent on outside, white to lavender; stamens included; capsule 4-sided, lanceolate, 8–9 mm long, about 12 seeds, these discoid slightly oblique or subreniform, sides smooth, brown, becoming almost black, 1–1.2 mm across, hilum white.

This is an extremely variable species, with more or less distinguishable local populations, not named here because of lack of sufficient material and lack of understanding of the variation outside Micronesia. Some of these have been given names but are inadequately characterized and seemingly do not

have definite geographic ranges. A variant in Palau has been described as *Hemigraphis pacifica* Hosokawa. Although the leaves on the type collection are more acute than is common in this species we cannot correlate this leaf shape with other characters. A similar shape seems to be found occasionally in Melanesian collections, and it is possible that intensive biosystematic studies of *H. reptans* might show that it has some significance.

At present we can only suggest several tendencies that seem to be related to geography. Marshall and Gilbert Islands collections have consistently smaller leaves, ranging from almost orbicular to, when well developed, broadly oblong, or oval, rarely elliptic, ordinarily not larger than 3 × 2 cm, plant commonly rather pubescent.

Plants from the western Carolines (Palau) and Kapingamarangi, have larger leaves, up to 6 × 4 cm, and more elliptic than oblong, less pubescent than material from the Marshalls.

The type of *H. pacifica*, *Hosokawa* 7400, fits here except that it has leaves to 10 × 4 cm, acute, with margins more crenate than usual. Two collections from Palau, *Fosberg* 32028 and *Hosokawa* 9294, differ in having the leaves unusually pale beneath and calyx lobes about 13 mm long, while in most specimens they are 7–10 mm.

A single Guam collection, *Fosberg* 35620, growing as a weed in nursery pots, has large thin, oblong leaves with subcordate bases, undulate margins, and veins pubescent beneath, unusually long peduncles but very short spikes, and a very short corolla with anther tips exerted. Its calyx lobes are not as attenuate as usual in this species. It is the only collection from the Marianas, and might be a weed from anywhere.

VERNACULAR NAMES.—

Keinga maitai (Kapingamarangi: Werua I., *Niering* 592)
wut lomjen (Arno Atoll: Anderson, 1951)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: Mangilao, 65 m, *Fosberg* 35620 (US).

CAROLINE ISLANDS.—Palau: s. l., *Ledermann* 14297 (K), 14081 (K, B), 14146 (K). Babeldaob: Koiguru, *Hosokawa* 9294 (A, BISH); in wet grassland facing on Grasmao cascade, *Hosokawa* 7120 (A); Ngatpang, *Tuyama* 9355 (K); Mt. Luis-Almonogui, *Kanehira* and *Hatusima* 4951 (FU); Galdok, *Hatusima* 5083 (FU). Koror: s. l., *Kanehira* 463 (FU, BISH); s. l., *Kanehira* and *Hatusima* 4445 (FU); in primary forest on coral near Almizu, *Hosokawa* 7400 (A, isotype of *H. pacifica*). Aulupse'el: Dii'ebachel Beach, 10 m, *Evans* 587 (US, BISH, POM); Risong, Matuker Bay, 30–50 m, *Fosberg* 47552 (US, BISH, POM, K). Urukthapel: *Tuyama* 10104 (K); middle NE coast of Magaiald, 2 m, *Fosberg* 25866 (US, BISH, POM, BM); E end, road to lighthouse, 1–5 m, *Fosberg* 32028 (US, BISH, POM, B, L).

Kapingamarangi: Werua I., *Niering* 592 (US), 544 (US); Machiro I., *Townes* in 1946 (US); *Fosberg* 26148 (US, POM, K, MO, L).

MARSHALL ISLANDS.—Kwajalein, Fosberg, seen growing in pot in 1956.

Majuro: Majuro I., village, *St. John* 21433 (BISH); west end, (Laura) of Majuro I., *Fosberg* 26963 (US, HAW, POM, MO, K).

Arno: Ine I., Ine village, *Stone* 1147 (US, POM); Arno I., *Anderson* 3764 (US, BISH, POM); Ine I., Ine village, *Anderson* 3734 (US).

Jaluit: Jabor I., *Fosberg* 41384 (US); Pinglap I., *Fosberg* 39461 (US).

GILBERT ISLANDS.—Butaritari: Butaritari I., *Herbst and Allerton* 2709 (US).

Hygrophila R. Brown

Hygrophila R. Brown, Prodr., 479, 1810.

Synnema Bentham in De Candolle, Prodr., 10:938, 1845.

Cardanthera F. Hamilton ex Nees, DC Prodr., 11:67, 1847.

Herbs with sessile leaves; flowers with 2 bracteoles, solitary or in axillary shortly dichasial or coiled cymes or panicles; calyx lobes equal or unequal; corolla tube cylindric or gradually dilated, stamens 4 or 2 with the other 2 reduced to staminodes; posterior lobe of stigma suppressed; capsule generally with 4 grooves, (2–) 4 to many seeds in a cell, placentae from base to apex, retinaculæ small, hook-like.

A small pan-tropical genus, mostly aquatics; one species locally established in Guam.

Hygrophila triflora (Roxburgh) Fosberg & Sachet

Hygrophila triflora (Roxburgh) Fosberg & Sachet, *Baileya*, 21:147, 1981; 22:138–140, 1984.

Ruellia triflora Roxburgh, Hort. Beng., 46, 1814.

Limnophila sp. of Moore et al., Inv. Mapping Wetl. Veg. Marianas, 13, 1977.

Elongate, branching prostrate to ascending herb, stems somewhat 4-angled, marked with numerous short white lines (rhapid bundles?), internodes straight, curvature of stem by small bends at nodes, stem spreading glandular-pilose, especially near nodes, branchlets at first slender compared with main stems; leaves of fertile shoots broadly ovate to broadly elliptic or slightly obovate, about 3 × 2 cm, rarely to 4.5 × 2.5, obtuse or rounded at apex, attenuate-contracted at base, decurrent on short petiole almost to base, margins sharply and conspicuously serrate except at base, sparsely puberulent or hispidulous, more so on veins on both surfaces, leaves of sterile shoots variously pinnately laciniately lobed or deeply cut, up to 6.5 × 4.5 cm; flowers axillary, subsessile 1–2 in an axil or pedunculate 2–3 flowered bracteate cymules, the peduncle rarely as much as 1 cm long, glandular-pilose, bracts narrowly oblong or obovate, with several teeth, pilose, flowers on pedicels up to 1 mm long, a small bracteole at summit of each, calyx 1 cm long, cut half or more into 5 linear-subulate stiffish lobes, the whole glandular pilose, base abruptly contracted; corolla about 12 mm long, deeply bilabiate, the tube cylindric,

3 mm long, the throat 3 mm long, dilated and almost gibbous, upper lip concave erect, tapering to a blunt emarginate apex, the lower lip reflexed, oblong, shortly 3-lobed, the palate with a few stiff hairs, its under side with 2 rows of 4-5 deeply rectangular transversely oriented pockets; fertile stamens 4, in 2 unequal pairs curved into the hollow of the upper lip, one sterile filament, anthers bluntly ovate-sagittate; style about 15 mm long, filiform or subulate, hispidulous, apex hooked, stigma minute; fruit not seen.

Native of India.

Well established locally and very abundant in wet ground and edges of water around Agaña Spring, probably an escaped aquarium plant.

GEOGRAPHIC RECORD AND SPECIMENS EXAMINED

MARIANAS ISLANDS—Guam; Agaña Spring, *Moore 762* (US, BISH, POM), *811* (US), *1096* (US), *1098* (US), *1118* (US), *1119* (US), *1120* (US), *1143* (US); *Fosberg & Moore*, 58335 (US, BISH, POM, NY, L).

Justicia L.

Justicia L., Sp. Pl., 15, 1753; Gen. Pl., ed. 5, 10, 1754 [= 1753].
Beloperone Nees in Wallich, Pl. As. Rar., 3:76, 102, 1832.
Jacobinia Nees in Moricand, Pl. Nouv. Amer., 156, 1847.

Herbs or rarely weak shrubs, leaves entire; flowers variously arranged, often spicate, spikes often with imbricate bracts, flowers bracteolate; calyx deeply 5-(rarely 4)-parted, lobes linear, subequal; corolla bilabiate, with usually short, straight or curved tube, upper lip entire or bidentate, lower 3-lobed, often reflexed; stamens 2, inserted in throat of corolla, anthers 2-celled, cells separated and more or less superposed, often appendiculate; disk cup-like, entire or lobed; pistil with capitate or bidentate stigma, filiform style, ovary with 2 ovules per locule; capsule short-stipitate, seeds 2 or 1 in a cell, flat, suborbicular.

A large pantropical genus with a few cultivated and some rather weedy species, three cultivated in Micronesia.

Key to Micronesian Species of *Justicia*

- 1. Inflorescences axillary, cymose, bracts small, scale-like *J. spicigera*
- 1. Inflorescences terminal, spicate, bracts large, foliaceous, imbricate 2
- 2. Spikes thick, not notably 4-sided, erect, flowers pink to purple, about 6 cm long *J. carnea*
- 2. Spikes slender, 4-sided, tending to droop, flowers white, about 3-4 cm long *J. brandegeana*

Justicia brandegeana Wasshausen & Smith

Justicia brandegeana Wasshausen & Smith in Reitz, Fl. Illustr., Catar. 1, Acanth., 102, 1969.

Beloperone guttata Brandege, Univ. Calif. Pub. Bot., 4:278, 1912.—Fosberg and Sachet, Atoll Res. Bull., 92:34, 1962.—Souder, In Guam Gardens, 46, 1972.—Randall et al., Univ. Guam Mar. Lab. Tech. Rept., 12:55, 1974 [non *Justicia guttata* Wallich, Pl. As. Rar., 1:24, t. 28, 1830].
Justicia fulvicoma sensu auct.—Fosberg, Sachet, and Oliver, Micronesica, 15:257, 1979.—Fosberg et al., Vascular Pl. Palau, 40, 1980 [non Schlechtendal and Chamisso, Linnaea, 6:369, 1831].

Slender shrub or herb to 1 m, stems tending to be geniculate, antrorsely subappressed pilose, internodes swollen, fleshy just above nodes; leaves ovate, to 7 cm long, 1.5-3 cm wide, apex bluntly acute to somewhat acuminate, base acute to obtuse, thin, softly appressed pilose especially along nerves, on slender petioles up to 2 rarely 3 or even 4 cm long; flowers in spikes, these 1-3 at terminal node and on ends of short lateral branches, up to 15 cm long, nodding to drooping, with 4 ranks of thin broadly ovate subacute, subcordate overlapping bronze to roseate bracts, softly pilose above and on nerves beneath, bracteoles similar but much smaller and narrower, pale, a pair enclosing the base of each flower; calyx lobes broadly lanceolate, acuminate aristate, pilose, pale green; corolla tubular, white, softly pilose without, glabrous within, almost straight, base of tube swollen or ventricose, distal third divided into 2 narrow lips, the upper erect, shortly bifid, sub-galeate or hooked, lower cuneate, straight, divergent at a small angle from tube, shortly trilobed, lobes ovate, rounded at apex, palate elongate, deeply plicate, broadly cross-banded with purple, swollen base filled with gummy clear nectar; stamens with stout, stiff white filaments attached about half-way up tube, straight, with deep purple anthers, the 2 cells strongly offset, basely exerted; ovary subglobose, style capillary, with beard-like globules of nectar, stigma minute, punctiform, one lobe scarcely developed; capsule squarish-ovoid, pilosulose, thin walled, on a broad stipe, apex acute, retinacula spoon-shaped.

This species, usually placed in the segregate genus *Beloperone*, when put in *Justicia* has been called *Justicia fulvicoma*, a principally Mexican species, with short erect spikes and narrow bracts. The two seem to be sufficiently different to be maintained. We have not seen seeds on the cultivated specimens studied. Though known from Guam, Kwajalein, Jaluit, and Nauru, we have only seen specimens from Nauru, one of which has pale canary yellow bracts (*Fosberg 58721*) and may be the cultivar "yellow queen," though the bracts of that are said to be chartreuse-green. This plant is known in Nauru as "yellow shrimp-plant."

GEOGRAPHIC RECORD AND SPECIMENS EXAMINED

NAURU ISLAND.—Denigomodu, W side of island, planted in pot, *Fosberg 58720* (US), *58721* (US).

Justicia carnea Lindley

Justicia carnea Lindley, Bot. Reg., 17, t. 1397, 1831.—Fosberg, Sachet, and Oliver, Micronesica, 15:257, 1979.
Jacobinia carnea (Lindley) Nicholson, Ill. Dict. Gard., 2:206, 1885.—Souder,

In Guam Gardens, 54, 1974.

Jacobinia obtusior (Nees) Bailey, Gentes Herb., 4:136, 1923.

Shrub 1–2 m tall, stems squarish and tending to be grooved, thinly to moderately tomentose, young growth tomentose; leaves large, to 30 × 10 cm or even larger, ovate, strongly but gradually acuminate, base obtuse, then abruptly decurrent for some distance on petiole, under surface thinly puberulent, especially on nerves, much less so on upper surface, petioles 3–10 cm long, usually wide-spreading; spikes terminal, very showy, up to 12 (–15) cm long, to 9 cm wide, in very luxuriant specimens tending to be inconspicuously paniculate, bracts overlapping, foliaceous, to 3 × 1.5 cm, smaller upward, lower ones tending to be acuminate, upper rounded at apex, tomentulose on nerves, bracteoles linear, ciliate, 1–2 cm long; calyx divided almost to base, lobes 5, linear-lanceolate, somewhat unequal, up to 9 mm long, ciliate towards the acute apex; corolla pink to rose-purple, about 6 cm long, straight or slightly curved, strongly curved at apex, tube 3 cm long, slender, slightly ampliate upward, upper lip erect, curved over the anthers at tip, apex only minutely notched or not at all, lower lip reflexed to almost a right-angle, clawed, claw about 6–7 mm, limb expanded, oblong-obovate and deeply trilobed, and recurved, the whole corolla thinly glandular-pilose; stamens not quite equalling corolla, filaments strongly curved at summit, anthers broadly oblong, somewhat curved, about 2–5 mm long, dark purple, cells slightly offset, style tip slightly exerted from upper lobe, stigma only very slightly enlarged; capsule not seen.

Native of Brazil and neighboring areas usually placed in the genus *Jacobinia*, often as *Jacobinia magnifica* (Nees) Bentham or *J. obtusior* (Nees) Bailey. It is frequently cultivated in warm countries and in greenhouses in temperate areas. Said to have been introduced into Guam by Mayo Nursery, called, in error, *Jacobinia obtusifolia*. Now sparingly planted.

VERNACULAR NAME.—Pink jacobinia (Souder, 1974).

No specimens available from Micronesia.

Justicia spicigera Schlechtendal

Justicia spicigera Schlechtendal, Linnaea, 7:395–396, 1832.—Fosberg, Sachet, and Oliver, Micronesica, 15:257, 1979.

Jacobinia spicigera (Schlechtendal) Bailey, Standard Cycl. Hort., 1715, 1915.

Shrubby or somewhat scandent, stems woolly-pilose, somewhat geniculate and nodose; leaves ovate to elliptic, acute to acuminate at apex rounded to acute and somewhat decurrent at base into a short petiole, blade up to (rarely) 15 × 6 cm or even larger, lower surface sparsely pilosulous, more so on veins, less on upper surface; flowers in sparsely woolly-pilose axillary (rarely terminal?) compound, or thyrsoïd, scorpioid cymes, these to 10 cm long, rarely more, with 1–2 (–3) internodes above peduncle, branched simple or dichotomous, flowers sessile, conspicuously secund, bracts much-reduced, scale-like, triangular; calyx glabrous divided to 3/4 to base into 5

lanceolate somewhat acuminate lobes about 2 mm long; corolla orange to scarlet, glabrous, about 3–4 cm long, straight to slightly curved, tube 2–2.5 cm, gradually dilated upward, limb in bud tapering to a blunt apex, upper lip erect, lanceolate, entire, minutely cucullate, lower wider, oblong, with 3 short rounded lobes, becoming strongly revolute and even coiled or rolled; stamens almost equalling upper corolla lobe, filament strong, glabrous, anthers 2 mm long, sagittate, to broadly elliptic, black or rarely brown when dry; style capillary slightly exceeding corolla, glabrous or very sparsely long-pilose; stigma very shortly unequally bilobed; capsule about 2 cm long, stipe about 1 cm, enlarged part oblong, slightly beaked; seed not seen.

A common Mexican species, occasionally cultivated as an ornamental, collected once in Micronesia. It seems to be rarely collected in fruit.

It is unusual in the genus *Justicia* in its axillary cymose inflorescences and in the very reduced bracts.

GEOGRAPHIC RECORD AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: Agaña Heights, planted in garden, 50 m, Fosberg 43471 (US, BISH, POM).

Odontonema Nees

Odontonema Nees in Endlicher, Gen. Pl. Suppl., 2:63, 1842 [Mar–Jun]; Linnaea, 16:300, 1842 [Jun 1].

Shrubs and herbs, leaves entire, opposite; flowers in terminal raceme-like thyrses, or these branched and paniculate; bracts and bracteoles small; calyx short, deeply divided; corolla tubular, more-or-less bilabiate, (4–) 5 lobed, stamens 2, attached near middle of corolla tube, staminodia 2, united with bases of fertile stamens, or 0; small style with stigma mostly shortly 2-lobed; capsule stipitate.

A small tropical American genus with 2 or 3 species occasionally cultivated as ornamentals, one rarely in Micronesia.

Odontonema callistachyum (Schlechtendal & Chamisso) O. Kuntze

Odontonema callistachyum (Schlechtendal & Chamisso) O. Kuntze, Rev. Gen. Pl., 2:494, 1891.

Justicia callistachya Schlechtendal & Chamisso, Linnaea, 6:370, 1831.

Thysacanthus callistachyus (Schlechtendal & Chamisso) Nees in de Candolle, Prodr., 11:326, 1847.

Odontonema strictum at least sensu auct. Pacific.—Stone, Micronesia, 6:535, 1971.—Souder, In Guam Gardens, 57, 1971.—Fosberg, Sachet, and Oliver, Micronesica, 15:258, 1979 [prob. non (Nees) O. Kuntze, Rev. Gen. Pl., 2:494, 1891].

Shrub or suffrutescent herb, up to 2 m tall, glabrous to puberulent; leaves elliptic, up to 25 × 10 cm, occasionally much larger on fast-growing shoots, acuminate at apex, base decurrent to a short petiole, puberulent beneath along midrib; inflorescence up to 15 (–30) cm long, narrow, rarely branched

at base, peduncle up to 15–20 cm, with or without 2 reduced leaves part way up, rhachis and cymules puberulent, cymules very short, fasciculiform, peduncle 1–3 (–5) mm long, flowers 3 or more, congested, subtended by tiny triangular mucronulate bracts and similar but smaller bracteoles, calyx campanulate, 2–2.5 mm long, divided about half way into 5 subequal narrowly ovate acuminate lobes; corolla 25–26 mm long, red, tubular, tube slightly ampliate upward, scarcely bilabiate, 5 more or less similiar short lobes spreading, ovate, rounded at apex; fertile stamens 2, anthers 2.5 mm long, included; style capillary, 13 mm long, glabrous, stigma minutely capitate; capsule stipitate, ellipsoid (none seen on cultivated specimens).

A variable species, native from Mexico to Panama and widely cultivated, usually under the name *Odontonema strictum*. The two seem almost indistinguishable, but *Justicia stricta* was described as having acute corolla lobes. The genus needs revision. Known in Micronesia only from Guam.

VERNACULAR NAME.—fire spike (Souder, 1974).

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

MARIANAS ISLANDS.—Guam: Mangilao, cultivated, 65 m, Fosberg 35624 (US).

Pseuderanthemum Radlkofer

Pseuderanthemum Radlkofer, Sitzungsab. Math.-Phys. Cl. Akad. Wiss. Munch., 13:285, 1883.

Shrubs, rarely reaching small tree size, vegetative parts usually glabrous; leaves entire or toothed; flowers in spike-like or branched thyrsoid inflorescences or in axillary cymules, or solitary, 1–3 in axils of bracts; calyx divided essentially to base; corolla hypocrateriform, tube slender not or scarcely enlarged upward, lobes patent, imbricate in bud, equal or two slightly smaller; fertile stamens 2, staminodia 2 or none, anthers 2-loculed; ovary with 2 ovules in a cell; capsule stipitate, retinacula sharp or blunt; seeds flat, round or angled, pitted or smooth.

A medium sized pan-tropical genus, with several commonly planted ornamental species.

Key to Micronesian Species of *Pseuderanthemum*

- 1. Inflorescences axillary, cymose *P. laxiflorum*
- 1. Inflorescences terminal 2
- 2. Inflorescence raceme-like, flowers single or in 2s or 3s on rhachis 3
- 3. Rhachis 4–6 cm long, slightly pilosulous, flowers opposite or subopposite on rhachis *P. palauense*
- 3. Rhachis elongate, to 24 cm, densely hirtellous, flowers 1–3 at a node, not opposite *P. inclusum*
- 2. Inflorescence thyrsoid, flowers in reduced cymules on rhachis 4

- 4. Leaves strongly acuminate, corolla tube slender, about 4 cm long *P. acuminatissimum*
- 4. Leaves obtuse to slightly acuminate, corolla tube 10–12 mm long *P. carruthersii*

Pseuderanthemum acuminatissimum (Miquel) Benoist

Pseuderanthemum acuminatissimum (Miquel) Benoist in Lecomte, Fl. Gen. Indo-chine, 4:721, 1935.—Glassman, Bish. Mus. Bull., 209:102, 1952 [as *P. sp.*].—Fosberg, Sacht, and Oliver, Micronesica, 15:258, 1979.—Fosberg and Sacht, Smith. Contr. Bot., 45:26, 1980.

Eranthemum acuminatissimum Miquel, Fl. Ind. Bot., 2:835, 1856 [1858].

Shrub to 2.5 m tall, stems squarish, younger parts and inflorescence puberulent with curved hairs (this not very evident in the one over-mature Micronesian specimen); leaves elliptic said to be purple, up to 20 × 7 cm, apex notably acuminate, base acute, slightly decurrent, blade thin, main veins 10–11 on a side, anastomosing into a network before reaching margin, glabrous, cystoliths minute, short-linear, petiole 1.5–4.5 cm long; inflorescence very narrowly thyrsoid, up to 21 × 1–1.5 cm (not counting spreading corollas), on a long (to 10 cm) or short (to 3 cm) peduncle, cymules densely flowered; bracts and calyx lobes narrowly lanceolate, attenuate, margins glabrous or densely ciliate; corolla tube slender, 4.0–4.3 cm long, lobes 10–12 × 5–6 mm, obovate to elliptic, white, one slightly larger and notably punctate, strongly spreading to somewhat reflexed; anthers exerted, 2 mm long, oblong, somewhat lobed and bluntly pointed at base, slightly curved; style filiform, glabrous, stigma minute, blunt, exerted; capsule 4–6 mm long, stipitate, fertile part bluntly ovoid. (Description, except fruit, mostly from Thailand and Indochina specimens).

A species otherwise known from the Indochinese Peninsula, probably accidentally, or deliberately, introduced in Ponape. The Ponape specimen has glabrous flowers while the 2 Asiatic specimens seen have more or less puberulent or pilose flowers and bracts.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

CAROLINE ISLANDS.—Ponape: "U" District, Glassman 2572 (US).

Pseuderanthemum carruthersii (Seemann) Guillaumin

Pseuderanthemum carruthersii (Seemann) Guillaumin, Ann. Mus. col. Marseille, VI, 5–6:48, 1948.—Fosberg, Phytologia, 5:290, 1955.—Stone, Micronesica, 6:535, 1971.

Eranthemum carruthersii Seemann, Fl. Vit., 185, 1866.

Eranthemum eldorado Hort., Williams, Cat., 21, 1877.

Pseuderanthemum eldorado (Hort.) Radlkofer, Sitzungsab. Math.-Phys. Cl. Akad. Wiss. Munch., 13:286, 1883.

Glabrous shrub or small tree, young internodes squarish; leaves broadly ovate to broadly elliptic, acute to obtuse, often very slightly and abruptly acuminate or mucronate, base obtuse

to rounded, often slightly decurrent, veins visible but not prominent, petiole short, to 1.5 or 2 cm; thyrses narrow, with basal branches usually somewhat more developed than above, thyrses frequently paniculately arranged at the ends of branches, glabrous or obscurely puberulent, bracts reduced to ovate or oblong strongly ciliolate green scales, 2–5 mm long; calyx divided almost to base into (4)–5 broadly lanceolate acute segments, about 3.5–4 mm long, thinly puberulent, margins strongly ciliolate; corolla white, pink, or crimson, tube about 12 mm long, 1.5 mm wide, slightly dilated upward, lobes 5, patent, oval or broadly ovate, rounded at apex; anthers curved, oblong, about 1.5 mm long, exserted, summit of filaments curved; style filiform, very minutely and sparsely pilosulous (or glabrous?), stigma exserted, very shortly bifid; fruit not seen, probably does not set in cultivated clones.

Plant described originally from Erromanga, New Hebrides (type *McGillivray s.n.* (K)), not known with certainty in wild state, possibly native in Melanesia; somewhat similar plants are known wild in the New Hebrides. A number of varieties are widely planted as ornamentals in many tropical countries and islands. These are usually treated as species, but the differences between them are slight, mostly in color patterns in leaves and flowers. At least three distinguishable ones are known in Micronesia. They are here treated as varieties, because nothing is known of their origins. They could equally well be called cultivars.

Key to Micronesian Varieties of *Pseuderanthemum carruthersii*

1. Leaves clear green, corolla white with crimson-purple dots around throat var. *carruthersii*
1. Leaves yellow veined or purple beneath 2
 2. Leaves green or purple-patched above, dark purple beneath, corolla mostly crimson or maroon, with white markings above var. *atropurpureum*
 2. Leaves green with bright yellow veins, corolla lobes white with crimson or purple dots var. *reticulatum*

Pseuderanthemum carruthersii (Seemann) Guillaumin var. *carruthersii*

Pseuderanthemum carruthersii (Seemann) Guillaumin var. *carruthersii*.—Catala, Atoll Res. Bull., 59:105, 1957.—Fosberg and Sachet, Atoll Res. Bull., 92:35, 1962.—Fosberg, Sachet, and Oliver, Micronesica, 15:258, 1979.—Fosberg et al., Vascular Pl. Palau, 40, 1980.

Pseuderanthemum reticulatum sensu Taylor, Plants of Bikini, 198, 1950 [non (Hort.) Kanehira, Enum. Micr. Pl., 413, 1935].

Eranthemum eldorado (Hort.) Williams ex Just. Bot. Jahresb., 135, 1877 [1879].—Okabe, Journ. Jap. For. Soc., 23:270, 1941.

Pseuderanthemum atropurpureum sensu St. John, Pac. Sci., 2:112, 1948 [non (Bull.) Radlkofer, Sitzungsab. Math.-Phys. Cl. Akad. Wiss. Munch., 13:286, 1883].

Leaves green above and beneath, acute to obtuse, or

mucronate, stems green when young, corolla lobes white with crimson or purple dots near throat.

Widely planted throughout Micronesia.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Saipan: Kagman Peninsula, hedge along abandoned building *Courage 35* (US).

Rota: *Necker R8* (US); wood along N shore from Songsong village, 5–10 m, *Sachet 1753* (US); *Cheatham 179* (US); trail up to Sabana region *Evans 2078* (US).

Guam: s. l., *G.E.S. 309* (US, BISH); Andersen Field, *Fosberg 35394* (US, BISH); *Guerrero 721* (BISH); Camp Quezon, Mangilao, *Stone 4077* (GUAM); Orote Pt., *Swezey* in 1936 (BISH).

CAROLINE ISLANDS.—Palau: Babeldaob: Ngiwal, *Emmons 83* (US). Koror: Ngerebe'ed, *Fosberg 32500* (US, BISH, POM, NY).

Sonsorol: Village area and cemetery, *Berry 40* (US, BISH).

Yap: s. l., *Wong 509* (US, BISH); road across from Catholic mission, *Blackburn 235* (US).

Ulithi: Fassarai I., in village, planted, 2 m, *Fosberg & Evans 47398* (?).

Woleai: Falalop I., Falalop village, *Evans 472* (POM).

Faraulap: Faraulap I., in outskirts of village, 2 m, *Fosberg & Evans 47346* (US), *47352* (US).

Lukunor: Lukunor I., *Anderson 2137* (US, BISH, POM, NY, L).

Nukuoro: Nukuoro (Matakena) I., *Fosberg 26216* (US, BISH, POM).

Ponape: Kolonia, planted, *Fosberg 60482* (US).

Pingelap: Pingelap I., village, *St. John 21489* (BISH).

Kusaie: Lele Island, planted, 1–5 m, *Fosberg 26554* (US, BISH, POM, NY, L).

WAKE ISLAND.—Seen in 1961 (Sachet) but not in 1963 (Sachet, Fosberg); Metais area, *Ward 218* (US).

MARSHALL ISLANDS.—Rongelap: Rongelap I., *Taylor 46-1389* (BISH, US).

Utirik: Utirik I., 1–3 m, *Fosberg 33690* (US, BISH, NY, POM, L).

Ujae: Ujae I., 1–3 m *Fosberg 34295* (US).

Wotho: Wotho I., *Fosberg 34236* (US, BISH, NY, POM, L).

Lae: Lae I., 1–3 m *Fosberg 34098* (US, BISH).

Kwajalein: Seen by Fosberg, growing in pot, 1956, 1958. Ebeye I., *Fosberg 31206* (US). Ennylabegan: *Herbst 8915* (US).

Ailuk: Ailuk I., 1–3 m, *Fosberg 33973* (US, BISH); *St. John & Cowan 21820* (BISH).

Likiep: Likiep I., *Fosberg 27030* (US).

Wotje: Armed I., *St. John & Cowan 22654* (BISH).

Ailinglupalap: Bikajle (Bigatyelang) I., *Fosberg 26868* (US, BISH, POM).

Majuro: W end of Majuro I., 1–5 m, *Fosberg 26950* (US, BISH).

Arno: Ine I., *Stone 1008* (POM); *Anderson 3660* (US, BISH, POM, NY, L).

Jaluit: Medijado (Mejat'to) I., planted, *Fosberg 26782* (US, BISH, POM, NY, L); *Fosberg 39423* (US).

GILBERT ISLANDS.—Marakei: Rawannawi, *Raulerson 3839* (US).

Tarawa: Bairiki, *Adair 145* (K, BISH); Abaokoro, *Adair 107* (BISH); Betio, *Adair 92* (K, US); Bikenibeu, *Raulerson 3653* (US).

Abemama: *Catala 47* (P).

Onotoa: Buariki, North Island, *Moul 8301* (US).

***Pseuderanthemum carruthersii* var. *atropurpureum*
(Bull) Fosberg**

Pseuderanthemum carruthersii var. *atropurpureum* (Bull) Fosberg, *Phytologia*, 5:290, 1955.—*Catala*, *Atoll Res. Bull.*, 59:105, 1957.—Fosberg and Sachet, *Atoll Res. Bull.*, 92:35, 1962; *Smith. Contr. Bot.*, 45:26, 1980.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:258, 1979.—Fosberg et al., *Vascular Pl. Palau*, 40, 1980.

Eranthemum atropurpureum Bull, *Gard. Chron. n. s.*, 3:619, 1875.—Okabe, *Journ. Jap. For. Soc.*, 23:270, 1941.

Pseuderanthemum atropurpureum (Bull) Radlkofer, *Sitzungsber. Math.-Phys. Cl. Akad. Wiss. Munch.*, 13:286, 1883.—Taylor, *Plants of Bikini*, 197, 1950.

Odontonema nitidum sensu Merrill, *Philipp. Journ. Sci. Bot.*, 9:142, 1914 [non (Jacquin) O. Kuntze, *Rev. Gen.*, 494, 1891].

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

Pseuderanthemum reticulatum sensu Kanehira, *Enum.*, 413, 1935 [non (Bull) Radlkofer, *Sitzungsber. Math.-Phys. Cl. Akad. Wiss. Munch.*, 13:286, 1883].

Shrub with deep purple young stems often marked with white lenticels, leaves variously variegated dark purple and green or green above and purple beneath, often variously malformed; flowers with corolla lobes pink dotted or blotched generally with crimson.

Very variable, a number of clones included, including one with crumpled leaves. Widely planted, the most commonly seen form of the species.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Saipan: *Kanehira 1077* (NY).

Tinian: Plateau 1 mi [1.6 km] N of Tinian, cult. in garden, 250 ft [76 m], *Fosberg 24724* (US, BISH, POM); s. l., *Okatani 26* (FU).

Rota: Road between Songsong village and Mackay Bay, 5 m, *Evans 2159* (US); Songsong village and vicinity, 5–10 m, *Evans 2023* (US).

Guam: Merrill, 1914:142; *Nelson 164, 165* (NY); Andersen Field, cult., *Fosberg 35395* (US, BISH); Agaña, *Seale* in 1900 (BISH); *G.E.S. 308* (BISH, US), *54* (US, NY); Harmon village, *Stone 3938* (GUAM); near Agriculture Dept., Mangilao, cult., *Stone 4370-A* (GUAM).

CAROLINE ISLANDS.—Palau: Babeldaob: Malekiok [= Melekiok], *Salsedo 128* (US). Peleliu: *Emmons 92* (US, BISH).

Sonsorol: *Salsedo 371* (US), *399* (US).

Yap: Malaya village, sea level, *Cushing 528* (US); *Wong 517*

(US); Colonia, *Fosberg 60013* (US).

Ulithi: Fassaral I., in village, 2 m, *Fosberg & Evans 47399* (US); Asor I., in garden around dwellings in village, 1–2 m, planted, *Fosberg 46473* (POM); Falalap I., 1–3 m, under coconut trees in and around village, planted, *Fosberg 46622* (POM).

Eauripik: Eauripik I., in open village, planted, 1–2 m, *Fosberg & Evans 47119* (US).

Woleai: Falalop, occasional in Faralop village, *Evans 441* (US).

Faraulap: Faraulap I., in outskirts of village, 1–2 m, planted, *Fosberg & Evans 47305* (US).

Lamotrek: Lamotrek I., in village around dwellings and in gardens, *Fosberg & Evans 46764* (US).

Satawal: Fassarai I., in village, 2 m, *Fosberg & Evans 47399* (US).

Truk: Moen (Harushima): *Takamatsu 200* (BISH).

Nama: Village and vicinity, 0–3 m, *Evans 1296* (US).

Lukunor: Anderson (seen but not collected).

Satawan: Moch I., *Anderson 1121* (US, BISH, POM, NY, L); Ta I. *Anderson 1022* (US, BISH, POM, NY, L).

WAKE ISLAND.—Seen in 1961 (Sachet), not in 1963 (Sachet, Fosberg).

MARSHALL ISLANDS.—Rongelap: *Taylor 46-1485* (US), *46-1388* (US).

Utirik: Utirik I., *Fosberg 36721* (US, BISH, POM).

Ujae: Ujae I., *Fosberg 34421* (US, BISH, NY, POM), *34290* (US, BISH).

Lae: Lae I., *Fosberg 34063* (US, BISH).

Kwajalein: Ebeye I., *Fosberg 31206* (US); Burle (= Murle), near village, *Bryan* in 1944 (BISH); growing in pot, 1956, 1958, Fosberg.

Ailuk: Ailuk I., *Fosberg 33973* (US).

Jemo: *Fosberg 33866* (US, BISH, POM).

Likiep: Likiep I., *Fosberg 27025* (US, BISH).

Ailinglapalap: Bikajle (Bigatyetlang) I., *Fosberg 26858* (US).

Majuro: W end of Majuro I. (Laura), abundantly planted along trail, 1–7 m, *Fosberg 26977* (US, BISH, POM, NY, L); NE side, *Bryan* in 1944 (BISH).

Arno: Ine I., *Anderson 3661* (US, BISH, POM, L).

Jaluit: Imruj (Imrodj) I., near house, 1–3 m, *Fosberg 26858* (US); *26729* (US); Mejatto I., *Fosberg 39424* (US).

NAURU ISLAND.—Buada Lagoon, *Fosberg 58792* (US).

GILBERT ISLANDS.—Marakei: *Catala 73* (P).

Tarawa: Betio, *Adair 24* (US); Abaoro, *Adair 103A* (US); Bikenibeu, *Raulerson 3692* (US).

Nonouti: Buariki, *Koch 26* (US).

Onotoa: *Moul 8301, 8038* (US, POM).

***Pseuderanthemum carruthersii* var. *reticulatum*
(Bull) Fosberg**

Pseuderanthemum carruthersii var. *reticulatum* (Bull) Fosberg, *Smith. Contr.*

Bot., 45:26-27, 1980.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:259, 1979.

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

Leaves broadly ovate obtusish, with conspicuous bright yellow vein-network (a narrow yellow zone along veins), corolla-lobes white with crimson or purple dots.

Very rarely planted in Micronesia, common in Samoa. No Micronesian specimens but plant seen by Fosberg growing in pot on Kwajalein in 1956.

Pseuderanthemum inclusum Hosokawa

Pseuderanthemum inclusum Hosokawa, Trans. Nat. Hist. Soc. Formosa, 28:157, 1938.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:259, 1979.—Fosberg et al., *Vascular Pl. Palau*, 40, 1980.

Slender shrub or suffrutescent herb, up to at least 70 cm tall, glabrous or young parts somewhat hirtellous, stems minutely white-punctate; leaves broadly lanceolate to elliptic, apex acuminate, base acute somewhat decurrent on petiole, blade stiff-chartaceous, flat or margin tightly revolute, 10-14 × 2.5-3 cm, reticulate venulose beneath, veins 7-9 on a side, glabrate, petiole 1-2 cm long, hirtellous; inflorescence a very slender, elongate, spike-like pseudo-raceme, 1-3 very short-pedicelled flowers at a node, tending to have one branch at first node, the whole densely hirtellous, up to 24 cm long, bracts pubescent, linear to linear-lanceolate, straight to falcate, acuminate, to 4 mm long, bractoles similar, smaller; calyx divided almost to base into 5 linear subulate to almost filiform puberulent lobes 4-5 mm long; corolla 10-13 mm long, tube ampliate upward to about 2 mm wide, pubescent outside, lobes 5, ovate-oblong, white, up to 6 × 2-3 mm, pilose outside, stamens with filaments 1.5-2 mm long, anthers oblong, 1 mm long, included, staminodia 2; pistil 4-5 mm long, style slender, 1.5 mm, stigma capitate or minutely bilobed, included; capsule 15-20 mm long, pilose, stipitate, stipe 1 cm long, fertile part very shortly beaked, ovoid, 4-seeded; seed disk-shaped, irregular in outline, notched on one edge, sides rugose.

Closely related to *P. lapathifolium* (Vahl) O. Kuntze and *P. polyanthum* (C.B. Clarke) Merrill, of India and Assam, differing principally in the narrower stiff chartaceous, strongly reticulate leaves and much shorter flowers.

Endemic, so far as known, to Babeldaob Island, Palau, at low elevations.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: *Ledermann 14441* (B). Babeldaob: Ngarumiscang, *Hosokawa 9128* (FU, type, 2 sheets, BISH, A, isotypes); Garamiscan, *Kanehira 561* (FU), *516* (sphalm ?) (NY); Ngardok, near seashore, *Takamatsu 1209* (BISH); Aimiriik, *Okuya s.n.* (FU).

Pseuderanthemum laxiflorum (Gray) Hubbard

Pseuderanthemum laxiflorum (Gray) Hubbard in Bailey, *Rhodora*, 18:159, 1916.—Catala, *Atoll Res. Bull.*, 59:77, 105, 1957.—Fosberg and Sachet,

Smith. Contr. Bot., 45:27, 1980.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:259, 1979.

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

Pseuderanthemum bicolor sensu Stone, *Micronesica*, 6:535, 1971 [non (Schrank) Radlkofer, *Sitzungsber. Math.-Phys. Cl. Akad. Wiss. Munchen*, 13(2):286, 1883].

Shrub or small tree to 5 m tall, in cultivation usually a shrub to 1 m, glabrous, much branched; leaves bronze-purple, small, up to 10 × 2.5 cm, rarely, but perhaps abnormally, larger, usually smaller, narrowly elliptic, bluntly acuminate at apex, base acute, veins 5-6 on a side, distinct beneath, network obscure except near margins, margins tightly and irregularly revolute, appearing somewhat undulate, cystoliths very numerous, very short-linear to punctiform, petiole very short, 2-10 mm; flowers in short axillary congested cymes, these sometimes reduced to a short peduncle with bract and a single pedicellate flower (specimens of wild plants of this species from Fiji show a great range of variation in the amplitude and complexity of the axillary cymes compared with the cultivated clone described here), bracts small, 2-3 mm long, green, pedicels up to about 4 mm; calyx divided almost to base into 5 narrowly lanceolate somewhat acuminate lobes, these glabrous except for minutely ciliolate margins, lobes about 4 mm long; corolla slightly purplish or white with red dots on lobes, tube about 20-22 mm long (longer in some wild plants), about 2 mm thick, only very slightly ampliate upward, lobes 10-15 mm long, obovate to broadly elliptic, patent to slightly reflexed; glabrous; anthers about 2 mm long, narrowly oblong, shortly exerted on curved glabrous filaments; style filiform, glabrous, about 25 mm long, stigma subcapitate, bilobed, exerted; capsule not seen on cultivated specimens, on wild Fijian specimens 2-3 cm long, fertile part oblong lanceolate, acute, retinacula curved, sharply subulate; seed discoid, light brown, relatively smooth on sides, margin entire.

Native of Fiji; uncommon in cultivation, where usually called *Pseuderanthemum bicolor*. In Micronesia cultivated in gardens on Guam and Tarawa (where it is used for leis).

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: Tamuning, *Fosberg 35351* (US).

GILBERT ISLANDS.—Tarawa: Bairilei, *Catala 110* (P).

Pseuderanthemum palauense Fosberg & Sachet

Pseuderanthemum palauense Fosberg & Sachet, Smith. Contr. Bot., 45:27, 1980.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:259, 1979.—Fosberg et al., *Vascular Pl. Palau*, 40, 1980.

Herb a few dm 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; pseudoracemes 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 stigma about 3 cm long (only detached ones seen intact); fruit glabrous, about 2 cm long, stipitate basal portion 1 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 *Pseuderanthemum inclusum* in its leaf shape, more slender and lax inflorescences, much longer corollas, styles and stamens, and in its scalloped warty seeds. It seems closest to Philippine plants commonly referred to *Pseuderanthemum bicolor* (Schrank) Radlkofer, which has predominantly axillary cymes, linear subulate bracts and sepals, and entire-margined seeds.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Peleliu: In forest, *Takamatsu 1768* (BISH, holotype). Babeldaob: Arakalong [= Arekalong], in field, *Takamatsu 1681* (BISH).

Ruellia L.

Ruellia L., Sp. Pl., 634, 1753; Gen. Pl., ed. 5, 283, 1754 [= 1753].

Herbs or shrubs with opposite or pseudo-verticillate simple entire or undulate leaves; flowers solitary in leaf axils or in terminal or axillary cymes; calyx deeply divided into 5 equal or rarely unequal segments; corolla tubular, campanulate, funnel-form or salverform, if tubular usually somewhat swollen or ventricose, often showy, lobes 5 usually spreading, obtuse, contorted in bud; stamens 4, anther-cells 2, mucicous at base; style filiform, stigma with 2 unequal lobes; fruit elongate, elastically dehiscent, with usually 3–12 (–16) seeds in each cell, these somewhat upwardly imbricate, with mucilaginous hairs, retinacula long, sharp.

A large pantropical and warm-temperate genus, some species weedy, several planted and one (*R. repens*) locally naturalized in Micronesia.

Key to Micronesian Species of *Ruellia*

1. Flowers solitary between bracts *R. repens*
1. Flowers in cymes or spikes 2
 2. Inflorescences cymose *R. brittoniana*
 2. Inflorescences spicate *R. sp.*

Ruellia brittoniana Leonard ex Fernald

Ruellia brittoniana Leonard ex Fernald, Rhodora, 47:7, fig. 1, 1945.

Ruellia longifolia sensu Fosberg, Sachet, and Oliver, Micronesica, 15:259,

1979 [non (Stocks) Stocks ex T. Anderson, Journ. Linn. Soc. Bot., 9:460, 1867].

Herb or small shrub with lance-linear leaves about 10–15 cm long or smaller; flowers in few flowered open cymes in upper axils, calyx lobes linear, about 10 mm, corolla purple, 3–4 cm long, curved, campanulate distally, lobes large, round, flaring; capsule about 2.5 cm long, very shortly stipitate.

GEOGRAPHIC RECORD

MARSHALL ISLANDS.—Kwajalein: Seen once in 1956 in potted nursery stock brought from Honolulu. Probably has not become established.

Ruellia repens L.

Ruellia repens L., Mant. Pl., 1:89, 1767.—Glassman, Bish. Mus. Bull., 209:102, 1952.—Stemmermann, Inv. Wetland Veg. Caroline Is., 2:194, 1978.—Fosberg, Sachet, and Oliver, Micronesica, 15:259, 1979.

Slender herb with square somewhat geniculate stems, sparse branching, internodes several cm long, young parts sparsely puberulent, usually glabrate, linear cystoliths abundant; leaves lanceolate to ovate or elliptic, shape varying even on same plant, up to 5 × 2 cm, usually smaller and narrower, apex obtuse to usually bluntly acute or acuminate, base usually acute or obtusish, veins not prominent, margins scabrous-ciliolate, petiole slender, 2–12 mm long; flowers solitary, axillary, each between 2 oval leaf-like bracts about 1 cm long; calyx segments narrowly lanceolate, about 4 mm long; corolla very prone to fall, pink to purple, curved, about 5 mm, throat narrowly campanulate, curved, lobes round, somewhat spreading; stamens and pistil included, style pilose, especially below, one stigma lobe long, narrowly ovate, flat; capsule slightly to noticeably pilosulose, 1–2 cm long, stipitate, slightly beaked; seeds about 16, discoid, with a conspicuous entire white margin.

A weedy species naturalized in Ponape and Kusaie, probably of southeast Asian or Malesian origin.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Ponape: Sapatik I., *Glassman 2785* (US, BISH); Kolonia, *Takamatsu 804* (BISH); in coastal forest between Owa and Kolonia *Hatusima 10948* (FU).

Ruellia sp.

Ruellia repens sensu Kanehira [non L., Mant. Pl., 1:89, 1767].

Herb rooting at nodes, stems tomentulose in lines, leaves broadly elliptic, acuminate, thin, sparsely puberulent with large-based hairs, midrib sparsely strigose, petiole very slender 1–2 cm long, spike axillary, very shortly pedunculate, about 10 nodes, rachis strigose; flowers and fruit not available.

A plant collected on Saipan by Kanehira (940, FU, NY) and

determined by him as *R. repens* differs in having longer petioles, pustulate hairs on leaf midribs, broader, more acuminate leaf blades, and shortly pedunculate axillary spikes to 10 nodes long, without flowers or fruit. It is obviously something else but has not been recollected. The record of *Ruellia repens*, in Kanehira's Enumeration (1935:413-414), is based entirely on this collection, so the species should be deleted from the recorded flora of Saipan, as was done in our *Geographic Checklist of the Micronesian Dicotyledonae* (1979:259).

Other unidentified *Ruellias* have been recorded from Micronesia as follows: Fosberg, Falanruw, and Sachet, *Smith. Contr. Bot.*, 22:40, 1975.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Anatahan: W coast, *Falanruw 1702* (US); Jaluit Atoll, Volkens, 1903:91; Fosberg and Sachet, *Atoll Res. Bull.*, 92:35, 1962.

Thunbergia Retzius

Thunbergia Retzius, *Physiogr. Sölsk. Handl.*, 1(3):163, 1780 [1776] [nom. cons.].

Herbs or shrubs, frequently climbing; leaves opposite, ovate to subreniform or oblong, frequently hastate or cordate, ordinarily petiolate; flowers showy, axillary or in terminal racemes, each subtended by an involucre of 2 large bracteoles; calyx small, ring-like or cup-like, truncate to toothed or lobed; corolla large, salverform or funnellform, usually zygomorphic, tube variously shaped, limb 5-lobed, abruptly spreading; stamens 4, attached low in tube, anthers 2-celled, often variously hairy; disk present; ovary with 2 ovules in a locule style filiform, stigma dilated and variously bilobed; capsule globose or depressed-globose, with a conspicuous erect flattened beak; seed 2 in a locule, "semiglobose" excavate on axial surface.

A large genus of the Old World Tropics, with a number of widespread cultivated and weedy species, several in Micronesia.

3. Leaves 8-15 cm wide, broadly ovate to orbiculate-cordate, usually lobed, lobes angular
. *T. grandiflora* var. *grandiflora*
3. Leaves 3-7 cm wide, ovate to oblong, acuminate, not cordate *T. grandiflora* var. *laurifolia*

Thunbergia alata Bojer

Thunbergia alata Bojer in Hooker, *Exot. Fl.*, 3, t. 177, 1823-7 [Sep 1825]; Bojer in Sims, *Curtis Bot. Mag.*, 52, pl. 2591, 1825.—Merrill, *Philipp. Journ. Sci. Bot.*, 9:142, 1914.—Kanehira, *Enum. Micr. Pl.*, 414, 1935.—Stone, *Micronesica*, 6:536, 1971.—Souder, *In Guam Gardens*, 53, 1974.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:259, 1979.

Extensively creeping and twining herbaceous vine, pilose, strigose to spreading hairs, internodes tending to be elongate; leaves 3-7 × 2-6 cm, broadly ovate or oblong hastate or cordate, sometimes slightly angular, apex obtuse, often apiculate, upper surface sparsely strigose, lower surface densely pilose, spreading to substrigose, sometimes almost equally pilose on both surfaces, main veins 5, palmately arranged, basal sinus deep, V-shaped, petiole almost or quite as long as blade, straight, narrowly but conspicuously alate, strap-shaped, almost to curved exalate base; flowers on axillary pedicels, 1 or 2 to a node, as long or longer than petioles, notably somewhat retrorse pilose; bracteoles 1.5-2 cm long, obtuse to acute, apiculate at apex, cordate at base, with parallel nerves enwrapping the flower in a cylindrical fashion; calyx rotate (at least in age) divided almost to base into 10-11 narrowly triangular somewhat subulate, unequal lobes; corolla tube plus throat about 2 m long, throat dilated upward, the limb abruptly spreading, to 30-40 mm wide, lobes broadly ovate, varying in color from white through cream to orange, rarely deep brownish red, orifice of throat in some forms almost black; anthers and stigma included; capsule pilose, globose, about 1 cm wide, beak stiff, woody, about 1 cm long, valves broadly lanceolate, bluntly acute, somewhat spreading.

A weedy twiner with many color forms (some of which have received varietal names), pantropical, said to be of tropical African origin, naturalized in Guam.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

MARIANAS ISLANDS.—Guam: Merrill, 1914:142; *G.E.S.* 281 (US).

Thunbergia erecta (Bentham) T. Anderson

Thunbergia erecta (Bentham) T. Anderson, *Journ. Linn. Soc. Lond.*, 7:18, 1864.—Stone, *Micronesica*, 6:536-537, 1971.—Randall and Tsuda et al., *Univ. Guam Mar. Lab. Tech. Rept.*, 12:24, 1974.—Souder, *In Guam Gardens*, 57, 1974.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:259, 1979.

Meyenia erecta Bentham, *Fl. Nigrit.*, 476, 1849.

Shrub 1-2 (-2.5) m tall, branched, young internodes strongly angled, glabrous, nodes slightly to prominently

Key to Micronesian Species and Varieties of *Thunbergia*

1. Erect shrub, corolla much longer than width of limb . . .
. *T. erecta*
1. Climbing or twining vines, corolla limb broader than length of tube and throat 2
2. Herbaceous vine, petiole narrowly winged, bracteoles 1.5-2 cm long, corolla tube plus throat about 2 cm long *T. alata*
2. Woody vine, petioles not winged, bracteoles 3-4 cm long, corolla tube plus throat 4-5 cm long (*T. grandiflora*) 3

woolly; leaves up to 6 (-7) × 2.5 cm, usually much smaller, ovate to elliptic or sub-rhombic, apex acuminate, base obtuse to rounded or subcordate, puberulent on nerves, glabrate, nerves pinnately arranged, 2-4 on each side, network rather obscure except when young, petiole about 5 mm long, slightly margined; flowers on slender pedicels up to 2.5 cm, somewhat dilated distally, axillary on small branchlets; bracteoles broadly oblong, obtuse, 2-2.5 cm long, rather early caducous; calyx a very low collar with about 10 unequal teeth 0.4-1.5 mm long, corolla about 6 cm or less long, tube about 1 cm, slender, throat pale without, yellow within elongate campanulate about 4 cm, slightly dorsiventrally compressed, slightly ventricose, lobes round or broadly ovate, 1.5-2 cm long, spreading deep purple; stamens well included, about half the length of the tube and throat; fruit not seen probably not set in cultivated clones.

A West-African species, planted pantropically as an ornamental; in Micronesia known from Guam, Ponape, and Nauru. Not setting seeds, it does not become naturalized. Its small pinnately veined leaves and narrow corolla are distinctive. A white-flowered form is known.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: s. l., *Nelson 168* (BISH); Agaña Heights, planted, 50 m, *Fosberg 43491* (US, BISH, POM, NY); Agaña, 5 m, *Evans 1520* (US, BISH, POM, B); Agaña, cult., *Stone 4681* (GUAM).

CAROLINE ISLANDS.—Ponape: Agriculture station, planted, *Fosberg 60436* (US, BISH, POM).

NAURU ISLAND.—Denigomodou: W side of island, *Fosberg 58700* (US).

GILBERT ISLANDS.—Tarawa: Bairiki, *Raulerson 3763* (US).

Thunbergia grandiflora (Roxburgh ex Rottler) Roxburgh

Thunbergia grandiflora (Roxburgh ex Rottler) Roxburgh in Loddiges, Bot. Cab., t. 324, 1819.—Bremekamp, Verh. Kon. Nederl. Akad. Wetensch., II, 50(4):45-47, 1955.—Stone, Micronesica, 6:537, 1971.—Souder, In Guam Gardens, 53, 1974.—Fosberg, Sachet, and Oliver, Micronesica, 15:260, 1979.—Fosberg et al., Vascular Pl. Palau, 40, 1980.

Flemingia grandiflora Roxburgh ex Rottler, Nov. Act. Nat. Cur., 4:202, 1803.

Extensive much branched liana, young stems strongly angled, glabrous to strongly pilose; leaves opposite, the pairs tending to be somewhat unequal, ovate to orbicular cordate, or even sub-reniform, usually somewhat hastately or doubly hastately lobed, lobes sometimes almost obsolete, to 15 or more cm across, slightly hispidulous to glabrate beneath, scabrous-hispidulous above, apex and lobes acute to slightly acuminate, or obtuse, nerves 5, palmate, petiole straight, up to 7 cm, glabrous to pilose, thick and curved at base; flowers on solitary or paired pedicels in upper axils and in long, pendent terminal and axillary racemes or pseudo-racemes, pedicels 3-5 cm long, usually 2-several at a node in the racemes; bracteoles broadly oblong, 3-4 cm long, obtuse, sharply mucronate,

puberulent and dark glandular-punctate, strongly nerved; calyx reduced to a narrow hispidulous collar with an irregular margin, lobes obsolete; corolla large, tube narrow, contracted in middle, about 8 mm long, throat campanulate, about 4 cm long, 2.5 cm wide at top, limb about 7 cm wide, mauve or white, lobes 2.5-3 cm long, broadly obovate; stamens and pistil included, reaching about half or two thirds the length of throat, anther 7-8 mm long, pilose along margins, spurred at base; stigma lobes equal in length but differently shaped; fruit subglobose, 14 × 13 mm, beak 35 × 6.5 mm, apparently not formed in cultivated clones, said to be self-sterile.

A pan-tropical cultivated ornamental, sometimes persisting after cultivation; both color forms, mauve and white, are present in Guam. The plant seems to be of Indian origin and in Micronesia is known from Guam and Palau. Two varieties, often distinguished as species, are found in Micronesia.

Thunbergia grandiflora (Roxburgh ex Rottler) Roxburgh var. *grandiflora*

The typical variety, with broad leaves, is known from both Guam and Palau. On Guam, at least in the Barrigada area, it presents the appearance of being spontaneous in roadside thickets, but is doubtless merely persisting from former plantings. This colony is of the white-flowered form, and is quite conspicuous, climbing over small trees.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: Talofoto Village, cult., 90 m, *Fosberg 35535* (US, BISH); Barrigada Junction, cult., *Stone 4270* (BISH, US, GUAM); Barrigada, 60 m, *Evans 1452* (US, BISH, POM, NY); Barrigada, *Fosberg & Null 59934* (US, BISH, POM, NY, L).

CAROLINE ISLANDS.—Palau: Koror: Ngerebe'ed, *Fosberg 50614* (US, BISH, POM, NY, L, P); road leading to Trust Territory entomology lab, 25 m, *Evans 602* (US, BISH, POM, NY, L); s. l., *Cheatham 134* (US); s. l., *Blackburn & Bechesrak E 99* (US, BISH).

Thunbergia grandiflora var. *laurifolia* (Lindley) Benoist

Thunbergia grandiflora var. *laurifolia* (Lindley) Benoist in Lecomte, Fl. Gen. Indo-Chine, 4:618, 1935.

Thunbergia laurifolia Lindley, Gard. Chron., 1856:260, 1856.—Stone, Micronesica, 6:537, 1971.—Souder, In Guam Gardens, 53, 1974.—Fosberg, Sachet, and Oliver, Micronesica, 15:260, 1979.

Differs from var. *grandiflora* principally in the narrower, 3-7 cm wide, ovate to oblong, rarely lobed but frequently very coarsely repand-serrate leaves, acuminate at apex, usually shorter petioles and more slender, often shorter pedicels, often more congested racemes.

The narrower leaves give a somewhat different aspect to the plant, but there is scarcely a break between the two varieties,

either in width or margin. The flowers seem practically identical. The spurs or horn-like processes on the bases of the anthers seem longer in var. *laurifolia*, but we have not been able to confirm the presence of the small spinules at the bases of these processes mentioned in some accounts. Because we have not seen capsules on either variety we can say nothing of the presence or absence of puberulence.

Var. *laurifolia* is known in Micronesia only from Guam.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

MARIANAS ISLANDS.—Guam: Mangilao, old nursery site, 65 m, Fosberg 35643 (US, BISH).

SYNONYMS AND MISAPPLIED NAMES OF ACANTHACEAE

Asystasia coromandeliana Nees; see *Asystasia gangetica* (L.) T. Anderson
Beloperone Nees; see *Justicia* L.
Beloperone guttata Brandegee; see *Justicia brandegeana* Wasshausen & Smith
Blechum pyramidatum (Lamarck) Urban; see *Blechum brownei* f. *puberulum* Leonard Jussieu
Eranthemum acuminatissimum Miquel; see *Pseuderanthemum acuminatissimum* (Miquel) Benoist
Eranthemum carruthersii Seemann; see *Pseuderanthemum carruthersii* (Seemann) Guillaumin
Eranthemum eldorado (Hort.); see *Pseuderanthemum carruthersii* (Seemann) Guillaumin
Eranthemum laxiflorum Gray; see *Pseuderanthemum laxiflorum* (Gray) Hubbard
Eranthemum nervosum (Vahl) R. Brown; see *Eranthemum pulchellum* Andrews
Eranthemum reticulatum Bull; see *Pseuderanthemum carruthersii* var. *reticulatum* (Bull) Fosberg
Flemingia grandiflora Roxburgh ex Rottler; see *Thunbergia grandiflora* (Roxburgh ex Rottler) Roxburgh
Graptophyllum hortense Nees; see *Graptophyllum pictum* (L.) Griffith
Gymnostachyum verschaffeltii Lemaire; see *Fittonia verschaffeltii* (Lemaire) E. Coemans
Hemigraphis angustifolia Hallier f. sensu auct.; see *Hemigraphis palauana* Hosokawa.
Hemigraphis colorata (Blume) Hallier f.; see *Hemigraphis alternata* (Burman f.) T. Anderson
Hemigraphis pacifica Hosokawa; see *Hemigraphis reptans* (Forster) T. Anderson
Jacobinia Nees ex Moricand; see *Justicia* L.
Jacobinia carnea (Lindley) Nicholson; see *Justicia carnea* Lindley
Jaconinia obtusior (Nees) L.H. Bailey; see *Justicia carnea* Lindley
Jacobinia spicigera (Schlechtendal) Bailey; see *Justicia spicigera* Schlechtendal

Justicia callistachya Schlechtendal & Chamisso; see *Odon-tonema callistachyum* (Schlechtendal & Chamisso) O. Kuntze
Justicia fulvicoma Schlechtendal & Chamisso sensu auct.; see *Justicia brandegeana* Wasshausen & Smith
Justicia gangetica L.; see *Asystasia gangetica* (L.) T. Anderson
Justicia infundibuliformis L.; see *Crossandra infundibuliformis* (L.) R. Brown
Justicia paniculata Burmann f.; see *Andrographis paniculata* (Burman f.) Wallich ex Nees
Justicia picta L.; see *Graptophyllum pictum* (L.) Griffith
Justicia tetragona Vahl; see *Aphelandra tetragona* (Vahl) Nees
Odon-tonema nitidum (Jacquin) O. Kuntze; see *Pseuderanthemum carruthersii* var. *atropurpureum* (Bull) Fosberg for Guam record
Odon-tonema strictum (Nees) O. Kuntze; see *Odon-tonema callistachyum* (Schlechtendal & Chamisso) O. Kuntze
Pseuderanthemum atropurpureum (Bull) Radlkofer; see *Pseuderanthemum carruthersii* var. *atropurpureum* (Bull) Fosberg
Pseuderanthemum bicolor (Schrank) Radlkofer; see *Pseuderanthemum laxiflorum* (Gray) Hubbard
Pseuderanthemum eldorado (Hort.) Radlkofer; see *Pseuderanthemum carruthersii* (Seemann) Guillaumin
Pseuderanthemum jaluitense Lindau; see *Pseuderanthemum carruthersii* var. *atropurpureum* (Bull) Fosberg
Pseuderanthemum reticulatum (Hort.) Kanehira sensu Taylor; see *Pseuderanthemum carruthersii* (Seemann) Guillaumin
Ruellia alternata Burmann f.; see *Hemigraphis alternata* (Burmann f.) T. Anderson
Ruellia fragrans Forster f.

MYOPORACEAE

Small trees and shrubs, leaves alternate, exstipulate; flowers axillary, solitary or fasciculate, bisexual, calyx deeply cut into 4–6 sepals, corolla 4–6 lobed, somewhat zygomorphic to nearly actinomorphic, stamens fewer than corolla lobes, attached in corolla tube, ovary 2–4 locular, ovules 1–4 in a locule, style 1, fruit a drupe.

A small tropical family, mainly Australian, with one West Indian and one widespread Pacific island genus, *Myoporum*, with one species in the Marianas.

Myoporum Solander ex Forster f.

Myoporum Solander ex Forster f., Prodr., 44, 1786.

Leaves elliptic to obovate, lanceolate or spatulate, gland-dotted, calyx 4–5 parted, corolla 4–5 lobed; stamens 4; style 1, ovary 2 or 6-loculed, ovules 1–2 in a cell, fruit a drupe, endocarp with 2–6 cells.

An Indo-Pacific genus, centered in Australia, with one Micronesian species.

Myoporum boninense Koidzumi

Myoporum boninense Koidzumi, Bot. Mag. Tokyo, 32:53–54, 1918.—Fosberg, Falanruw, and Sachet, Smith. Contr. Bot., 22:40, 1975.—Fosberg, Sachet, and Oliver, Micronesica, 15:260, 1979.

Myoporum tenuifolium sensu auct. Micr. [non Forster f., Prodr., 44, 1786].—Kanehira, Fl. Micr., 352, 1933; Enum. Micr. Pl., 414, 1935; Bot. Mag. Tokyo, 50:607, 1936.—Tuyama, Journ. Jap. Bot., 14:812, 1938.

Myoporum latronum Tuyama in sched. ex Hosokawa, Trans. Nat. Hist. Soc. Formosa, 33:214, 1943.

Myoporum papuanum sensu Bloembergen, Fl. Males., 1, 4:265, 1951 [pro min. parte; non Kraenzlin in Fedde, Repert., 22:238, 1926].

Glabrous shrub, to 1.5 m tall, usually lower, prostrate in exposed places, branchlets finely punctate, leaves scattered, fleshy, narrowly obovate, at most 5 × 1.5 cm, apex rounded to acutish or slightly short acuminate, base attenuate-cuneate into a short petiole, obscurely serrate toward apex, obscurely punctate glandular on both sides, rugulose when dry; flowers on axillary pedicels about 1 cm long, 1–3 in an axil, sepals ovate, acute, to only slightly acuminate, not ciliolate, tending to be somewhat concave or inrolled, somewhat punctulate, 1.5 mm long, corolla campanulate, 3 mm long, 6 mm wide when fully mature, when lobes are not reflexed the whole corolla may be 4–5 mm long, lobes 5, ovate-rounded, throat glabrous at base, white, somewhat punctate, stamens 4, inserted near base of corolla, included, anthers orbicular-horseshoe shaped; style about 2 mm long, stigma sub-trilobate; fruit globose about 4 mm across, dark purplish red when ripe, stone depressed globose, about 3 mm wide, acuminate at top, at base, with 4 keels from center of base about $\frac{2}{3}$ the way to the summit, intervals between keels convex.

This has been referred to the New Caledonian *M. tenuifolium* Forster f. by some earlier writers. It is indeed closely allied to that species. It differs in leaves being obovate, tending to be obtuse and fleshy, with venation not obvious when dry, rather than elliptic-lanceolate acuminate, and in the acute inrolled glabrous sepals rather than acuminate flat ciliolate ones. These differences are not very impressive, but in a genus as difficult as *Myoporum* these species seem about as well separated as most. Together with the great geographic separation the differences seem to justify recognition of the Bonin-Marianas plant as a distinct species.

In the Marianas it is found on Pagan, Saipan, Tinian, Rota, and Guam, on low cliff tops above the ocean, at least usually on limestone. The *Moore 477* collection is the first record from Guam. The species was originally described from Chichi Jima, in the Bonin Islands. In the Marianas it is not common, but may be found especially on terraces and cliff tops facing the sea at rather low elevations.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Pagan: Cliff above shore, 4 m, *Anderson 600* (US, BISH, POM).

Saipan: *Hatusima 10686* (FU); *Stephens 57* (POM); S side of Kagman Peninsula, W of Kagman Pt., 30 m, *Fosberg 31295*

(US, BISH); Marpi Pt., 30 m, *Fosberg 31330* (US, BISH).

Tinian: *Kanehira 1071* (FU); *Okatani 27* (FU); *Hosokawa 7736* (US, BISH, A, UC); terrace on SE coast of island NE of Carolinas Pt., 60–80 m, *Fosberg 24841* (US, BISH); W coast, 50 ft [15 m], *Hosaka 2872* (US, BISH).

Rota: *Kanehira 1819* (FU, US), *3605* (FU), *3604* (A); West Dock, 5–25 m, *Evans 2142* (US, BISH, POM, NY, L); Dugi District, 10 m, *Herbst & Falanruw 6764* (US); road inland from Matmos, *Raulerson 11280* (US).

Guam: Pati Pt., outer edge of middle terrace, *Moore 477* (US).

PLANTAGINACEAE

Herbs or rarely shrubs; leaves simple, usually in basal rosettes or rarely, in caulescent species, in rosettes at tip of branches, leaf-bases frequently broad and tending to be sheathing, main veins longitudinal; flowers in scape-like bracteate spikes or subcapitate; sepals 4, united at least below; corolla united, scarious or membranous, usually 4-lobed; stamens usually 4, often exserted; style 1, bifid, ovary superior, 1–4-loculed, placentation axile or basal, ovules 1–several in a locule; fruit a circumscissile capsule or rarely nut-like, seeds few.

A small family of three genera, cosmopolitan, predominantly temperate, largest genus *Plantago*.

Plantago L.

Plantago L., Sp. Pl., 112, 1753; Gen. Pl., ed 5, 52, 1754 [1753]

Characters of the family, fruit a usually 2-celled, dehiscent capsule, circumscissile, few (to 20) seeded, seeds often mucilaginous.

Perhaps 200 species, temperate and subtropical, in tropics, mostly in mountains. One species found in Micronesia.

Plantago major L.

Plantago major L., Sp. Pl., 112, 1753.—Fosberg, Sachet, and Oliver, Micronesica, 15:260, 1979.

Acaulescent herb, leaves roughish puberulent, petiolate, blade elliptic to ovate or somewhat cordate, with a few strong ribs, margin subentire to irregularly dentate, broad petiole; spike pedunculate, slender, 4–10 (–15) cm long, tip bluntish, capsules ovoid, circumscissile near middle, cells several-seeded.

A practically cosmopolitan weed, collected twice in Micronesia.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: Playing field (baseball) at NCS, NW Guam, *Raulerson 1894* (US).

MARSHALL ISLANDS.—Kwajalein: 0–4 m, *Fosberg 48060* (US, BISH).

RUBIACEAE

Habit various; leaves simple, almost always entire, opposite or rarely whorled, with interpetiolar (very rarely intra-petiolar) stipules; flowers usually cymose or thyrsoïd, less often solitary or racemose, rarely spicate; calyx and corolla epigynous, corolla gamopetalous, rotate to tubular, usually actinomorphic, very rarely zygomorphic, limb usually 4 or 5, rarely 3 or 6 or more parted, stamens alternate with corolla lobes, usually inserted on the corolla tube below the sinuses, anthers sessile or on short filaments (rarely long), dehiscing by longitudinal slits, flowers perfect or variously polygamous or more rarely

dioecious, often heterostylous; ovary usually inferior, 2, or rarely more, celled, ovules one to many in a cell, on axile placentae, style with 2 or rarely more stigmatic branches or lobes, or entire; fruit a berry, drupe, or capsule, rarely indehiscent and nut-like or a schizocarp; seed with endosperm, a thin testa or none.

A practically cosmopolitan family of many thousand species, mostly tropical, and an important element of the flora and vegetation of Micronesia. 28 genera, 21 of them native, are found in these islands. They may be separated by the following key.

Key to Micronesian Genera of Rubiaceae

1. Epiphytic herbs or subshrubs with stems emanating from a tuber-like mass, permeated with galleries inhabited by ants *Hydnophytum*
1. Usually not epiphytic, mostly shrubs or small trees, without tubers or symbiotic ants 2
 2. Scrambling shrubs with globose heads of flowers and conspicuous strongly recurved stipular spines *Uncaria*
 2. Not as above, if flowers capitate or glomerate, spines lacking 3
 3. Plants with raphid bundles showing as short white marks on the surface of at least some organs, corolla aestivation valvate 4
 4. Plants clearly woody, erect or diffuse shrubs or trees, rarely climbing 5
 5. Ovary with several to many ovules or seeds in a cell 6
 6. Flowers with corolla tetramerous, fruit capsular *Hedyotis*
 6. Flowers with corolla pentamerous, involucrate with white bracts, fruit fleshy or leathery *Mycetia*
 5. Ovary with a single ovule or seed in a cell 7
 7. Flowers and fruits aggregated into fused syncarps *Morinda*
 7. Flowers free, paniculate, cymose, fasciculate or rarely solitary, fruit drupaceous with 2 pyrenes *Psychotria*
 4. Plants herbaceous or suffrutescent, woody only toward base 8
 8. Stems prostrate, running and rooting at nodes or underground 9
 9. Prostrate stems subterranean, with swellings (Micronesian planted species only), branches erect, stipules pectinate, flowers and fruits in a terminal involucrate head . . . *Cephaelis*
 9. Prostrate stems lying on ground, stipules not pectinate 10
 10. Delicate mat-like plant, leaves not at all cordate, flowers solitary, axillary, sessile, corolla lobes dentate, fruit a very thin-walled indehiscent capsule, seeds many *Dentella*
 10. Coarser elongate plant, leaves strongly cordate, flowers on erect peduncles or branches, one or more involucrate, glomerate, fruit a red drupe with 2 stones, one seed in a stone *Geophila*
 8. Stems erect or diffuse, if prostrate not conspicuously rooting at nodes 11
 11. Flowers and fruits in dichotomous, secund, strongly flattened cymes, bracts filiform or subulate, corollas slender, tubular or tubular-funnelform *Ophiorrhiza*
 11. Inflorescences and flowers otherwise 12
 12. Flowers pentamerous, in corymbiform cymose clusters 13
 13. Erect suffruticose herbs *Pentas*
 13. Vigorous, ill-scented climbers *Paederia*

12. Flowers quadrimerous, variously disposed 14
14. Ovules and seeds several to many in an ovary locule *Hedyotis*
14. Ovule and seed one in an ovary locule 15
15. Capsule circumscissile, seed with ventral groove cruciform *Mitracarpus*
15. Capsule septicial and loculicidal, seed with linear or elliptic ventral groove *Spermacoce*
3. Plants lacking raphid bundles, corolla aestivation generally imbricate (or induplicate, rarely valvate) 16
16. Lianas or elongate scramblers 17
17. Flowers in many-flowered globose heads, stipular spines present *Uncaria*
17. Flowers separated or in very few flowered heads or in syncarps *Gynochthodes*
18. Flowers separate or fused as a syncarp, few flowered *Gynochthodes*
18. Flowers in globose, many-flowered heads *Morinda*
16. Shrubs or trees 19
19. Flowers in heads with ovaries fused, fruit a fleshy syncarp *Morinda*
19. Flowers separate or solitary 20
20. Flowers solitary, or peduncles 3-flowered, or few-flowered dichasia 21
21. Corolla lobes linear, less than 1 cm long, tube sericeous, calyx with small lobes or subtruncate, without vertical appendages *Timonius*
21. Corolla lobes expanded, narrowly oblong, obovate or lanceolate, and then pointed, tube glabrous 22
22. Calyx lobes with conspicuous vertical, laterally flattened, green appendages (in Micronesian species) *Gardenia*
22. Calyx truncate or margin very obscurely dentate, not appendaged *Trukia*
20. Flowers fasciculate to usually cymose or paniculate 23
23. Inflorescences terminal 24
24. Flowers usually tetramerous *Ixora*
24. Flowers pentamerous 25
25. Stipules bifid at tips, calyx in at least 1 or a few flowers with at least one large expanded leaf-like showy lobe, fruit baccate *Mussaenda*
25. Stipules entire, calyx lobes equal 26
26. Flowers and fruits many, paniculate-thyrsoïd, corolla lobes notably ciliate, fruit capsular *Cinchona*
26. Flowers either in loose or congested, few-flowered cymes, or many-flowered corymbiform cymose panicles, fruit baccate or drupaceous 27
27. Inflorescences few-flowered, irregularly several times branched 28
28. Cyme once or twice dichotomous or reduced and fasciculate, buds with limb tapering to a fine point *Trukia*
28. Cyme loose, few-flowered, buds moderately pointed *Aidia*
27. Inflorescences many-flowered, flat or low-round topped, corolla clavate in bud, at least slightly puberulent externally, pilose within, fruit drupaceous, stones 2, multi-spermous *Tarenna*
23. Inflorescences axillary or pseudoaxillary 29
29. Flowers in pedunculate heads, their ovaries fused, fruits fleshy syncarps . . . *Morinda*
29. Flowers in cymes, these often much reduced 30
30. Cymes thyrsoïd, long-pedunculate, flower in bud to 3 cm long, fruit a fusiform capsule *Badusa*
30. Cymes open branched, dichasioid, but flowers not crowded 31
31. Cyme dichotomous or dichasioid 32
32. Stipules sheathing, subtruncate *Scyphiphora*
32. Stipules triangular or ovate, or sheathing at base and acuminate 33

33. Stipules ovate or triangular, corolla tube shorter than lobes, drupes 2-loculed, 1 seed in a locule *Canthium*
33. Stipules sheathing, corolla tube longer than, or at least equal to lobes, flowers dioecious, fruit with many pyrenes, one seed in each *Timonius*
31. Cymes contracted, pedunculate or peduncles very short or suppressed, flowers crowded 34
34. Cymes dichasioid, pedunculate, flowers crowded, secund, open one at a time, corolla hypocrateriform, 2 or more cm long, lobes oblong with crispate thin margins *Guettarda*
34. Cymes much contracted, peduncle short or obsolete, flowers not secund, few 35
35. Peduncles short, stiff, pedicels 1-several, calyx lobes stiff, laterally compressed, corolla several or more cm long, corolla lobes valvate, capsule stiff, several cm long, valves diverging, bifid at apex, seeds many, horizontal *Bikkia*
35. Cymes reduced, peduncles slender to 1 cm or less, or suppressed, flowers with short corolla tube 36
36. Corolla lobes 5-6, showy, 1 cm or more long, longer than tube, calyx much reduced, drupe cylindric, bright red, endocarp thin *Coffea*
36. Corolla lobes oblong, spreading, 5 mm or less long, not showy, drupe obovate to somewhat obcordate, endocarp hard *Canthium*

Aidia Loureiro

Aidia Loureiro, Fl. Cochinch., 143, 1790.

Randia [Houst.] L., Gen. Pl., 74, 1754 [1753]; Sp. Pl., 1192, 1753 [pro parte excl. type].—Valeton, Bot. Jahrb., 63:301, 1930.—Kanehira, Enum. Pl. Micr., 424, 1935.

Erect shrubs or small trees, branches sterile and fertile; leaves subcoriaceous; stipules small, triangular-acuminate, caducous; cymes congested to loose, once to several times branched, terminal but becoming pseudo-axillary or pseudo-leaf-opposed by appearance of a branch at terminal node, usually occurring at alternate nodes or every third node on fertile branches, bracts small and scale-like; calyx a collar or cup with 5 dentiform lobes; corolla hypocrateriform, lobes 5, imbricate and somewhat sinistrorsely contorted; anthers exerted from sinuses of corolla and deflexed, linear; stigma tardily exerted, ovary cells 2, placentas attached to septum, enlarging in fruit, ovules few to many; fruit baccate, globose, 5-10 mm diam, with thin flesh; seed angular rather few in a cell, embedded in fleshy placentae.

A genus of a few (to many ?) species, extending from Africa to the Pacific Islands, often considered a part of *Randia* sensu lato. One species native in Micronesia.

A common lowland tree from southeast Asia and Malesia eastward throughout most of the western Pacific Islands and at least as far east as the Society Islands. In Micronesia on practically all high islands and the atolls of the southern

Marshalls and northern Gilberts, but not recorded from the Caroline atolls.

Aidia cochinchinensis Loureiro

Aidia cochinchinensis Loureiro, Fl. Cochinch., 143, 1790.—Fosberg, Sachet, and Oliver, Micronesia, 15:260, 1979.—Fosberg et al., Vascular Pl. Palau, 40, 1980.—Fosberg et al., Micronesica, 16:213, 1980 [1981].

Randia densiflora (Wallich) Benth., Fl. Hongkongensis, 155-156, 1861.—Guillaumin, Bull. Soc. Bot. France, 99:40, 1952.

Randia racemosa (Cavanilles) F. Villars, Navis., App., 108, 1880.—Merrill, Philip. Journ. Sci. Bot., 9:149, 1914.—Valeton, Bot. Jahrb., 63:330, 1930.—de la Corte, Guam Recorder, 159, 1926.—Kanehira, Fl. Micr., 375, 1933; Enum. Micr. Pl., 424, 1935.—Okabe, Journ. Jap. For. Soc., 23:270, 1941; Nankyo, 2:21, 1943.—de la Corte, Guam Recorder, 11, 2(4):15, 1972.

Aidia racemosa (Cavanilles) Tirvengadam, Nordic Journ. Bot., 3:455, 1983.

Randia graeffei Reinecke, Bot. Jahrb., 24:683, 1897.—Volkens, Bot. Jahrb., 31:475, 1901.—Prowazek, Deutschen Marianen, 120, 1913.

Randia cochinchinensis (Loureiro) Merrill, Am. Phil. Soc. Trans., 24:265, 1935.—Fosberg, Occ. Pap. Bish. Mus., 15:216, 1940.—Glassman, Bish. Mus. Bull., 209:96, 1952.—Fosberg and Sachet, Atoll Res. Bull., 92:36, 1962.—Stone, Micronesica, 6:558-559, 1971.—Souder, In Guam Gardens, 61, 1974.—Fosberg, Falanruw, and Sachet, Smith. Contr. Bot., 22:41, 1975.—Moore and McMakin, Plants of Guam, 43, 1979.

Tree, glabrous; leaves elliptic to somewhat oblong or ovate, up to 16 × 7 cm, stiff chartaceous to subcoriaceous, apex acuminate, base acute, slightly attenuate, 6-7 main veins on a side, some smaller ones, network obscure, petiole 10-15 mm long; stipules broadly triangular, sharply and abruptly subulate-acuminate, early caducous; cymes axillary, one at a node,

possibly sometimes terminal and becoming axillary, irregular (2-) 3-5 times branched, branches and pedicels subtended by scale-like bracts, ultimate branches either ending in a triad of pedicellate flowers or proliferating and elongating, leaving naked pseudo-rhachises with scale-like bracts and occasional fruits, flowers pedicellate, hypanthium glabrous, narrow to cup-shaped, crowned by a spreading to funnellform calyx collar, minutely denticulate, corolla white with a short tube, 3-5 mm long, lobes 5, narrowly oblong, reflexed, apex rounded, mucronate or not, throat stiffly bearded; anthers completely exerted, linear, 9-10 mm long, tending to twist distally; stigma and part of glabrous style exerted, stigma about 1 cm long, tending to be curved, somewhat thickened, not bifid, apex bluntish-pointed; fruit red to black, pea-like, crowned with persistent calyx collar. Seeds not very numerous, embedded in pulp, irregularly angular, angles tending to be thin and wing-like.

Tirvengadam (pers. comm., 1988) considers the Pacific Islands *Aidia* populations to be distinct from those of Vietnam, and proposes to use the name *Aidia racemosa* (Cavanillas) Tirvengadam for the Pacific plant. Comparison of a series of Pacific and especially Micronesian specimens with a series of Asian ones, including some from Indo-China reveals a wide variability in both series, but much overlap and no consistent differences. Until a more convincing contrast is made, we continue to use *Aidia cochinchinensis* in the present very broad sense.

Occasional or locally common in low to mid-elevation forest on high islands and wet atolls in Micronesia.

USES.—Used for framework of roofs of native houses (de la Corte, Guam Recorder, 1972). Used against fever (Marianas, Fritz cited by Prowazek, 1913). Syphilis: Decoction of young leaves of "kelmusu" is taken like tea (Palau: Okabe, 1941). Beverage: Decoction of leaves is taken like tea (Palau: Okabe, 1941, 1943). Tuberculosis: Bark of "gasmatz," "kureuebuh" (skin of betelnut) and young sprouts of "buh" (*Areca* or *Schizostachym lima* ?) are crushed together, and taken with coconut milk (Yap: Okabe, 1943). "Used for namot tinino" a kind of sickness." (Source unknown.)

VERNACULAR NAMES.—

chumag (Marianas: Prowazek, 1913)
 smak (Saipan: Rota: Kanehira, 1933)
 snak (Saipan: Kanehira, 1935)
 suma (Agiguan: *Kondo s. n.* in 1952)
 sumac (Guam: de la Corte, 1926; Merrill, 1914; Guam Recorder, 1972; *Marche 145*; Guam, *Evans 1762*)
 sumak amor (Guam: *Evans 1806*; *Whiting S6*)
 gulmus (Palau: Kanehira, 1933)
 kelmusu (Palau: Okabe, 1941)
 kerms (Palau: Okabe, 1943)
 kerumes (Palau: Fosberg et al., 1980)

kerums (Palau: *Owen 26*)
 krumes (Palau: *Owen 9*; Otobed, ms., 1967)
 gasmatz (Yap: Okabe, 1943)
 gathomatsch (Yap: Prowazek, 1913)
 kahmant (Ponape: Kanehira, 1935)
 katchwel (Ponape: Kanehira, 1933)
 kent'mant or ken mant (Ponape: *Riesenberg 66*)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Pagan: Isthmus, *Anderson 539* (US), *Anderson 506* (US, BISH, POM, L, P, TI, NY).

Alamagan: Around Partido village, *Fosberg 31673* (US, BISH, POM); *Anderson 422* (US, BISH, POM, NY, L).

Saipan: Kagman Peninsula, 120 m, *Fosberg 50540* (US, BISH, POM); *Hosokawa 6668* (US); N of Mt. Marpi, N end of island, *Fosberg 25222* (US, BISH, POM, L, NY, P); *Marche 10* (P, POM); *Hosokawa 6625* (BISH, US); *Fritz s. n.* in 1903 (BISH); *Kanehira 43* (BISH).

Tinian: *Kanehira 1047* (P); *Kanehira 2260* (US); *Kanehira 61* (BISH); dry cliff, *Cowan s. n.* in 1945 (BISH); Marpo Valley E of Tinian (former town) SE part of island, 60 m, *Fosberg 24811* (US, BISH, POM, NY); Tinian (former town), SW coast of island, 3-30 m, *Fosberg 24760* (US, BISH, POM, NY); N end, 10 ft [3 m], *Hosaka 2841* (US, BISH); above Carolinas (Lolo) Pt., S end of island, 80 m, *Fosberg 24718* (US, BISH, POM).

Agiguan: *Kondo s. n.* in 1952 (BISH, 2 sheets); W Pt., 200 ft [60 m] *Kondo s. n.* in 1952 (BISH); N side, *Kondo & Owen s. n.* in 1952 (BISH).

Rota: Taipinkoto, *Hosokawa 7662* (BISH, US), 7882 (US); beach road, 10 ft [3 m] *Kondo s. n.* in 1952 (BISH); airstrip N of Shinapaaru, 180 m, *Fosberg 25160* (US, BISH, POM, NY, L); between airstrip and northernmost part of island, 150-250 m, *Evans 2173* (US, BISH, POM, NY, L, P, TI); S of Shinapari (airstrip), 180 m, *Fosberg 31829* (US, BISH, POM, NY); road along N coast, NE of Songsong village, 5-10 m, *Sachet 1780* (US); road along N shore, well inland from Puntan Batco, 10 m, *Sachet 1765* (US, BISH, POM, NY, L, P, TI); NW coast road, near Tatachog Pt., 3-4 m, *Fosberg with Moore 58290* (US, BISH, POM, NY, L); S of Dugi, *Stone 5193 s. l.*, *P.H. Moore 154* (GUAM); between As Matmos upper cliffline and Dugi, *Raulerson 19145* (US).

Guam: Merrill, 1914:149; *G.E.S. 6* (K, BISH, US); Uruno Pt., *Moore 1002* (GUAM), *Moran 4505* (US, BISH, POM, US); s. l., *Marche 145* (P, POM); *Guerrero 746* (BISH), 735 (BISH); Yigo, *Whiting S6* (US); Ritidian Pt., *Anderson 207* (US, BISH, POM, NY, L); plateau NE of Mt. Santa Rosa, *Fosberg 35524* (US, BISH, POM, NY, L, P); Tumon Bay, *Hosaka 3051* (US, BISH, POM); *Nelson 358* (US); road in to Two Lovers' Pt., *Rinehart LR 14108* (US); Ritidian Pt., *Necker 370* (US); 1 mi [1.6 km] E of Barrigada, 400-600 ft [120-180

m], *Moore 52* (US); Harmon Field near Harmon village, *Stone 4275* (GUAM); Asdonlucas, near Yigo, *Stone 4256* (GUAM); plateau above Anao, *Moore 1249* (US); W side of Barrigada Hill, *Stone 4506* (GUAM); falls of the N branch of the Inarajan River, *Stone 5054* (GUAM); Haputo Pt., *Moore 466* (GUAM); Paget upper terrace, *Moore 58* (GUAM); Paget Plateau, near edge of cliff, *Moore 537* (GUAM, 2 sheets); Inhuna, 180 m, *Evans 1762* (US, BISH); Taguac, 110 m, *Evans 1806* (US, BISH, POM, NY).

CAROLINE ISLANDS.—Palau: Limestone island, *Dutton 99* (US, BISH, POM); 70 Islands # 6, *Rinehart (Raulerson's) 16961* (US); Ngaruangel: *Owen 9* (US). Babeldaob: Arukodorokkuru, *Takamatsu 1152, 1139, 1132* (BISH). Koror: Gatulelto, Ailai-son, *Hosokawa 7336* (BISH); north section, 10 ft [3 m], *Hosaka 3377* (US, BISH, POM, NY). *Owen 26* (US); *Kanehira 1913* (US); limestone rock island, Iwayama Bay, *Salsedo 430* (US, GUAM); *Ledermann 14067* (B), *14310* (B), *14158* (B); Negermeyaus I., S Koror Munic., S end of island, 2 m, *Canfield 653* (US). Olophsacal [= Aulupse'el], *Takamatsu 1471* (US, BISH); Oropusyakaru-to (S of Koror) *Hosokawa 7445* (BISH, US); *1483* (BISH). Ngarakabesan: *Takamatsu 1253* (BISH). Malakal: 100 m, *Fosberg 47514* (US, BISH, POM, NY, L, TI). Aulupse'el: Risong, Metuker Bay, S side of island, *Fosberg 47534* (US, BISH, POM, NY, P, TI); Ngerebe'ed Beach, 2–10 m, *Evans 591* (US, BISH, POM); *Fosberg 47472* (US, BISH). Urukthapel: SW peninsula, on N coast, 1–10 m, *Fosberg 32192* (US, BISH, POM, NY, L, P); 50 m, *Canfield 465* (US); S side of SW peninsula, 10 m, *Fosberg 32238* (US, BISH, POM); Todaisan, *Hosokawa 7507* (BISH). Aulong (rock island): *Salsedo 19* (US). Ngeanges: 1 m, *Fosberg 25822* (US); 2–25 m, *Fosberg 25853* (US, BISH, POM, NY, L); Ng'edobel I., N of Eil Malk I., *Fosberg 50569* (US, BISH, POM), *50572* (US, BISH, POM, NY, L); Aumasuku I., *Hobdy 1484* (BISH). Peleliu: E side of island, "Purple Beach," 0–2 m, *Fosberg 25988* (US, BISH, POM, NY, L). 70 Islands: Bkulomekerall (13) Island, 10 m, *Rinehart LR 16626* (US); 5 m, *Raulerson 16567* (US); west beach, 3 m, *Raulerson 16602* (US). Angaur: NW corner of island, 40 m, *Fosberg 25946* (US, BISH, POM, NY, L); midway between Lakes A and D, 10 m, *Canfield 206* (US); S part of W side of island, 3–5 m, *Fosberg 32003* (US, BISH, POM, MO); just W of airstrip, 4 m, *Canfield 251* (US); Ngerenail Island, *Owen 9* (US); Ngerchong Island, along path running E across N half of island, 5 m, *Canfield 548* (US).

Yap: *Volkens 502* (BISH); channel NW Gagil Distr., *Stemmermann 3202* (BISH); N end of Gagil Dist., Maki, 2–5 m, *Fosberg 25591* (US, BISH, POM, NY, L); Fanif, Weloy, *Falanruw 3455* (US); near Makiy, N end of Gagil Mun., *Fosberg 60146a* (US, BISH); Gorrer I., central plateau, 100 ft [30 m] *Hosaka 3305* (US, BISH, POM, NY).

Fais: Inland from S side of island, 15 m, *Fosberg 46699* (US, BISH, POM, L, NY).

Ponape: *Riesenberg 66* (BISH); *Ledermann 13492* (B);

Taman, *Takamatsu 877* (BISH).

MARSHALL ISLANDS.—Arno: Arno I., interior, *Stone 1055* (POM, US); Ine I., *Anderson 3714* (US, POM, BISH); Arno I., *Anderson 3762* (US, POM, BISH); Arno I., *Hatheway 800* (US, BISH, POM).

Jaluit: Okabe, 1941:270.

NAURU ISLAND.—Nibok, *Burges K9* (K, 2 sheets).

BANABA ISLAND.—*Rhone 9* (NSW); *Catala 1b* (P).

GILBERT ISLANDS.—Guillaumin, 1952:40. *Catala 1* (P).

Badusa A. Gray

Badusa A. Gray, Proc. Amer. Acad., 9:308, 1860.—Darwin, Allertonia, 2:21, 1979.—Ridsdale, Blumea, 28:145–150, 1982.

Shrubs and small trees, essentially glabrous; leaves opposite, generally elliptic or nearly so; stipules forming a low fimbriate-ciliate collar, adnate at base to petiole bases; flowers borne in corymbiform pedunculate thyrses in upper leaf axils, a pair of reduced leaves at first node, small scale-like bracts with minutely fimbriate margins, subtending thyrses-branches and pedicels, hypanthium fusiform, calyx cup-like with 5 teeth or lobes; corolla in bud very narrowly clavate or almost cylindrical, limb slightly broader than tube, blunt, lobes 5, in aestivation imbricate, almost imperceptibly or not at all contorted (though originally described as "contorto-imbricatis"), one lobe outside, lobes linear-oblong, more or less equalling tube, spreading, white; stamens prominently exserted; stigma small, appearing subcapitate but composed of 2 coherent lobes; capsule fusiform, crowned by the persistent calyx, septicidally dehiscent, fruiting pedicels tending to be recurved; seeds many, irregularly angular in outline, strongly compressed, slightly and irregularly winged, surface bullate-cellular.

A genus of 3 or 4 species native to Tonga, Fiji, Melanesia, the Philippines, and Palau. Related to, or at least resembling *Exostema* of the Caribbean area.

Badusa palauensis Valeton

Badusa palauensis Valeton, Bot. Jahrb., 63:299–300, 1930.—Kanehira, Fl. Micr., 354, 1933.—Fosberg, Occ. Pap. Bish. Mus., 15:213, 1940.—Fosberg, Sachet, and Oliver, Micronesica, 15:261, 1979.—Fosberg et al., Vascular Pl. Palau, 40, 1980.—Ridsdale, Blumea, 28:147, 1982.

Glabrous shrub or small tree, internodes mostly short, leaves broadly elliptic to oblong or oval, up to 16.5 × 8.5 cm, usually much smaller, apex rounded to obtuse, often shortly pointed, base acute or very slightly decurrent on petiole, principal veins usually 10 or 11 on a side, network rather obscure, petioles 1–3 mm thick; stipular collar up to 5 mm or more high, with a triangular lobe or a small tooth on each side, or almost truncate; thyrses in upper axils or on short branches in upper axils, these branches with reduced leaves, peduncles up to 7 cm long, stiff,

thyse with 2 principal internodes and a pedicellate terminal flower, each branch with 2 internodes and a pedicellate terminal flower, branching slightly irregular, reduced bracts and their stipules at nodes, bracts triangular subulate, both bracts and stipules strongly and stiffly fimbriate-ciliate, hypanthium about 5 mm long, contracted slightly above, calyx abruptly larger, about 1 mm high, with 5 subulate teeth about 2.3 mm long, margins scabrous-ciliate, inner surface tomentulose; corolla white, magenta at base, in bud up to 3 cm long, tube 10–12 mm, limb narrowly cylindrical-clavate, lobes longer, at anthesis spreading, strap-shaped, recurved-curling in age; anthers linear exserted, style subequal with filaments; capsule narrowly ellipsoid to clavate, 10–12 mm long, valves slightly spreading distally after dehiscence; seeds about 2 mm long, compressed narrowly and irregularly cuneate light brown, with a pale irregularly bidentate wing at apex.

Found in forest and scrub on limestone, apparently endemic to Palau.

VERNACULAR NAMES.—ralm? (Fosberg et al., 1980).

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: *Kanehira 2478* (P, K); *Ledermann 14099a* (B); *Kanehira 1856* (US). Babeldaob: Gatulel-to, Ailai-son, *Hosokawa 7340* (BISH, A, US). 70 Islands, Island 15, *Raulerson 1676* (US); Ngerukeued I., 70 Islands, *Raulerson 16962*. Koror: 10–100 m, *Ledermann 14150* (B, syntype); limestone islands “east of town,” *Hobdy 1519* (Bish); Coral I., *Kanehira 216* (BISH), *2406* (US); Oropseyakal-tio, *Hosokawa 7457* (BISH, A); Olophacal [= Aulupse’el], *Takamatsu 1490* (US, BISH); Mecherechan I., *Otobed P-10123* (US); limestone islet, *Dutton 109* (US, BISH, POM); Ngelobel I., S. Koror Munic., NW side of island, 1 m, *Canfield 668* (US); Arukodorokkuru, *Takamatsu 1155* (BISH); Kaiguru, *Takamatsu 1601* (BISH); in insulis in Sinu Iwayama, *Tuyama 9359* (K).

Bikkia Reinwardt

Bikkia Reinwardt in Hornschuch, Sylloge Pl. Nov., 2:8, 1825 [nom. cons.].—Darwin, Allertonia, 2:23, 1979.

Cormigonus Rafinesque, Ann. Gen. Sc. Phys., 6:83, 1820.

Portlandia sensu auct. Pacific, non P. Brown.

Shrubs, leaves leathery, obovate, stipules connate and adnate to petioles; flowers 1–several on stout axillary peduncles, tetramerous, calyx short, cup-like with 4 strong pointed lobes; corolla large, funnelliform the limb in bud strongly 4-angled; stamens free to base, anthers linear, exserted; style elongate, upper part stigmatic in two long lines, ovary cylindrical, placentae axile, attached lengthwise from top to bottom, ovules numerous; fruit a heavy capsule, subcylindrical with 8 strong costae, dehiscing septicidally, then the apices of valves splitting somewhat loculicidally, the valves remaining surrounded by the loose heavy costae; seeds many horizontally

arranged, porrect from placentae.

A small Indo-Pacific or Western Pacific genus centering in New Caledonia, with 2 Micronesian species.

Key to Micronesian Species of *Bikkia*

- Leaves with about 4 or 5 principal veins on a side, peduncles 5–20 mm long, calyx lobes incurved, 3–8 mm long, corolla tube about 5–8 cm long *B. tetrandra*
 Leaves with about 9–10 principal veins on a side, peduncles about 3 mm long, calyx lobes erect, about 1–2 cm long, corolla tube 10–14 cm long *B. palauensis*

Bikkia palauensis Valeton

Bikkia palauensis Valeton, Bot. Jahrb., 63:288, 1930.—Kanehira, Fl. Micr., 354, 1933; Enum. Micr. Pl., 415, 1936.—Hosokawa in Yamamoto et al., Mat. for Study of Fl. Form. and Micr. Pl., 38, 1936.—Fosberg, Occ. Pap. Bish. Mus., 15:214, 1940.—Fosberg, Sachet, and Oliver, Micronesica, 15:262, 1979.—Fosberg et al., Vascular Pl. Palau, 40, 1980.

Bikkia grandiflora var. *tenuiflora* sensu Fosberg, Sachet, and Oliver, Micronesica, 15:262, 1979 [non Valeton in Gibbs, Contr. Arfak. Mus., 220, 1917].

Shrub, often pendent, to 5 m, glabrous, branchlets subquad-rangular, with internodes short and congested in the distal flowering portions; leaves coriaceous, broadly elliptic to 15 × 8 cm, apices rounded, base acute to broadly acute, venation obscure, main veins about 9–10 on a side, petiole rather broad, 1.5–2.0 cm long; peduncles only about 3 mm long, pedicels 5–10 mm long; hypanthium quadrangular, about 1.0–1.5 cm long somewhat sulcate, calyx abruptly spreading about 2.5 mm long, lobes linear, stiff, erect, about 2 cm long, acute, somewhat flattened; corolla tube 10–14 cm long, upper part gradually dilated, lobes triangular, 3 cm long somewhat twisted at top, becoming hirsute below, anthers linear, 37 mm long; pistil 12.5–14.5 cm long, distal 1 cm stigmatic and twisted, 2 apparently stigmatic lines or grooves below but these not puberulent; capsule ellipsoid, 2.5 × 1.0 cm, valves obovate, notched at apex; seeds cuneate, flattened, faces brown, longitudinally striate-cellular-reticulate, marginal cells, especially at top and base, large, almost bulbous, light amber colored, transparent.

Found on wet limestone cliffs and steep slopes.

VERNACULAR NAMES.—

kalau (Palau: *Salsedo 48*)

zur (Palau: *Hardy 36*; Fosberg et al., 1980)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—s. l., *Ledermann 14373a* (B, syntype); Palau: Rock isles, *P.H. Moore 184* (GUAM). Babeldaob: Rock island near “Ulong” Island, *Cheatham 112* (US, BISH, POM,

NY, L); rock island, *Cheatham 50* (US). Koror: *Tuyama 10113P* (K); limestone rock island in Iwayama Bay, *Salsedo 48* (US, GUAM); Ngrtmeduch Rock, *Hardy 36* (US, BISH); Madmosuk Island, just W of Koror, *Stone 1287* (US); NE corner of island, *Fosberg 50623* (US, BISH, POM, NY, L); *Kanehira 1892* (US, 2 sheets); Iwayane, *Takamatsu 1448* (US, BISH); *Ledermann 14073a* (B, syntype); near causeway to Babeldaob ferry, *Falanruw et al. 1072* (GUAM); Ngemelis group, Aremasuku I., *Hobdy 1464* (Bish); Gatulel-to, Ailai-son, *Hosokawa 7302* (A). Urukthapel: One of small islands N of SW peninsula of Urukthapel, 1–2 m, *Fosberg 32196* (US, BISH, POM, NY, L); middle of NW coast of Magaiald (N arm of Urukthapel) SW shore of Malakal Harbor, 1 m, *Fosberg 25860* (US, BISH, POM, NY, L). Ngeanges: Just W of S point of Urukthapel, 2–25 m, *Fosberg 25833* (US, BISH, POM, NY, L). Eil Malk: Oroukuizu or “Seventy Islands” Nature Reserve, eastern-most large island, 30 m, *Fosberg 47652* (US, BISH, POM, NY), 2 m, *47650* (US, BISH, NY, POM, L); limestone islet, *Dutton 110* (US, BISH, POM); island 12, 5 m, *Kerr LR 16688* (US). Peleliu: *Kanehira 2450*. Angaur: *Takamatsu 1812* (BISH, K).

Bikkia tetrandra (L. f.) A. Richard

Bikkia tetrandra (L. f.) A. Richard, Mem. Soc. Hist. Nat. Paris, 5:231, 1834.—Stone, *Micronesica*, 6:539, 1971.—Souder, In Guam Gardens, 65, 1974.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:262, 1979.

Portlandia tetrandra L. f., Suppl. Pl., 143, 1781.

Bikkia mariannensis Brongniart, Bull. Soc. Bot. France, 13:42, 1866.—Merrill, Philip. Journ. Sci. Bot., 9:142, 1914.—Valeton, Bot. Jahrb., 63:289, 1930.—Kanehira, Fl. Micr., 355, 1933; Bot. Mag. Tokyo, 47:562, 1933; Enum. Micr. Pl., 113, 1935.—Stone, *Micronesica*, 6:539–40, 1971.—Falanruw and Payne, Life on Guam, 66, 1976.—Moore and McMakin, Plants of Guam, 121, 1979.

Cormigonus mariannensis (Brongniart) Wight ex Safford, Contr. U.S. Nat. Herb., 249, 1905.

Bikkia longicarpa Valeton, Bot. Jahrb., 63:289–290, 1930.

Bikkia mariannensis var. *longicarpa* (Valeton) Fosberg, Occ. Pap. Bish. Mus., 15:213, 1940.

Stiff shrub, glabrous, stems weakly quadrangular; leaves to 10 × 6 cm, obovate, glossy, thick, apex rounded to obtuse, base gradually attenuate, venation rather obscure, main veins 4–5, with weaker ones between them, petioles 5–10 (–12) mm, slightly winged; stipules low-triangular, acuminate; peduncles 5–20 mm long, with 2 scale-like triangular-acuminate stipular bracteoles at summit, flowers usually one to a peduncle, rarely several on a branching condensed inflorescence, pedicels stout, about 1 cm long; hypanthium about 1 cm long, sulcate (when dry), calyx with free part abruptly larger than ovary, shallowly cup-like, lobes stiff, horn-like, carinate, curved upward, sharp, to about 4 mm; corolla tube gradually, then more strongly dilated upward, about 5.5 cm long, lobes spreading, triangular; filaments 4.0–4.3 cm long, glabrous above, becoming more and more hirsute in lower $\frac{2}{3}$, anthers linear, about 2.4 cm long, basally attached with short appendages; pistil about 8 cm long,

distally curved, distal 1 cm or so with glandular surface, the next 3 cm with two puberulent lines, the lower 4 cm glabrous; capsule sub-quadrangular prism-shaped, or slightly dilated upward, obovate, notched at summit; seeds irregularly broadly cuneate, 1.2–1.4 mm long, flattened, irregularly longitudinally cellular reticulate on faces, margins of large, thick-walled translucent cells.

Common and conspicuous on sea-cliffs, usually of limestone. Found also, in the south Pacific, apparently in similar situations.

USES.—The wood ignites easily and is used for torches (Guam. Safford, 1905).

VERNACULAR NAMES.—

gau sali (Rota: *Fosberg 25005*)

gausuli (Guam: *Anderson 230*; Safford, 1905; *G.E.S.* 40; *Marche 129*; Safford & Seale 1107; *Falanruw & Payne 1676*)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Saipan: *Lange 6* (BISH); *Stephens 58, 69* (POM); Kagman Peninsula, *Courage 16* (US); Bahia Fanchuluyan, *Holt 29–2* (US); *Hosokawa 8015* (BISH); S side of Kagman Peninsula, W of Kagman Pt., 30 m, *Fosberg 31291* (US); sea cliffs on Tsukimi Bay, E of Mt. Petosukara, E side of island, 75 m, *Fosberg 25201* (US, BISH, POM, NY); Charan-Tarhoho, 500 ft [150 m], *Hosaka 2992* (US, BISH); Bird Island Beach, 0–10 m, *Evans 2331* (US, BISH, POM, NY); “Old Man by the Sea” Beach, E side of island, *Ogata 1837* (US); *Hosokawa 8015* (A), 9319 (A).

Tinian: *Hosokawa 7781* (BISH, A, US); Long Beach, *Smith 1292* (US); N end, 10 ft [3 m], *Hosaka 2840* (US, BISH); Masalog ridge, 400 ft [120 m], *Hosaka 2837* (US, BISH, POM); S end of Masalog Ridge, E side of island, 100 m, *Fosberg 24752* (US, BISH), 24751 (US), 24750 (US) terrace on SE coast of island, NE of Carolinas Pt., 60–80 m, *Fosberg 24835* (US, BISH, POM), 24838 (US, BISH).

Agiguan: 100 ft [30 m], *Kondo s. n.* in 1952 (BISH); SW part, *Kondo VII* in 1949 (BISH); West Pt., *Kondo* in 1952 (BISH).

Rota: *Ledermann 14026* (B, isotype of *B. longicarpa* Valeton); *Kanehira 1822* (US); *Necker R 29* (US); Sabana, 1500 ft [460 m], *Kondo s. n.* in 1952 (BISH); E of Songsong village, 30 m, *Sachet 1642* (US, BISH, POM, NY); S coast of island, from Songsong village to a point above Aratsu Bay, 150–250 m, *Evans 1930* (US, BISH, POM, NY, L); *Cheatham 177* (US, BISH, POM, NY); NW coast of W end of main part of island between Rota and Tataacho Pt., 1–70 m, *Fosberg 25005* (US, BISH, POM, NY), 25121 (US, BISH, POM, NY); *Kanehira 1774* (P, NY); savanna, *Hosokawa 7591* (A); ESE side of island, *Quinata LR 19221* (US).

Guam: s. l., *McGregor 634* (K); s. l., *Le Guillou 31* (P); *Gaudichaud s. n.* (P, type of *Bikkia mariannensis* acc.

Bakhuizen annotation); Pati Pt., 160 m, *Necker 376* (US, BISH); Ritidian Pt., *Bryan 1141* (BISH, 2 sheets, K); *G.E.S. 407* (US, BISH); *Marche 187* (P, POM); Ile de Cabra, *Marche 129* (P, POM); Ypan Pt., *Stone 4296* (GUAM); Asanite Pt., *Stone 4896* (GUAM); Marine Beach, *Pedrus 1* (GUAM); *McGregor 634* (US, E); Pago Pt., *Moran 4596* (E); sea level, Agaña, *Safford & Seale 1107* (US), *Knox 848* (US); E coast, Talofoto, Ypan Pt., *Moore 365* (US); near Yona, *Rodin 579* (US); Pati Pt., 160 m, *Necker 367* (US); Ypao Pt., *Necker 137* (US); Pago Pt., *Moran 4596* (US, POM, US); Ritidian Pt., top of cliff, N end of island, 170 m, *Fosberg 25321* (US, BISH), *25304* (US, BISH, POM), *25310* (US), *25316* (US); Asanite Bay, 5–10 m, *Evans 1516* (US, BISH, POM, NY, L); Tarague Beach, W end near caves, 5–6 m, *Anderson 230* (US, BISH, POM, NY, L); Ritidian Pt., near light, 150 m, *Anderson 214* (US, BISH, POM); S of Tarague Bay, *Moran 4570* (UC, POM, US); Pagat, *P.H. Moore 92* (GUAM); Tagachan Bay, *Stone 4022* (GUAM); between Pugua and Haputu Pt.s, *Fosberg & Aguon 59775* (US, BISH, POM, NY, L); Asanite Bay, N of Talofoto Bay, *Fosberg & Moore 59947* (US, BISH, POM, NY, L).

***Canthium* Lamarck**

Canthium Lamarck, *Encycl. Meth. Bot.*, 1:602, 1785.
Plectronia sensu de Candolle et auct. plur. [non L., *Mant. Pl.*, 6, 1767].
Psyrax Gaertner, *Fruct. et Sem. Pl.*, 1:125, 1788.
Cyclophyllum Hooker f. in Bentham and Hooker f., *Gen. Pl.*, 2: pari prima Addend. 535, 1873.

Shrubs or trees; stipules ovate, cuspidate or acuminate; inflorescences axillary cymes, often much reduced, even to small fascicles; flowers 4–5 merous; corolla with short cylindrical tube, usually pilose within, especially at throat, lobes valvate, spreading; stamens inserted in throat, filaments short; ovary usually 2-loculed, with one pendulous ovule in each locule, style 1, stigma cylindric, 2–4 lobed, included or exserted; fruit a drupe with one 2-loculed or two 1-loculed stones.

Key to Micronesian Species and Varieties of *Canthium*

- 1. Cymes open, usually several cm long *C. odoratum* var. *tinianense*
- 1. Cymes contracted, relatively few flowered, usually 2 cm or less long 2
- 2. Cymes sessile, subcapitately congested *C. barbatum* var. *korrorense*
- 2. Cymes shortly pedunculate, branched *C. barbatum* var. *rupestre*

***Canthium barbatum* (Forster f.) Seemann (sensu lato)**

Canthium barbatum (Forster f.) Seemann, *Fl. Vit.*, 132, 1866.
Chiococca barbata Forster f., *Prodr.*, 16, 1786.

Cyclophyllum barbatum (Forster f.) A.C. Smith and S. Darwin, *Fl. Vit. Nov.*, 4:234, 1988.

Shrubs or small trees, vegetative parts glabrous or nearly so; branchlets tending to be rather long, leafy over a considerable length, leaves so oriented as to appear distichously arranged although in origin normally decussate, varying in size, shape and texture in different varieties, stipules triangular-acuminate; cymes very much reduced, 1 or 2 in an axil, peduncle very short to at most 1 cm long, branched portion condensed, few-flowered (even as few as 1, as in original description), pedicels from several mm to as much as a cm long, calyx teeth short, corolla salverform, 4 lobes ovate, horizontally spreading from a short cylindric tube, throat usually bearded; fruit obovoid plump to more or less compressed, tending to be slightly obcordate at least when dry.

Canthium barbatum (Forster f.) Seemann var. *barbatum*, not known from Micronesia.

***Canthium barbatum* var. *korrorense* (Valeton) Fosberg**

Canthium barbatum var. *korrorense* (Valeton) Fosberg, *Occ. Pap. Bish. Mus.*, 145:218, 1940.—Glassman, *Bish. Mus. Bull.*, 209:92, 1952.—Fosberg, Sacht, and Oliver, *Micronesica*, 15:262, 1979.—Fosberg et al., *Vascular Pl. Palau*, 40, 1980.
Plectronia korrorensis Valeton, *Bot. Jahrb.*, 63:311–312, 1930.
Canthium korrorense (Valeton) Kanehira [Sphalm.], *Bot. Mag. Tokyo*, 46:671, 1932; *Enum. Micr. Pl.*, 416, 1935.
Canthium oblongum (Valeton) Kanehira sensu Kanehira, *Bot. Mag. Tokyo*, 46:671, 1932; *Enum. Micr. Pl.*, 416, 1935 [non Valeton, *Bot. Jahrb.*, 63:310, 1930].
Geniostoma niinoanense Kanehira, *Bot. Mag. Tokyo*, 45:341, 1931.

Young stems squarish but not sharply so, internodes 1–7 cm long; leaves broadly elliptic to slightly obovate, up to 12 × 7.5 cm, mostly 5 veins on a side, apex abruptly shortly acuminate, tip blunt, base acute to obtusely narrowed and slightly decurrent to a short (3–8 mm) petiole; stipules triangular, strongly acuminate, 3–6 mm long; cymes sessile (peduncle to 1–1.5 mm), 8–10-many-flowered, strongly condensed (capitate or subcapitate) pedicels about 2 mm long at anthesis, elongating to 5–6 mm in fruit, subtended by erose broad scale-like bracts; calyx sharply dentate, with hypanthium 1–1.5 mm long, corolla tube about 3.5 mm long, lobes ovate, about 2 mm long, throat barbate; fruit “rosarot,” obovoid, about 13 × 9 × 5 mm, not or scarcely sulcate nor emarginate.

All records of this variety are from Ponape, in spite of the epithet *korrorense*, which clearly refers to Koror, Palau. Valeton does not explain his choice of epithets.

Other varieties of this species are found in the South Pacific on many islands from New Guinea and Australia on the west to the Marquesas and Henderson Island in Eastern Polynesia.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Ponape: s. l., *Kanehira 1523* (P); Mt.

Nanalaut, 1600 ft [488 m], *Glassman 2363* (BISH, US); Mt. Beirut, 2100 ft [640 m], *Glassman 2542* (BISH, US), *2547* (BISH, US); Mt. Poaipoai, 1900 ft [580 m], *Glassman 2486* (BISH, US); *Kanehira 798* (BISH); *Kanehira 1635* (BISH, US); Nipit-one, *Hosokawa 5823* (BISH, A); Ronkity-oviekan, *Hosokawa 9590* (BISH, US, A); *Hosokawa 8230* (US, A); Awak Valley, 250–300 m, *Stemmermann & Haun 6525* (Bish); Toletik, *Takamatsu 941* (P, BISH); Paran, *Takamatsu 621* (K, US, BISH); Tean-Parkil Sinrin-titai oyobi sogen, *Hosokawa 5849* (A); Mt. Kankauzan, *Hosokawa 5484* (A); *Kanehira 1489* (US), *1497* (US), *1699* (US); Tolon, Palikir, *Fosberg 60409* (US, BISH, POM, NY, L); Toleailuka, *Takamatsu 815* (BISH); Mt. Tolotom, *Takamatsu 1060* (BISH); Mt. Tean, *Takamatsu 1761* (BISH); Kolonia, *Kanehira 1482* (US, NY), *1489* (NY); Parkier, *Kanehira 1520* (NY), *1699* (US, NY), *1479* (NY); Matalanim, *Stone 5436* (US).

***Canthium barbatum* var. *rupestre* (Hosokawa) Fosberg**

Canthium barbatum var. *rupestre* (Hosokawa) Fosberg comb. nov.

Canthium rupestre Hosokawa, Trans. Nat. Hist. Soc. Formosa, 32:18, 1942.—Fosberg, Sachet, and Oliver, Micronesica, 15:263, 1979.—Fosberg et al., Vascular Pl. Palau, 40, 1980.

Shrub, branchlets nodose; leaves ovate to 15 × 7 cm, apex acute or shortly acuminate, base acute, abruptly decurrent into a short petiole, main veins 5–6 on a side, blade chartaceo-coriaceous; cymes 3–6-flowered, short, axillary, very shortly pedunculate, branched 1–2 times; calyx somewhat flaring, very short, subtruncate or weakly denticulate; corolla tube 5 mm long, densely pilose in throat, lobes ovate-oblong, 3 mm long; stamens exserted, anthers 3 mm long, style glabrous, 8.5 mm long, stigma mitriform, 2 mm wide and high, bilobed, lobes thick, acute; fruit “globosus, paullo adpressus,” 1.3 wide, 9 mm thick.

Apparently very rare, only collected once; material examined is very inadequate and might almost as well belong to the genus *Gynochthodes*.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

CAROLINE ISLANDS.—Palau: Oropsyakal [= Aulupse’el], *Hosokawa 9779* (A, BISH, isotypes).

***Canthium odoratum* (Forster f.) Seemann (sensu lato)**

Canthium odoratum (Forster f.) Seemann, Fl. Vit., 132, 1866.

Coffea odorata Forster f., Prodr., 16, 1786.

Psychdrax odorata (Forster f.) A.C. Smith and S. Darwin, Fl. Vit. Nov., 4:230, 1988.

Shrub or small tree, with whitish or light gray trunk and branches, branchlets slender, these not elongate; leaves small variously shaped from elliptic to ovate or oblong, acute or bluntly acuminate to obtuse or rounded at apex, very glossy dark green; stipules triangular, tending to be mucronate; cymes

open, corymbiform, dichotomous with a sometimes abortive central flower, branches several times to repeatedly rather irregularly branched, flowers pedicellate, calyx obtusely 5-dentate, corolla salverform with short tube, throat very woolly (or glabrate), lobes oblong exceeding tube, spreading; stamens exserted, anthers erect, sagittate; style and stigma exserted to twice length of stamens, stigma cylindrical; fruit a rather leathery black drupe, somewhat orbicular, somewhat compressed and grooved on sides, stone separable into two.

Occasional in exposed or rather dry places, mostly on limestone in the Marianas. Variety *odoratum* is very widespread from Hawaii to Australia.

A widely distributed species, ranging from Hawaii and eastern Polynesia to the Marianas and Australia and highly variable. In Micronesia it is represented by var. *tinianense*.

Canthium odoratum (Forster f.) Seemann var. *odoratum* not known from Micronesia.

***Canthium odoratum* var. *tinianense* (Kanehira) Fosberg**

Canthium odoratum var. *tinianense* (Kanehira) Fosberg, Phytologia, 5:289–291, 1955.—Stone, Micronesica, 6:540–541, 1971.—Fosberg, Sachet, and Oliver, Micronesica, 15:263, 1979.

Randia tinianensis Kanehira, Bot. Mag. Tokyo, 46:494, 1932.

Canthium tinianense (Kanehira) Kanehira, Bot. Mag. Tokyo, 49:354, 1935; Enum. Micr. Pl., 416, 1935.

Canthium odoratum sensu Fosberg, Occ. Pap. Bish. Mus., 15:218–219, 1940 [non (Forster f.) Seemann].

Shrub, vegetative parts glabrous, internodes terete, mostly 1–5 cm; leaves broadly ovate to broadly elliptic, 5–7 × 2.5–4.5 cm, apex acute to obtuse but actual tip rounded, base acute, blade coriaceous, stiff, 3–4 main veins on a side, minor veins and network rather obscure, petiole 2–6 mm; stipules low adnate with petioles and forming a very short sheath, apices cuspidate or mucronate; cymes axillary, pedunculate, rather irregular 3–5 (–6) times dichotomously branched, open when in fruit, flowers shortly pedicellate, calyx very short, 4-toothed, corolla tube short, lobes longer, oblong, spreading; fruit obcordate, somewhat compressed, about 3 mm long, 3.5 mm wide 2 mm thick, with thin leathery flesh, pyrenes 2.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Saipan: Kagman Pt., 150 m, *Fosberg 31935* (US, BISH, POM, NY, L); Mt. Raeda, 300 m, *Stone 5252* (GUAM).

Tinian: s. l., *Kanehira 1059* (US, BISH, P, NY); *Kanehira 50* (BISH, NY); *Kanehira 2275* (P, NY), *1069* (NY); *Kanehira s. n.* (P) s. l., *Hosokawa 7706* (A, BISH); S end Masalog Ridge, 100 m, *Fosberg 24754* (US, BISH), *24756* (US, BISH); Mt. Lasso near beach, 25 ft [8 m], *Hosaka 2815* (US, BISH); 0.5 km SE of Liyang Makiang, 160 m, *Fosberg 64513* (US, BISH, POM); ridge above Lasu Shrine, *Fosberg 64487* (US, BISH).

Rota: N coast of W end of main part of island, 3 m, *Fosberg 25131* (US, BISH); s. l., *Kanehira 1745.B* (NY); between

Matmas and Michong, *Raulerson 19136* (US).

Guam: Ritidian Pt., *Hosaka 3106* (US, BISH); Anao Mati Conservation Reserve, 160 m, *Fosberg 39237* (US, BISH, POM, NY); Pagat Plateau, *P.H. Moore 620* (GUAM); "near quadrat #2," *P.H. Moore 171* (GUAM).

Cephaelis Swartz

Cephaelis Swartz, Prodr., 3, 45, 1788.

Shrubs or small trees, rarely dwarf shrubs or herbs; leaves opposite, entire; stipules usually persistent; inflorescence an involucre head, terminal or axillary, rarely a thyse of small involucre heads, involucre of at least 4 free bracts; calyx cup 4-7-dentate, persistent; corolla salverform or funnellform, lobes 4-5, valvate, spreading; stamens inserted in throat; ovary 2-celled with erect ovules; fruit a fleshy drupe, often bright blue, pyrenes 2, usually longitudinally sulcate.

A large tropical American and African genus, often united with *Psychotria*. One species has been planted in Micronesia.

***Cephaelis ipecacuanha* (Brotero) A. Richard**

Cephaelis ipecacuanha (Brotero) A. Richard, Bull. Fec. Med., 4:92, 1818.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:263, 1979.

Callicocca ipecacuanha Brotero, Trans. Linn. Soc. London, 6:137, t.11, 1802.
Uragoga ipecacuanha (Brotero) Baillon, Hist. Nat. Pl., 7:281, 1880.—Okabe, Bull. Trop. Indust. Inst. Palau, 5:14,17, 1940.

Slender dwarf shrub or suffrutescent herb, not or scarcely branching above ground, stems pubescent, underground stems creeping, sending up stems several dm tall, elongate horizontal roots with irregular swollen indurate cortex in crowded rings, small rootlets emerging from these; leaves elliptic, 5-7 x 2.5-4.5 cm, apex acute to shortly acuminate, base acute, decurrent into a very short petiole; stipules broadly oblong, long-pectinate, with a row of erect elongate glands (colleters) in axils; inflorescence terminal, pedunculate, much shorter than leaves, involucre of 4 broadly ovate subcordate acute hirsute bracts; flowers 15-24 in a head, greenish (?), subtended by ovate "bracteoles"; calyx very short, with 5 obtuse teeth; corolla tube 3 mm long, woolly in throat, lobes 5, ovate, acute, recurved, shorter than tube; stamens included; styles included, bifid; drupe about 1 cm long, pyrenes 2, about 5 mm, somewhat twisted.

This important medicinal plant is said to have been tried out in cultivation in Palau and Ponape. We have seen no Micronesian material and have only the Okabe record of it from the area.

Cinchona L.

Cinchona L., Sp. Pl., 172, 1753; Gen. Pl., ed. 5, 79, 1754.

Trees, rarely shrubs or subscandent, bark bitter, raphid bundles none; leaves lanceolate, elliptic, ovate, or broadly

oblong, rarely somewhat obovate, chartaceous to subcoriaceous, veins few to rather numerous, petiolate, usually turning red when old; stipules interpetiolar, subfoliaceous, caducous; inflorescence thyrsoid-paniculate, terminal, small to ample, leaf-like bracts at lower nodes, rapidly diminishing to scales distally; calyx small, cup-shaped, 5-dentate; corolla hypocrateriform, 5-lobed, lobes patent, thin, notably ciliate, valvate in bud; anthers attached at or near top of corolla tube, subsessile; ovary 2-loculate, placentae axile, peltate, attached to middle of septum, with many ovules; style filiform, bifid, branches spreading, stigmatic, exserted; fruit a capsule, elliptic to ovoid, septicidally dehiscent, often starting to split from base, apices of valves held together at first by persistent calyx; seed small conspicuously winged, especially at both ends, imbricate.

A tropical American, principally Andean genus of perhaps 12-15 species, widely planted in the wet tropics for its bark, which is the source of quinine and other medicinal alkaloids. The species are mostly very variable and are interfertile, readily hybridizing. Many of the planted and naturalized forms are of hybrid origin.

Key to Micronesian Species of *Cinchona*

- Leaves narrowly elliptic to elliptic, tending to be acute but blunt or rounded at tip, subcoriaceous or thick chartaceous, veins not prominent, glabrous or almost so beneath; fruit ovoid, about 1 cm long, rather thin-walled *Cinchona calisaya*
- Leaves broadly elliptic to broadly oblong, apex broadly rounded, often with a slight tip, chartaceous, somewhat pubescent beneath, main veins 7-11 or more, prominent; fruit narrowly ovoid or fusiform, well over 2 cm long, firm-walled *Cinchona succirubra*

***Cinchona calisaya* Weddell**

Cinchona calisaya Weddell, Ann. Sci. Nat., III, 10:6, 1848.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:263, 1979.

Cinchona officinalis sensu auct. non L., Sp. Pl., 172, 1753.

Cinchona ledgeriana Moens ex Trimen, Journ. Bot., 19:323, 1881.—Okabe, Bull. Trop. Ind. Inst. Palau, 5:13, 16, 1940.—Mayo survey, m.s. 28, 1954.

Small tree, bark gray; leaves lanceolate to elliptic or somewhat ovate, firm chartaceous, glabrous to sparsely strigulose beneath, apex bluntly acute or rounded at tip, rather few veins on a side; panicle small to rather ample, rhachis of 4-7 internodes, leaf-like bracts at lower nodes, densely minutely appressed pubescent or tomentulose; calyx as broad as high; corolla rose-pink externally, "shell-pink" on inner surfaces of lobes; fruit ovoid, about 1 cm long or less, rarely more.

Native of Bolivia and southern Peru, and one of the most important quinine-yielding species. Said to have been planted experimentally in Palau in 1938. We have seen no Micronesian specimens.

Cinchona succirubra Pavon ex Klotsch

Cinchona succirubra Pavon ex Klotsch, Abh. Akad. Berl., 1857:60, 1858.—
Mayo survey, m.s. 28, 1954.

Small to rather large tree, bark tending to turn reddish when cut; leaves from broadly elliptic or oval to broadly oblong, rather thin, conspicuously veined, somewhat pubescent beneath; flowers in large panicles, pink, fragrant; capsules ovoid fusiform, 2–3 cm long, walls firm.

This species is doubtfully distinct from *C. pubescens* Vahl, and by most modern authors merged with that species. That is probably where it belongs, but until the varieties and synonyma in that protean species, are properly sorted out, it seems more convenient to maintain it as an admittedly weak species. It was formerly widely planted for quinine production, but was not the best species for that purpose. It is said to have been introduced experimentally into Palau by the Japanese, but we have not seen any Micronesian specimens.

Coffea L.

Coffea L., Sp. Pl., 172, 1753; Gen. Pl., ed. 5, 1754.

Shrubs and small trees with (at least in our species) dimorphic branching, with robust ascending shoots sending out slender horizontal flowering branches with leaves pseudodistichously arranged; leaves opposite (or rarely ternate), pinnately net-veined; stipules persistent, entire, sheathing near base, with axillary glandular trichomes (colleters); flowers bisexual, borne in axillary cymes that may be variously condensed, even to triads or solitary flowers, subtended by very reduced foliar and stipular bractlets, these often subulate or scale-like; calyx lobed, toothed or truncate; corolla salverform or funnelform, 4–7-lobed, lobes patent, stamens the same number as corolla lobes, attached in corolla-throat, included or (in ours) well exerted; ovary 2-loculed, ovules 1 in a locule, attached to the septum, style elongating during anthesis, stigma bifid, exerted; fruit dry or (in ours) fleshy, 2 endocarps thin, parchment-like with 2 large seeds, seed with a longitudinal groove on inner face.

A genus of about 70 species of the Old-World Tropics, mainly African. Several species are commercially important, 3 of these introduced in Micronesia.

Key to Micronesian Species of *Coffea*

1. Cymules compact but much branched, flowers and fruits usually 6–8 in a cymule, bracts conspicuous, foliaceous, much exceeding the hypanthia and calyx-ring, acuminate *C. canephora*
1. Cymules few-flowered, flowers and fruits usually less than six, bracts small, subulate or scale-like 2
 2. Corolla 5-lobed, leaves thin *C. arabica*
 2. Corolla 6–7 lobed, leaves subcoriaceous, strongly nerved *C. liberica*

Coffea arabica L.

Coffea arabica L., Sp. Pl., 172, 1753.—Volkens, Bot. Jahrb., 31:476, 1901.—Safford, Contr. U.S. Nat. Herb., 9:244, 1905.—Merrill, Philip. Journ. Sci. Bot., 9:143, 1914.—Kanehira, Enum. Micr. Pl., 417, 1935.—Okabe, Bull. Trop. Indust. Inst., 5:13, 17, 1940.—Glassman, Bish. Mus. Bull., 209:92, 1952.—Mayo, m.s. 30, 1954.—Stone, Micronesica, 6:542, 1971.—Fosberg, Sachet, and Oliver, Micronesica, 15:263, 1979.—Fosberg et al., Vascular Pl. Palau, 41, 1980.

Shrub or small tree, glabrous, to 10–12 m tall, with dimorphic branches, vegetative strongly ascending, flowering slender and spreading horizontally; leaves thin oblong to elliptic, to 16 × 7 cm, apex bluntly acuminate, base usually acute, main veins 8–10 pairs, opposite or subopposite, margins tending to be noticeably undulate when fresh, petiole 1–1.5 cm; stipules scarious or membranous ovate, abruptly strongly mucronate or acuminate, basal parts connate and sheathing, margins often sharply denticulate, teeth slender, tending to be caducous; inflorescences condensed bracteate cymes, usually with 3 flowers, usually 2 in an axil, the flowers pedicellate; calyx reduced to a narrow denticulate flange; corolla white, salverform, tube short, lobes 5, spreading, to reflexed, contorted in bud, somewhat longer than tube; anthers exerted; style exerted, stigma well exerted, bilobed; fruit a drupe, subglobose to subcylindric, about 10 × 8 mm, or slightly larger, red, flesh rather thin, sweetish, pyrenes 2, hemi-ellipsoid or hemi-cylindric with rounded ends, longitudinal groove or infold on the flat side, endocarp thin, firm, parchment-like, seed with a very thin membranous testa about 1 layer of cells thick, endosperm hard.

Native of Ethiopia; persisting occasionally after cultivation, possibly still planted in gardens on some islands.

VERNACULAR NAMES.—

kohi (Palau: Fosberg et al., 1980)
coffee (English)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Saipan: *Stephens 15, 12* (POM); 3 km E of Susupe Pt., abandoned plantation, 100 m, *Fosberg 25169* (US, BISH); S slope Mt. Tapotchau, planted in forest, 800 ft [244 m], *Hosaka 2919* (US, BISH), *2918* (US, BISH).

Rota: Plateau above Tataacho Pt., 150–250 m, *Evans 2061* (US, BISH, POM, CHR, GUAM, A, L, MO); *2055* (US, BISH, K, UC).

Guam: Merrill, 1914, 143; *G.E.S. 400* (BISH, US); *McGregor 515* (BISH); abandoned farm near base of Mt. Santa Rosa, *Rodin 560* (BISH); Talofoto, *Stone 4402* (GUAM, US); Mt. Almagosa, 300 m, *Pedrus 54* (GUAM); Mataguac, *Moran 4440* (US, POM); Finaguayac, *Moran 4577* (US); W of Mt. Santa Rosa, *Anderson 153* (US).

CAROLINE ISLANDS.—Yap: Volkens, 1901:476.

Ponape: Anapeng-pa, *Takamatsu 770* (BISH).

MARSHALL ISLANDS.—Kwajalein (Fosberg, growing in pots, 1956.)

Coffea canephora Pierre ex Froehner

Coffea canephora Pierre ex Froehner, Notizbl. Berlin, 1:237, 1897.
Coffea robusta Linden, Cat. Pl. Econ., 64, 1900.—Mayo, survey, m.s. 30, 1954.

Small glabrous tree with strong flowering branches with internodes 2.5–6 cm long, leaves elliptic, up to 23 × 10 m, somewhat bluntly acuminate, firm, with 9 to 12 (–13) strong somewhat arching nerves, domatia slightly puberulent, petiole 10–12 mm; stipules triangular-acuminate, slightly sheathing at base; flowers in tight many-flowered conspicuously bracteate cymules, the bracts lanceolate, acuminate, often equalling or exceeding the flowers; calyx subtruncate, reduced to a narrow subtruncate to slightly dentate collar; corolla 4–5-lobed, lobes and tube sub-equal, to 9–14 mm long, lobes becoming reflexed, anthers linear, exerted, twisting on drying, style exerted, bifid; fruit subglobose, slightly compressed, sides slightly channelled at least when dry, about 12 mm long, both ends subtruncate, up to 8 in each cluster, 16 at a node.

Native of tropical Africa, persisting from experimental planting.

VERNACULAR NAME.—robusta coffee (English).

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Saipan: Mt. Tapotchau, S slope, 800 ft [244 m], *Hosaka 2918* (US).

Guam: Leyang Barrigada, 150 ft [46 m], *Scully 101* (US).

CAROLINE ISLANDS.—Palau: Koror: Ngerebe'ed, 5–10 m, *Fosberg 32265* (US).

Coffea liberica Bull ex Hiern

Coffea liberica Bull ex Hiern, Trans. Linn. Soc., ser. II, 1:171, t. 24, 1876.—Safford, Contr. U.S. Nat. Herb., 9:245, 1905.—Merrill, Philip. Journ. Sci. Bot., 9:143, 1914.—Mayo, survey, m.s. 30, 1954.—Stone, Micronesica, 6:542, 1971.—Fosberg, Sachet, and Oliver, Micronesica, 15:264, 1979.

Plectronia oblonga Valetton, Bot. Jahrb., 63:310, 1930.

Small tree, to 8 m tall, branchlets strong, slightly 4-angled, internodes to 6 or rarely 10 cm long, nodes prominent; leaves subcoriaceous, to 21 × 10 cm, broadly elliptic to somewhat oblong or slightly obovate, slightly bluntly acuminate, 9–10 strong nerves on a side, domatia slightly puberulent, petiole thick, 1–2 cm long; stipules triangular-obtuse, very slightly united at base; cymules several to few (rarely "many") flowered, very condensed; corolla 6–7-lobed; fruit broadly ellipsoid to subglobose, to 2 × 1.5 cm.

Introduced to Guam before 1905 fide Safford.

Native of west Africa, persisting from former cultivation, perhaps still planted occasionally.

VERNACULAR NAMES.—

kafe (Guam: *Whiting R12*)

Liberian coffee (English)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: Merrill, 1914, 143; *G.E.S 243* (BISH, US); *Nelson 58* (BISH); *Oakley 19* (US, BISH, POM); Mt. Santa Rosa, planted along edge of forest, 700 ft [214 m], *Hosaka 3150* (US, BISH); abandoned farm near base of Mt. Santa Rosa, *Rodin 560* (US); Santa Rosa, *Whiting R12* (US); Yigo, cult., 120 m, *Fosberg 35401* (US, BISH, POM).

CAROLINE ISLANDS.—Palau: Babeldaob: Garamiscan Colony, 10 m, *Fosberg 25695* (US, BISH). Koror: Ngerebe'ed, 5–10 m, *Fosberg 32285* (US, BISH, POM, NY, L); *Cheatham 133* (US).

Ponape: Kolonia, *Fosberg 60434* (US, BISH, POM, NY, L); *Ledermann 13528* (B, type of *Plectronia oblonga* Valetton).

Dentella J.R. & G. Forster

Dentella J.R. & G. Forster, Char. Gen. Pl., 25, 1776.

Slender prostrate creeping herbs; leaves opposite, venation obscure except midrib, a few raphid bundles but these not conspicuous; stipules membranous, interpetiolar, adnate at base to petioles; flowers solitary, terminal or in one axil of a pair at alternate nodes and in forks of branches; 5-merous, calyx tubular deeply divided; corolla funnellform or salverform, lobes induplicate-valvate, often 2–3 lobed or toothed; stamens 5, anthers linear, dorsifixed; ovary 2-celled, with fleshy axile placentae and numerous ovules, style short, bifid, stigmatic on all sides; capsule indehiscent, thin-walled; seeds numerous, angular.

A small genus, native from Australia and New Caledonia to southeast Asia, introduced into Micronesia.

Key to Micronesian Species of *Dentella*

Hypanthium and capsule conspicuously white-hirsute
 *Dentella repens*
 Hypanthium and capsule glabrous . . . *Dentella serpyllifolia*

Dentella repens J.R. & G. Forster

Dentella repens J.R. & G. Forster, Char. Gen. Pl., 26, pl. 13, 1775.—Fosberg, Occ. Pap. Bish. Mus., 15:215, 1940.—Walker and Rodin, Contr. U.S. Nat. Herb., 30:465, 1949.—Merrill, Journ. Arn. Arb., 35:155, 1954.—Fosberg and Sachet, Atoll Res. Bull., 92:35, 1962.—Stone, Micronesica, 6:542–543, 1971.—Fosberg, Sachet, and Oliver, Micronesica, 15:264, 1979.

Plant prostrate, much branched, forming a thin mat, vegetative parts glabrous, rooting at nodes; leaves oblanceolate, sub-fleshy, about 5 × 1.5 mm, or larger or smaller, shortly broad-petiolate; stipules very thin, hyaline, triangular, entire; flowers solitary, sessile, mostly terminal, subtended by two branches, ovary densely pilose, calyx prismatic, about 2 mm long, erect, lobed about 1/3 of length, lobes lanceolate, acute, very slightly pilose or not, parts below sinuses membranous

alternating with thick parts below lobes, tube very slightly widening upward; corolla white, funnellform, about 6 mm long, sparsely pilosulous within, 5-lobed, lobes ovate, acute, clearly to obscurely tridentate distally, throat with some long straight slender hairs; stamens inserted near base of tube, anthers pale yellow, lanceolate, 0.5 mm long, on slender filaments about 0.5 mm long; pistil not quite equalling stamens, style slender, stigma oblong, thickened, bifid but coherent, fruit globose, an indehiscent membranous capsule covered sparsely to densely, at least in upper part, with rather stiff, rather thick straight white hairs; seeds many, angular, dull blackish.

First described from New Caledonia, now widespread in disturbed places throughout the Old World Tropics; found on bare mineral soils, spreading rapidly in recent years in Micronesia, especially around places where there is much human activity.

VERNACULAR NAME.—borduegas (Guam: *Seale* in 1900).

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Saipan: Puerto Rico, *Herbst & Falanruw 6914* (US).

Rota: Mua District, 50 m, *Herbst & Falanruw 6696* (US); Beach Road, *Raulerson 19152* (US).

Guam: *Fosberg 43432* (US, BISH); Dededo, cult. 100 m, *Fosberg 35306* (US); Agaña Spring, 1–2 m, *Fosberg 31235* (US, BISH, POM, NY, L); Agaña, *Seale* in 1900 (BISH); Agaña, *G.E. Moore 265* (US); Agaña, *G.E. Moore 266* (US, UC); about 1 mi [1.6 km] S of Potts Junction, 140 m, *Fosberg 39272* (US, BISH, POM) (fruits very sparsely to not pilose); Harmon village, *Stone 4091* (GUAM, BISH); Mangilao, 65 m, *Fosberg 46218* (US, BISH); Agaña Heights, *Fosberg 50558* (US, BISH); Tamuning, *Falanruw 1276* in part (US); Mangilao, University of Guam campus, *Fosberg 59621* (US, BISH, POM, NY, L).

CAROLINE ISLANDS.—Palau: Peleliu: Around N landing, *Fosberg 31957* (US, BISH, POM). Anguar: E side, 3–5 m, *Fosberg 31991* (US, BISH, POM).

Ulithi: Asor islet, *Fosberg 48017*.

Truk: Moen: Moen village, agriculture station nursery, *Fosberg & Sared 60315* (US, BISH, POM, NY, L).

MARSHALL ISLANDS.—Kwajalein: Ennylabegan: *Herbst 8885* (US).

Majuro: Dalap I., *Fosberg 39486* (US).

Jaluit: *Fosberg 39458* (US), *41397* (US).

GILBERT ISLANDS.—Tarawa: Bonriki, *Raulerson 3683* (US), *3690* (US), *3752* (US); Tanaea; *Raulerson 3878* (US).

Dentella serpyllifolia Wallich ex Airy-Shaw

Dentella serpyllifolia Wallich ex Airy-Shaw, Kew Bull., 1932:289, 1932.—Craig, Fl. Siam. Enum., 2:27, 1932 [nomen nudum].—Merrill, Journ. Arn. Arb., 35:155, 1954.—Fosberg, Sacht, and Oliver, Micronesica, 15:264, 1979.

Differing from *D. repens* especially in the glabrous

hypanthium and calyx; vegetative parts glabrous or sparsely puberulent.

It is questionable whether this is to be treated as a species or as a form of *D. repens*. In many places, including Guam, they grow together. Until experimental evidence is available it seems convenient to admit them as separate species. First described from India.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: Asan Pt., 1 m, *Anderson 40* (US, BISH, POM, NY, L); Agaña, 2 m, *Fosberg & Evans 46203* (US, BISH, POM, NY); *G.E. Moore 265* (UC), *266* (UC); Mangilao; University of Guam campus, *Fosberg 59622* (US, BISH); Tamuning, *Falanruw 1276* (US, part); Puga Pt., 10 m, *Herbst 8748* (BISH); above Haputu Beach, *Herbst 8732* (BISH).

CAROLINE ISLANDS.—Ponape: Kolonia, *Fosberg 60468* (US).

MARSHALL ISLANDS.—Kwajalein I., *Fosberg 41420* (US, BISH, POM), *48017* (US, BISH, POM, NY, L); Omelek I., *Herbst 9017* (US); Roi-Namur I., *Herbst 8942* (US); Illiginni I., *Herbst 8979a* (US).

Gardenia Ellis

Gardenia Ellis, Philos. Trans. R.S., 51:935, t. 23, 1761 [nom. cons.].

Small trees or shrubs, branchlets subterete; leaves opposite or rarely whorled, entire, usually firm chartaceous, veins often with domatia in axils below, petiolate to subsessile; stipules sheathing, at least at base, where they are joined to the petioles, in some species secreting a gum around terminal bud, unlobed to deeply bilobed, or a single lobe, separating from attachment by circumscissile dehiscence; flowers solitary, terminal, becoming pseudo-axillary by development of an axillary bud at the terminal node; hypanthium turbinate or prismatic, at or below the apex externally in some species developing 3–5 lobe-like “spurs” or appendages, flattened radially, alternating with the placentae, persisting on the fruit; corolla hypocrateriform (at least in our species), tube usually at least slightly dilated upward, bearing 6–9 lobes, imbricate and contorted sinistrorsely in bud, spreading, very fragrant at anthesis; anthers attached dorsally by very short filaments in corolla throat, linear, tips exerted at anthesis; style slender-cylindric to filiform, stigma fleshy, connate, tips slightly exerted, ovary unilocular with 3 to 5 parietal placentae with many ovules in vertical rows; fruit a large subglobose or prismatically angled or alate “drupe” with a fleshy to fibrous-coriaceous mesocarp and bony endocarp, the numerous seeds embedded in a pulpy mass developed from the fleshy placentae; seed with testa fleshy-papillate drying to a “scrobiculate” surface.

This description is partially adapted from the very ample one by A.C. Smith (Am. Journ. Bot., 61:109–111, 1974), treating the species of the Fiji area. Hence it may not be completely applicable to all species in other tropical regions.

The genus is a large one, 250 species, according to Airy Shaw (Willis, Dict. ed. 7, 1966), widely distributed in the Old World Tropics. Two species are cultivated as ornamentals in Micronesia, *G. augusta* (L.) Merrill, and *G. taitensis* de Candolle.

Key to Cultivated Micronesian Species of *Gardenia*

- Leaves elliptic to oblong or narrowly obovate, apex acuminate, calyx appendages 15–30 mm long, linear to linear lanceolate, acuminate, corolla lobes elliptic-obovate *G. augusta*
- Leaves broadly obovate, apex rounded, calyx appendages 10–12 (–30) mm long, ovate or oblong, acute to rounded at apex, corolla lobes narrowly ovate to oblong or slightly obovate *G. taitensis*

***Gardenia augusta* (L.) Merrill**

Gardenia augusta (L.) Merrill, Int. Herb. Amb., 485, 1917.—Okabe, Bull. Trop. Indust. Inst., 5:13, 1940.—Kanehira, Enum. Micr. Pl., 417, 1935.—Fosberg, Sachet, and Oliver, Micronesica, 15:264, 1979.—Fosberg et al., Vascular Pl. Palau, 41, 1980.
Varneria augusta L., Amoen. Acad., 4:136, 1759.
Gardenia jasminoides Ellis, Roy. Soc. Philos. Trans., 51(2):935, 1761.—Valeton, Bot. Jahrb., 63:303, 1930.—Fosberg, Occ. Pap. Bish. Mus., 15:226, 1940.—Glassman, Bish. Mus. Bull., 209:92, 1952.—Otobed, Guide List Plants Palau Islands, 1971.—Stone, Micronesica, 6:543–544, 1971.—Souder, In Guam Gardens, 54, 1974 [sensu auct., at least in part].
Gardenia florida L., Sp. Pl., ed. 2, 305, 1762.

Erect shrub, branchlets subterete or weakly 4-angled, dark grayish brown to almost black; leaves opposite, elliptic to oblong or obovate, sharply acuminate, base contracted to cuneate, to about 10–14 cm long; stipular sheath to 15 mm long, spathiform, split down one side; hypanthium and calyx narrowly 5–7-winged, with as many linear or linear-lanceolate, acuminate appendages 15–30 mm long; corolla white, fading yellowish, deliciously fragrant, lobes 5–7 to, usually, many, broadly elliptic-obovate, obtuse, usually concave, ventrally; anthers partly exserted; style termination and stigmatic mass clavate and somewhat exserted; fruit narrowly obovate, 5–7-angled or costate.

Commonly planted in gardens, cultivated for its fragrant flowers in most or all inhabited high islands in Micronesia. Probably of East Asian origin.

USES.—A decoction of dry fruit, is good for jaundice, gonorrhoea, colic, cold, hemoptysis, and consumptive fever. Besides, it is used as a hematic (Okabe, 1940).

VERNACULAR NAMES.—

- gardenia (Japanese name, Palau: *Fosberg 32085*)
- kadenia (Palau: Fosberg et al., 1980)
- iosep (Ponape: *Saloman & George 6*)
- yosef sarauri (Ponape: *Fosberg 26332*)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: Mangilao, near Dept. of

Agriculture, cult., *Stone 4368* (GUAM, US); Barrigada, cult., *Shmull 89* (GUAM); Inarajan, 5 m, *Fosberg 46284* (US).

CAROLINE ISLANDS.—Palau: Babeldaob: Nekkeng, *Emmons 132* (US); Medekgnei School, Ibibang, 8 m, *Raulerson 6064* (US). Koror: 5–10 m, *Fosberg 32085* (US, BISH, POM, NY).

Truk: Moen: Track from Nob Hill to main island, 150–250 m, *Evans 1404* (US).

Ponape: N coast, cult., *Fosberg 26332* (US); Kolonia village, *Saloman & George 6* (US); NE coast, Roi, *Fosberg 58491* (US, BISH).

Kusaie: Planted, Kanehira, Enum. Micr., Pl. 417.

MARSHALL ISLANDS.—Kwajalein, growing in pot, *Fosberg, 1956 and 1958.*

***Gardenia taitensis* de Candolle**

Gardenia taitensis de Candolle, Prod., 4:380, 1830.—Luomala, Bish. Mus. Bull., 213:49, 1953.—Souder, In Guam Gardens, 54, 1974.—Fosberg, Sachet, and Oliver, Micronesica, 15:264, 1979.

Shrub or rarely small tree, branchlets dark grayish brown, weakly 4-angled, terminal buds gummy; leaves to 20 × 10 cm, opposite, glossy green, obovate, rounded at apex or with a short blunt umbo, contracted to somewhat cuneate at base, on short-thickish petioles; stipules ovate, connate at base into a very short sheath; pedicels 1–2 cm long, angled above, hypanthium turbinate (3–) 4–5 angled, calyx short, broadly campanulate, to 10 mm high with (3) 4 or 5 ovate to oblong, acute to rounded appendages; corolla white, fading yellowish, very fragrant, tube 3–4 cm long, somewhat ampliate to throat, limb 4–6 or more cm wide, lobes 6–8, narrowly elliptic or slightly obovate, spreading; anthers linear, partly exserted; narrowly fusiform stigmatic mass partly exserted, acute; fruit obovoid to ellipsoid, costate or angled, cultivated plants usually not fruiting.

An attractive cultivated ornamental, native in Melanesia and western Polynesia, highly prized and much cultivated in the Society Islands, there called “Tiare Tahiti”; said to have been introduced into Guam by Harold Mayo in late 1950, or early 1960s. In eastern Polynesia, Hawaii, and probably Micronesia it seems never to set fruit. This may indicate that only a single self-sterile clone is present, or that a suitable pollinator is lacking.

VERNACULAR NAME.—tiare (Gilbert: Luomala, 1953).

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: Agaña, 65 m, *Fosberg 46297* (US, BISH, POM, NY, L); Agaña, cult., *Fosberg 59786* (US, BISH).

GILBERT ISLANDS.—Luomala, 1953:49.

Geophila D. Don

Geophila D. Don, Fl. Nepal, 136, 1825 [nom. cons.].
Carinta Wight in Safford, Contr. U.S. Nat. Herb., 9:216, 1905.—Stone,

Micronesica, 1:124, 1964.
Geocardia Standley, Contr. U.S. Nat. Herb., 17:445, 1914.

Herbs with white raphid bundles, prostrate to somewhat ascending stems, branches at first may be ascending, later prostrate; leaves petiolate, cordate; stipules broad, membranous, becoming firm, sub-persistent; peduncles terminal, often on short branches; flowers solitary or in subcapitate clusters at ends of peduncles, subtended by bracts, these sometimes trifid or incised, 5-merous; calyx united at base; corolla tube cylindrical with 5 spreading or recurving lobes; anthers included; style with bilobed stigma; fruit a soft drupe with 2 pyrenes, each with a single seed, dorsally rounded, ventrally flattened; seed with endosperm entire.

A pan-tropical genus, most species in tropical America and Africa, a few in Asia and Malesia. One species extends eastward to the Society Islands and northward to Guam and Saipan.

Geophila repens (L.) I.M. Johnston

Geophila repens (L.) I.M. Johnston, Sargentia, 8:281, 1949.—Stone, Micronesica, 6:543, 1971.

Rondeletia repens L., Syst. Nat., ed. 10, 928, 1759.

Psychotria herbacea Jacquin, Enum. Pl. Carib., 16, 1760.—L., Sp. Pl., ed. 2, 254, 1762.

Geophila reniformis D. Don, Prodr. Fl. Nepal., 136, 1825.—Chamisso and Schlechtendal, Linnaea, 4:137, 1829.—Endlicher, Ann. Wien. Naturges., 1:176, 1835.—K. Schumann and Lauterbach, Fl. Deut. Schutzgeb. Süds., 594, 1901.

Carintia herbacea (Jacquin) W.F. Wight in Safford, Contr. U.S. Nat. Herb., 9:216, 1905.—Stone, Micronesica, 1:124, 1964.

Geophila repens (L.) I.M. Johnston var. *repens* does not occur in Micronesia.

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

Geophila repens var. *asiatica* (Chamisso & Schlechtendal) Fosberg, Smith. Contr. Bot., 45:27, 1980.—Fosberg, Sachet, and Oliver, Micronesica, 15:265, 1979.

Geophila reniformis var. *asiatica* Rheede ex Chamisso and Schlechtendal, Linnaea, 4:137, 1829 [type: Ex insula Guahan e Marianis; Chamisso (G)].

Carintia herbacea W.F. Wight in Safford, Contr. U.S. Nat. Herb., 9:216, 1905.

Stems slender, very prostrate, glabrous to puberulent, especially near nodes, rooting at nodes, with short branches tending to produce a peduncle at first node; leaves orbicular cordate to narrowly reniform, apex rounded, basal lobes rounded, veins 7-9 (-11), palmate, upper surface glabrous, under surface puberulent, especially toward base, petiole fleshy, variable in length, with one conspicuous vascular strand, pilose in two lines, or more generally toward summit; stipules broad, low-rounded to reniform, adnate to petiole bases, or free if leaves absent at node, with conspicuous abundant raphid bundles; peduncle fleshy, with one vascular strand, puberulent, with narrowly lanceolate to linear attenuate bracts at summit subtending flowers, lowest occasionally trifid,

pedicels very short, flowers 1-several; calyx lobes lanceolate, acuminate-attenuate or filiform at apex, united in lower 1/5 to 1/3; corolla salverform, tube to about 5 mm long, lobes ovate, spreading; stamens almost sessile, inserted well below mouth of tube, narrowly sagittate; style glabrous, subequal with corolla, stigma capitate, slightly bilobed; fruit globose, red, soft-fleshy, pyrenes hemi-ovoid, somewhat pointed, tending to be more or less rugose on convex side, and rarely somewhat so or slightly carinate on flat side, pyrene not at all warped or twisted.

This small inconspicuous herb is seldom seen on Guam and has only been found once in Saipan. In the Carolines it is more frequent, but still scarcely common. It occurs in shade on forest floor, especially where there has been moderate disturbance.

VERNACULAR NAMES.—

groundberry (Guam: Safford, 1905)

tamanes-hating (Guam: Stone, 1971)

kapen (Ponape: Stone 5476)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Saipan: s. l., *Hosokawa* 6660 (US).

Guam: Endlicher, 1835:176; *Chamisso* s. n. (G, isotype); Haputo, *Moran* 4719; s. l., *Safford & Seale* 1002 (US); *McGregor* 397 (US); SW slope Alifan, *Anderson* 337 (US).

CAROLINE ISLANDS.—Palau: Arakabesan: *Hardy* 109 (US).

Truk: Tol: Mt. Tumuital (Uiniboet), 200-460 m, *Fosberg* 24465 (US). Moen: Ridge E of Moen Village, 100 m, *Anderson* 790 (US).

Ponape: Mt. Nanalaut and Mt. Nginani, 2200 ft [670 m], *Stone* 5476 (BISH, US, GUAM); Anapeng-pa, *Takamatsu* 739 (BISH, K); Kiti Dist., One, *Nakao* in 1941 (KYO); Matalanim Dist., Le Tan, *Nakao* in 1941 (KYO); *Hallier* s. n. 17. VIII.03 (HBG); Nipit-one, *Hosokawa* 9587 (US); NW ridge Mt. Tamatamansakir, above Palikir and Nanpil, 150-250 m, *Fosberg* 26294 (US); Mt. Paoipoai, 700 ft [213 m] *Glassman* 2476 (US); 750 ft [229 m], *Glassman* 2695 (US).

Kusaie: Mt. Tafayet, S of Lele Harbor, *Fosberg* 26660 (US); Mt. Wakapp, *Takamatsu* 408a (BISH, K); Kepla Plateau, near Palestik River, *Falanruw* 3546 (US).

Guettarda L.

Guettarda L., Sp. Pl., 991-992, 1753; Gen. Pl., ed. 5, 428, 1754 [1753].

Trees and shrubs, sometimes spiny, leaves simple, opposite or rarely ternate; stipules obovate or ovate or lanceolate, apex obtuse, often recurved; cymes axillary, dichotomous or rarely flowers reduced to 2 or 3, or 1, often secund; flowers bisexual, rarely polygamo-dioecious (4-) 5-8 (-10)-merous; calyx tubular, truncate to dentate; corolla salverform, lobes imbricate or their membranous margins infolded, undulate or crenulate; anthers sessile or subsessile, inserted in corolla throat, included or slightly exserted; ovary 2-9 celled, with 1 pendulous ovule

in each cell, style filiform with a cylindro-capitate stigma; fruit a drupe with 2 to 9 pyrenes united into a woody or bony stone, or corky and floating.

Originally described in Genera Plantarum and species Plantarum as monoecious.

Guettarda speciosa L.

Guettarda speciosa L., Sp. Pl., 991, 1753.—Chamisso, Rem. Op., 145, 154, 1821.—Endlicher, Ann. Wien. Mus. Naturgesch., 1:176, 1835.—Dana, Coral and Coral Islands, 1-398, 1872.—F. Mueller, Deser. Nat. Pap. Pl., 59, 1876.—Schumann, Bot. Jahrb., 9:221, 1881.—Volkens, Bot. Jahrb., 31:475, 1901; Notizbl., 4:90, 1903.—Safford, Contr. U.S. Nat. Herb., 9:288, 1905.—Merrill, Philip. Journ. Sci. Bot., 9:143, 1914.—Koidzumi, Bot. Mag. Tokyo, 29:255, 1915.—Valeton, Bot. Jahrb., 63:304, 1929.—Kanehira, Fl. Micr., 358, 1933; Enum. Micr. Pl., 418, 1935.—Sabatier, Iles Gilbert, 1-298, 1939.—Fosberg, Occ. Pap. Bish. Mus., 15:216, 1940.—Okabe, Journ. Jap. For. Soc., 23:270, 1941; Nanyo no Sangyo, 3, 1943.—St. John, Pac. Sci., 2:112, 1948; 5:285, 1951.—Taylor, Plants of Bikini, 199-200, 1950.—Anderson, Atoll Res. Bull., 7:111, 1951.—Glassman, Bish. Mus. Bull., 209:92-93, 1952; Pac. Sci., 7:295-296, 1953.—Guillaumin, Bull. Soc. Bot. France, 99:21-22, 1952.—Luomala, Bish. Mus. Bull., 213:23, 27, 1953.—Niering, Atoll Res. Bull., 49:22a, 1956; 76:1-15, 1961.—Hatheway, Atoll Res. Bull., 55:2, 1957.—Moul, Atoll Res. Bull., 57:21, 1957.—Catala, Atoll Res. Bull., 59:95, 1957.—Stone, Pac. Sci., 13:104, 1959.—Fosberg and Sacht, Atoll Res. Bull., 92:35, 1962.—Kiste, Kili Island, 51, 74, 1968.—Stone, Micronesica, 6:544-545, 1971.—Alkire, Micronesica, Atoll Res. Bull., 10:4, 1974.—Souder, In Guam Gardens, 66, 1974.—Fosberg, Sacht, and Oliver, Micronesica, 15:265, 1979.—Moore and McMakin, Plants of Guam, 40, 1979.—Fosberg et al., Vascular Pl. Palau, 41, 1980.

Large shrub to small or medium-sized tree, very bushy, much branched in habit, twigs about 1 cm thick, subterete, pubescent with short incurved hairs that turn golden on about the 2nd or 3rd internode; leaves broadly oblong to somewhat ovate or obovate, on short thick petioles about 1-2 cm long, 5 mm thick, terete, blades heavy chartaceous, nerves pinnate, 10-11 pairs spreading widely, curving gradually into the margin, connected by irregularly ladder-like cross-nerves the spaces filled with several orders of close network, main nerves slightly puberulent above, densely short-pilose beneath, smaller nerves less so, apex obtuse with slight acumen, base cordate; stipules large, strongly acuminate, shortly sheathing, carinate where united at sides, sparsely strigose, caducous from all but first 1-3 nodes, leaving a row of small hairs (colleters) in axils; leaf scars orbicular slightly flattened distally, with a narrow horseshoe of bundle scars; cymes axillary from second node from apex, prominently pedunculate, peduncles strongly ascending, about 10 cm long, branching crowded, twice dichotomous, a sessile flower in each fork, with an oblong acute bract subtending it externally, each branch with about 5 alternately disposed flowers in 2 rows, each subtended by a lanceolate bract; whole inflorescence appressed puberulent; calyx deeply cup-shaped, longer than wide, very shallowly 3-lobed, with purplish rudiment very poorly developed in each sinus; corolla salverform, tube much longer than the obovate lobes, very slightly dilated gradually upward, 3-5 cm long,

about 1.5 mm in diameter below, to 4 mm at top, pilose within, lobes 7-8, even on the same plant, lobes and tube puberulent without, lobes papillate within, tube pilose within except basal few mm; anthers same number as corolla lobes, linear, attached several mm below sinuses, dorsally but almost basally; style single, filiform, of 2 lengths, on brevistylous plants about $\frac{1}{2}$ to $\frac{2}{3}$ length of corolla, on longistylous plants stigma slightly exerted, stigma short cylindrical, truncate on top, exuding a drop of liquid; corolla opening in evening, strongly fragrant, dropping before noon next day, leaving the style, which usually falls somewhat later; both longistylous and brevistylous plants fruit abundantly; young fruit globose, mature ones depressed globose, drupaceous, flesh white, containing stiff fibers that persist after flesh rots or is eaten by hermit crabs; stone corky, floating, with 5 or 6 cells.

USES.—Wood used as building material (Rota: *Fosberg 24947*). Cold: Leaves of "tiff" (*Alpinia carolinensis*), of "alphos" (*Eugenia javanica*), of "warao," of "job" (*Phymatodes scolopendria* or *Angiopteris evecta?*), of "teribuk" (*Cheilanthes tenuifolia*), and of "wararg" (*Decaspermum fruticosum*) are mixed, with which the whole body, starting with the head, is rubbed. Monthly troubles: Fruit, young leaves, and bark of "warao" are crushed together and the sap is taken (Yap: Okabe, 1943). Used as medicine: Branches have a magical significance in treatment of swelling. Wood used in paddles and construction. Used in garlands (Woleai: *Alkire 39*). Useful for house frames, house posts, outrigger booms, and the diagonal braces between the outrigger and the canoe hull. When large, it is also used for canoe hulls. The leaves are medicinal (Kili: Bikini people, St. John and Mason, 1953). Provides wood for house frames, house posts, and the construction of outrigger booms, and braces. The leaves were valued for medicinal qualities and were part of the native practitioners' standard stock of remedies (Kili: Bikini people, Kiste, 1968). The wood is used in houses for rafters and wall frames, in canoes for hull and ribs. Formerly used in fire-making by friction. Flowers are commonly used in making garlands. Leaves are used as a fertilizer for babai and other plants (Tarawa: Catala, 1957). Timber tree (Micronesia: Okabe, 1941). Wood for construction and implements. Root for shark hooks. Flowers for leis. (Kapingamarangi: Niering, 1956). Used for leis; leaves are spread on ground on which to dry *Pandanus* pulp; skin of fruit and *Scaevola* were said to cure venereal disease. (Onotoa: Moul, 1957).

Usually regarded as a strand species, and very common along Old World tropical shores, but also in places at considerable elevations. In Micronesia upland occurrences are frequent in the Marianas.

VERNACULAR NAMES.—

panau (Rota: Kanehira, 1933)

pano (Rota: *Fosberg 24947*)

panao (Guam: *Nelson, 14; Rodin 719; Dutton 132; Marche 25; Merrill, 1914*)

belau (Palau, Melekiok: *Emmons 87*)
 bellau (Palau, Koror: Raymondus in Valeton, 1929)
 blau (Palau: Fosberg et al., 1980)
 pelau (Palau, Babeldaob: *Fosberg 32398*)
 balow (Yap, Rul I.: *Wong 401*)
 bolow (Yap, Ruming I.: *Wong 401*)
 warao (Yap: Okabe, 1943)
 uth (Ulithi: Mueller, 1876; *Lessa 3*)
 yuth (Ulithi: *Fosberg 25465*)
 outh (Fais: *Evans 353*)
 wut (Eauripik: *Fosberg & Evans 47093*)
 ood (Woleai: *Wong 24*)
 ut (Woleai: Alkire, 1974; *Alkire 39*)
 wut or wutu (Ifaluk: *Abbott & Bates 96; 4*; Mueller, 1876;
Burrows s. n. in 1948)
 oot (Lamotrek: *Fosberg & Evans 46770*)
 muesor (Satawal: *Fosberg 46945*)
 moser (Namonuito: Stone, 1959)
 mosor (Nomwin: *Fosberg 24559, 24579; Evans 1086*)
 moosor (Truk: *Wong 228*)
 mosor (Truk, Moen: *Pelzer 72*; Pis: *Fosberg 24648*)
 mosor (Satawan: *Anderson 942*)
 bua (Nukuoro: *Carroll 55, 34, 12*)
 pua (Nukuoro: *Fosberg 26178*)
 pau (Kapingamarangi: *Niering 503, 619*)
 ti pua (Kapingamarangi: *Fosberg 26065*)
 ti raupua (leaves) (Kapingamarangi: *Fosberg 26065*)
 mohsor (Ant: *Glassman 2807*)
 eet (Ponape: *Glassman, 1953*)
 ith (Ponape: *Fosberg 26394*)
 eet (Mokil: *Glassman 2598*)
 eles (Pingelap: *St. John 21492*)
 kienglak (Kusaie: *Ward 215*)
 Wutilomar (southern Marshalls: Hatheway, 1952)
 wut (Eniwetok: *Fosberg 24364*)
 wut (Utirik: *Fosberg 33667*)
 wut (Ujelang: *Fosberg 34196*)
 wut (Lae: *Fosberg 34106*)
 wut (Kwajalein: *Cameron 2*)
 wut i lomar (Likiep: *Fosberg 27002*)
 wudilonaro (Aur: St. John, 1951)
 wudi-lo-marō (Aur: *St. John 21387*)
 wut (Ailinglapalap: *Fosberg 26800*)
 wut (Majuro: St. John, 1951)
 wut (Arno, Ine I.: *Anderson 3641*)
 wut kolaema (Arno, Bikarej I.: *Anderson 3752*)
 wut (Kili: Bikini people; St. John and Mason, 1953; Kiste,
 1968)
 wot (wuott) (utt) (Jaluit: Okabe, 1941)
 wut (Jaluit: *Fosberg 26692*)
 uri (Gilbert Is.: Luomala, 1953)
 ti uri (Abaiang: *Catala 25*)
 te uri (Tarawa: *Catala, 1957*)
 uri (Nonouti: *Koch 14*)

ti uri (Tabiteuea: *Luomala 19*)

ti uri (Onotoa: *Moul 8280*)

kenrak (Kanehira, 1935)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—*Gaudichaud* (P). Saipan: *Stephens 42* (US), 70 (US); Mt. Tapotchau, N slope, in lower forest, 700 ft [214 m], *Hosaka 2945* (US, BISH).

Tinian: Kanehira, 1933:358; 1935:418.

Agiguan: W Pt., edge of cliff, 200 ft [60 m], *Kondo s. n.* in 1952 (BISH); s. l., *Kondo s. n.* in 1952 (BISH).

Rota: Sabana, *Kondo s. n.* in 1952 (BISH); Taipinkoto, *Hosokawa 7661* (BISH, POM); *Hosokawa 7547* (BISH, US); Sonson, ruined town-site, 1–10 m, *Fosberg 24947* (US, BISH, POM); Sabana, *Necker RS14* (US); from Songsong village to point above Aratsu Bay, 5–100 m, *Evans 1947* (US, BISH, POM, NY, L, P); Songsong and vicinity, 5–10 m, *Evans 2007* (US); between airstrip and northmost part of island, 150–250 m, *Evans 2167* (US, BISH, POM, NY, L, P); vicinity of Rota airfield, *Cheatham 173* (US); 0.5 km S of Songsong village, *Fosberg with H. Moore 58293* (US, BISH, POM, NY, L).

Guam: Merrill, 1914:143; *Guerrero 730* (BISH); s. l., *G.E.S. 119* (US, BISH); *McGregor 550* (US, BISH); Cabras I., rocky cliffs near sea, *Nelson 525* (BISH); forest between Yigo and Upe, *Nelson 14* (BISH); N of Northwest Field, 500 ft [152 m], *Steere 5* (US); E coast, N of Inarajan, edge of woods, *P.H. Moore 366* (US); Tumon Bay area, *P.H. Moore 387* (US); near Ritidian Pt., on N plateau, *Rodin 719* (US); Ritidian Pt., *Moran 4452* (UC, POM); Ritidian Pt., near light, *Anderson 209* (US, BISH, POM, NY, L); S of Tarague Bay, *Moran 4574* (US, POM, UC); s. l., *Marche 25* (POM, P); W of Barrigada Hill, near N.C.G. towers, *Stone 3806* (GUAM); Hilaan Pt., *P.H. Moore 500* (US); behind University of Guam, *Falanruw 1416* (US); Tarague Beach, 8 m, *Anderson 243* (US); Harmon, *Moore 56.3* (GUAM); Pagat (base of escarpment), *Moore 56.2* (GUAM); Pagat (near edge of escarpment), *Moore 56.1* (GUAM); Hilaan Pt., back of sandy beach, *Moore 500* (GUAM) (leaves not at all pointed); Ritidian Pt., behind beach, *Cushing & Falanruw 715* (GUAM) (leaves sub-glabrous, narrow pointed).

CAROLINE ISLANDS.—Palau: s. l., *Ledermann 14069* (B); *Kanehira 2477* (K, P); *Richardson* in 1967 (US); *Hosokawa 7310* (POM). Babeldaob: W coast of island, Ngerengel Pt., Aimeliik, top of beach, 2 m, *Fosberg 32398* (US, BISH, POM); Ogiwaru, seashore, *Takamatsu 1423* (BISH); Melekeok [= Melekiok], *Emmons 87* (US). Koror: Ngemelis Group, Arimasuku Islet, *Hobdy 1454* (BISH); islet in Iwayama Bay, *Tuyama 9365* (GUAM). Aulupse'el: *Takamatsu 1461* (K); Risong, Matuker Bay, *Fosberg 47538* (US, BISH, POM, NY, L). Urukthapel: *Dutton 87* (US, BISH, POM). Ngeanges: Rare in forest on sandy flat, 1 m, *Fosberg 25786* (US, BISH). Angaur: s. l., *Kanehira 2477* (US); northwest coast, on dissected coral limestone above sea, *Fosberg 25935* (US,

BISH).

Sonsorol: From village to southern tip of island, *Hardy 155* (US, BISH).

Merir: *Salsedo 374* (US).

Mapia: *Vink 12074* (L) acc. van Balgooy, letter, 8 Oct 1975.

Sorol: Sorol I., *King 25* (US).

Yap: Volkens, 1901:475, sandy clay soil, 3 ft [1 m], *Wong 401* (US, BISH, POM); Mer Peninsula, sea level, *Cushing 638* (US, GUAM).

Ulithi: Mogmog I., common on broken coral and coral gravel, 3–4 m, *Fosberg & Wong 25470* (US, BISH, POM, NY, L); *Lessa 3* (BISH); E Mogmog I., *Knox 830* (US); Fassera I., on outer beach, 2–4 m, *Fosberg 25465* (US, BISH, POM, NY, L); Portangeras I., in forest, 5 ft [1.2 m] *Hosaka 3233* (US, BISH); Asor I., beach ridge, *Fosberg 46461* (POM).

Fais: Yldow, W coast near S end of island, 15 m, *Fosberg 46718* (US); Lochochoy, in village, 5 m, *Evans 353* (US).

Eauripik: Siding I., scrub around coconut grove, 1–5 m, *Fosberg & Evans 47093* (US, BISH, POM).

Woleai: Utagal I., grove on coral soil, 1–2 m, *Wong 24* (US, BISH); Falalop I., in village, *Evans 480* (POM); Wottagai I., village, 1–2 m, *Fosberg 47073* (US); Falalis I., *Alkire 39* (US).

Faraulap: Pis I., village, 1–2 m, *Fosberg 47287* (US).

Ifaluk: *Burrows s. n.* in 1948 (BISH); N tip of Falarik, *Abbott & Bates 96* (US, BISH); Ifaluk I., village, 1–2 m, *Fosberg 47190* (US, BISH, POM, NY); Ifaluk I., outer boulder ridge, 3 m, *Fosberg 47206a* (US); *Abbott & Bates 4* (US).

Lamotrek: Lamotrek I., boulder ridge at east end of lagoon beach, *Fosberg & Evans 46770* (US).

Satawal: Satawal I., S side of island, 2 m, *Fosberg 46945* (US).

Paluwat: Puluwat I., Niering, 1961:76 (seen in 1954).

Namonuito: Piserras I., beach and rampart, 0–3, *Evans 902* (US); Magur I., beach and rampart, 0–3 m, *Evans 931* (US).

Nomwin: Nomwin I., near beach, 1–2 m, *Fosberg 24559* (US, BISH); in forest, 1–2 m, *Fosberg 24579* (US, BISH); Fananu I., beach and rampart, 0–3 m, *Evans 1086* (US); Ruo I., lagoon shore, 0–3 m, *Evans 1156* (US).

Truk: Moen: *Pelzer 72* (US, BISH, POM, NY, L). Kuli I. (near Romonum), 2 ft [0.6 m], *Wong 228* (US, BISH, POM). Pueles I. on reef, *Anderson 798* (US, BISH, POM). Pis: Along beaches on coral sand and rock, 1–2 m, *Fosberg 24648* (US, BISH); beach and rampart, 0–3 m, *Evans 848* (US). Param (Kaedeshima): seashore, *Takamatsu 325* (BISH).

Nama: Anderson, seen but not collected.

Losap: Losap I., lagoon shore, 0–5 m, *Evans 1363* (US).

Namoluk: Namoluk I., 1–2 m, *Marshall 52* (US).

Etal: Small islet northwest of island, *Anderson 2217* (US, BISH, POM, NY, L).

Lukunor: Anderson, seen but not collected.

Satawan: Moch I., *Anderson 942* (US, BISH, POM, NY, L); Lalung I., *Anderson 959* (US, BISH, POM, NY, L); Ta I., *Anderson 1074* (US, BISH, POM, NY).

Nukuoro: Kaujema I., along shore, 4 ft [1.2 m] (US, BISH);

Hosaka 3461 (US, BISH); Sinukutai I., along outer beach, 1–2 m, *Fosberg 26178* (US, BISH); Hausosiga, *Carroll 55* (US); Deahu, *Carroll 34* (US); Dagamanga, *Carroll 12* (US).

Kapingamarangi: Seetaw I., along edge of islets and in open spaces in forests, 5 ft [1.5 m], *Hosaka 3450* (US, BISH); Hare I., common along outer beach, less common in forest, 1 m, *Fosberg 26065* (US, BISH); Taringa I., *Niering 503* (US, BISH, POM); Werua I., *Niering 619* (US, BISH, POM).

Ant: Nikalap I., along beach, *Glassman 2807* (US, BISH).

Ponape: Na I., seashore, *Takamatsu 847* (BISH); Narlap I., *Hosaka 3572* (US, BISH); Nanmatol I., Matalanim Distr., in mangrove swamp on coral sand flats covered by tide, 0 m, *Fosberg 26394* (US, BISH), Taman, *Takamatsu 874* (BISH); Metalanim, low elev., *Stone 5442* (GUAM).

Mokil: Manton I., along strand, *Glassman 2598* (US, BISH).

Pingelap: St. John, 1948:112 (citing *St. John 21492*).

Kusaie: Mt. Matante, at coast, *Takamatsu 568* (BISH); Mwot, seashore, *Takamatsu 457* (US, BISH); Lelu I., Metais area, *Ward 215*).

MARSHALL ISLANDS.—Chamisso, 1821:145, 154; Radak, Endlicher, 1835:176; Radak, *Bryan s. n.* in 1944 (BISH); *Eschscholtz* in Dec 1816 (LE); Eniwetok: Aomon I., 1–3 m, *Fosberg 24364* (US, BISH); Eniwetok I., 1–4 m, *Fosberg 24294* (US); Igurin I., sandy flat, 5 ft, [2 m], *Hosaka 2687* (US, BISH); Japtan I., 1–4 m, *Fosberg 24318* (US, BISH); Engebe I., on coral flats, 1–5 m, *Fosberg 24398* (US, BISH); Rigili I., *Rainey s. n.* (POM); Rigili I., *St. John 23745* (US, BISH); Runit I., *St. John 23843* (BISH); Runit I., *Taylor 46-1254* (US); Aitsu I., *St. John 23793* (US, BISH); Bogon I., *St. John 23773* (BISH); Biiijini I., *St. John 23815* (US, BISH); Engebi I., *Bryan s. n.* in 1944 (BISH); Aniyaanii I., *Taylor 46-1278* (US, BISH); Igurin I., 1–3 m, *Fosberg 24312* (US, BISH); Bogombojo I., *Taylor 46-1310* (US); Rujoru I., *Taylor 46-1328* (US); Jieroru I., *Taylor 46-1244* (US); Boken I., *Lamberson* Feb 1975 (MI).

Bikini: Airukiraru I., *Taylor 46-1161* (US); Enilrikku I., *Taylor 46-1037* (US, BISH); Ourukaen I., *Taylor 46-1448* (US); Namu I., *Taylor 46-1122* (US); 46-1132 (US, BM); Rochikarai I., *Taylor 46-1064* (US, BM); Bokonofuaaku I., *Taylor 46-1057* (US); Lonchebi I., *Taylor 46-1106* (US, BISH); Enyu I., *Taylor 46-1011* (US, BISH); Bikini I., *Fosberg 65199* (US, BISH).

Ailinginae: Sifo I., *Fosberg 36681* (US, BISH, POM).

Rongelap: Eniwetok I., *Taylor 46-1363* (US); Rongelap I., *Fosberg 36651* (US, BISH, POM).

Rongerik: Bock I., *Taylor 46-1407* (US); Latoback I., *Taylor 46-1418* (US).

Taka: Taka I., *Fosberg 33740* (US).

Utirik: Utirik I., *Fosberg 33667* (US).

Ujelang: Ujelang I., *Fosberg 34196* (US).

Ujae: Bock I., *Fosberg 34316* (US).

Wotho: Wotho I., *Fosberg 34276* (US).

Lae: Lae I., *Fosberg 34106* (US).

Kwajalein: Ennylabegan: *Bryan s. n.* in 1944 (BISH); *Herbst*

8894 (US); Gugegwe I., *Bryan* s. n. in 1944 (BISH); Bennet (Bigej) I., *Fosberg* 26494 (US, BISH); Kwajalein I., *Cameron* 2 (BISH); Roi-Namur I., *Herbst* 8965 (US); Gagan I., *Herbst* 8996 (US); Legan I., *Herbst* 8937 (US).

Ailuk: Ailuk I., *Fosberg* 33934 (US).

Jemo: *Fosberg* 33897 (US).

Likiep: Likiep I., near outer beach, 1–2 m, *Fosberg* 27002 (US, BISH).

Mejit: Sea level, *Stone* 1079 (US).

Wotje: *Chamisso* in 1816 (LE).

Aur: Tabal I., *St. John* 21387 (US, BISH).

Ailinglaplap: Bikajle I., on flat coral sand and rubble, 1–3 m, *Fosberg* 26800 (US, BISH).

Majuro: Islet W of Dalap, E end of atoll, 1–2 m, *Fosberg* 26924 (US, BISH).

Arno: Ine I., *Anderson* 3641 (US); Bikarej I., *Anderson* 3752 (US, BISH, POM); Langar I., *Hatheway* 871 (US, BISH, POM).

Kili: Kiste, 1968:74

Jaluit: Schumann, 1881:221; Jaluit I., S of Jabor, in thickets on elevated coral rock, 1–2 m, *Fosberg* 26692 (US, BISH).

NAURU ISLAND.—Anetan, *Burges* K. 30 (K, NSW); Meneng, S coast, *Fosberg* 58759 (US, BISH, POM, NY).

GILBERT ISLANDS.—*Woodford* s. n. (BM); *Jensen* (K).

Butaritari: Butaritari I., *Herbst & Allerton* 2763 (US).

Marakei: Between Bainona village and walking bridge, *Raulerson* 3811 (US).

Abaiang: Luomala, 1953:14 (citing *Sabatier*, 1939).

Tarawa: Volkens, 1903:90; Schumann, 1881:221; Bike-nibeu, *Catala* 25 (P); Guillaumin, 1952:22; Bikenibeu I., *Herbst & Allerton* 2669 (US).

Aranuka: Luomala, 1953:9 (from *Sabatier*, 1939:30); Non-outi: Tetua, *Koch* 14 (US).

Tabiteuea: Luomala, 1953:36 (from *Dana*, 1872), 38 (from *Woodford*, 1895), 42 (from *Mueller*, 1876); Eita, *Luomala* 19 (BISH).

Onotoa: North I., *Moul* 8280 (BISH, US), 8079 (US), 8041 (POM).

Guettarda speciosa L. var.?

Leaves glabrate to slightly puberulent, firm, pointed at apex, varying in size but ranging to considerably smaller than is usual for the species.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: Mt. Alifan, 260–265 m, *Fosberg & Scully* 59722 (US), 59731 (US), 59733 (US); Asanite Bay, *Fosberg & P.H. Moore* 59947 (US); Yigo, *Dutton* 132 (US, BISH, GUAM).

CAROLINE ISLANDS.—Palau: Koror: Ngetmedush, 12–13 m, *Sherard & Spence* 77 (US).

MARSHALL ISLANDS.—Bikini Atoll: Enyu I., *Taylor* 46–

1011 (S).

These may represent a distinct variety but large amounts of material should be studied.

Gynochthodes Blume

Gynochthodes Blume, *Bijdr.*, 993, 1827.

Woody climbers, nodes prominent; leaves coriaceous, opposite or whorled; flowers axillary or terminal, variously arranged, solitary, in racemes or racemoid thyrses, triads, or heads, bisexual or unisexual, 4–5 merous; stamens exerted from corolla tube; pistil with ovary 4–5 celled, 1 ovule in a cell axile attachment, inferior ovaries sometimes fused several into a syncarp, style bifid or stylode in staminate flowers simple; fruit a 2 or 5 celled drupe with 2 to 4 stones or a syncarpous drupe with 2 or 5 or more stones, one seed in each or some aborted.

As many as 14 species ranging from the Andamans to Samoa (fide *Airy Shaw*, 1966), with one in Micronesia.

Gynochthodes ovalifolia (Valeton) Kanehira

Gynochthodes ovalifolia (Valeton) Kanehira, *Bot. Mag. Tokyo*, 46:351, 1931; *Fl. Micr.*, 359, 1933; *Enum. Micr. Pl.*, 418, 1935.—Hosokawa, *Journ. Jap. Bot.*, 13:615, 616, 1937.—Christophersen, *Bish. Mus. Bull.*, 154:25–26, 1938.—*Fosberg, Occ. Pap. Bish. Mus.*, 15:219, 1940.—*Fosberg, Sachet, and Oliver, Micronesica*, 15:265, 1979.—*Fosberg et al., Vascular Pl. Palau*, 41, 1980.

Plectronia ovalifolia Valeton, *Bot. Jahrb.*, 63:310, 1930.

Gynochthodes trukensis Hosokawa, *Trans. Nat. His. Soc. Formosa*, 32:18–19, 1942.

Gynochthodes verticillata (Valeton) Hosokawa, *Journ. Jap. Bot.*, 13:616, 1937.—*Fosberg, Sachet, and Oliver, Micronesica*, 15:266, 1979.

Plectronia verticillata Valeton, *Bot. Jahrb.*, 61:60, 1927; 63:312, 1930.

Canthium verticillatum (Valeton) Kanehira, *Bot. Mag. Tokyo*, 46:672, 1932; *Enum. Micr. Pl.*, 416–417, 1935.

Glabrous slender woody climbing liana, tending to be extensive, no strong odor noted; leaves opposite (no whorls noted in Micronesian specimens), from elliptic to oblong or almost orbicular, somewhat acuminate at apex, acutish at base, up to 10 or more cm long, apparently glossy above, veins 4–8 on a side, petiole slender, 1–2 cm long; stipules sheathing, forming a very low truncate collar, persistent; flowers mostly in axillary loose clusters, rarely subcymose, or reduced to fascicles or one or two flowers, rarely in terminal triads, rachis with one or two nodes, the lower with usually 2 flowers or branches that may bear one or several flowers, the upper bearing a pseudo whorl, an umbel, or a pair of pedicels, these to 1 cm or more long, hypanthium urceolate; calyx very short, subtruncate or slightly denticulate; corolla with (4 or) 5 lobes, these valvate, much exceeding tube, tube to 4 mm, lobes to 7 mm, narrowly lanceolate, densely woolly within, bluntly pointed; anthers 4–4.5 mm long, linear, slightly swollen at tips, strongly exerted on glabrous filaments attached about 1 mm

from base of anther; style glabrous, exerted 3–4 mm, stigma lobes blunt, about 4 mm long, stigmatic on inner sides, margins slightly revolute; fruit a drupe up to 16 × 11 mm, ovoid to subglobose, with 4 or 5 thin-walled stones, one or more usually undeveloped, without a seed.

Plants from other parts of range, e.g., Samoa, are larger, have fruits much larger than those in Micronesia, with all four stones with developed seeds. Not enough fruiting Micronesian specimens are available to tell if a different taxon is involved. *Gynochthodes trukensis* and Micronesian plants, at least, of *G. verticillata*, seem to fall within the range of variation of this plastic species. Uncommon in volcanic and limestone areas in open forest; not well known.

VERNACULAR NAMES.—

daenot (Palau: Otobed list)
megikkal (Truk: Hosokawa, 1937)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: s. l., *Kanehira* 235 (BISH). Babeldaob: *Richardson* 33 (US); Aimeliik, *Hosokawa* 7252 (US, A); Garikiai, *Takamatsu* 1741 (BISH, US); Kamsetu, *Takamatsu* 1118 (BISH); Garudokku [Ngardok], *Takamatsu* 1270 (BISH); Mecherechan I., *Otobed P-10124* (US); Arumizu, *Takamatsu* 1728 (BISH, US). Koror: *Hosokawa* 9091 (A); Ngebkuu, *Emmons* 67 (US, BISH). Oropusyakaru-naisoku [Aulupse'el]: *Hosokawa* 9785 (BISH, A).

Truk: Moen: *Takamatsu* 237 (BISH). Dublon: Kanehira, 1936; 201. Fefan: Hosokawa, 1937, 201. Tol: *Hosokawa* 8328 (BISH, US, isotypes of *G. trukensis*); Mt. Tumuital (Uiniboet), 200–400 m, *Fosberg* 24470a (US).

Ponape: *Kanehira* 1722 (US).

Hedyotis L.

Hedyotis L., Sp. Pl., 101, 1753; Gen. Pl., 44, 1754 [= 1753].

Oldenlandia L., Sp. Pl., 119, 1753; Gen. Pl., 55, 1754 [= 1753].

Leptopetalum Hooker and Arnott, Bot. Beechey Voy., 295, t. 61, 1841 [1838].

Habit various; leaves opposite (rarely whorled), entire; stipules interpetiolar, low triangular to somewhat sheathing, entire or pectinate; inflorescence axillary or terminal, cymose or thyrsoid or flowers in close axillary verticels, pedunculate heads, or glomerules, or solitary, flowers sessile or pedicellate, usually 4-merous; corolla salverform to funnellform, rarely almost rotate, tube short to somewhat elongate, cylindric, dilated upward, or somewhat globose; stamens usually attached below sinuses, rarely basal; style with 2 branches, stigmatic on inner faces; fruit a capsule, globose, cup-shaped or somewhat compressed, crowned by persistent calyx, disk flat or elevated, dehiscence loculicidal, septicidal, or both, rarely indehiscent; locules 2 with axile, more or less fleshy placentae covered by seeds, these various, usually peltate or angular by compression, rarely angles winged, hilum superficial, on a prominence, or in a pit.

A very large pantropical and temperate genus, if accepted in a broad sense as treated here, adapted to many and diverse habitats. Many of the species are found in open, weedy or savanna situations but some are plants of forests, especially montane ones. The genus is well represented on islands, especially in the tropics. Twenty seven species, some with several varieties, are found in Micronesia, of which five or possibly six may be introduced. Of the native ones, all but four are endemic. Only one, *Hedyotis biflora*, possibly an aboriginal introduction, is found on low coral islands (as well as on high islands).

Key to Micronesian Species of *Hedyotis*

1. Inflorescence an axillary or terminal open few-flowered (usually 7 or less) cyme or flowers solitary in leaf axils 2
2. Flowers solitary, axillary 3
 3. Pedicels short, leaves ovate, pointed *H. pumila*
 3. Pedicels 1 cm or more long, capillary, leaves narrow *H. lancifolia*
2. Flowers 3 or several in cymes 4
 4. Leaves linear to narrowly lanceolate *H. corymbosa*
 4. Leaves ovate, elliptic or obovate 5
 5. Leaves thin ovate, cymes with capillary pedicels, capsules thin-walled, globose *H. biflora*
 5. Leaves thick or firm, cymes with stout pedicels, flowers in triads, capsules firm, thick-walled *H. strigulosa*
1. Inflorescence axillary or terminal, many-flowered, or if few flowered, densely so 6
 6. Plant a wiry herb, probably annual *H. cyanantha*
 6. Plant with strong stems 7
 7. Terminal panicles on main stems, no axillary cymes except rarely in uppermost axils 8

8. Stems sharply 4-angled, flowers 1 cm or more long *H. megalantha*
8. Stems not sharply 4-angled, flowers less than 1 cm long 9
 9. Corolla tubular, fruits globose, 2 mm diam. *H. foetida*
 9. Corolla subtovate, fruits ovoid, 3 mm long *H. kanehirae*
7. Inflorescence axillary or both axillary and terminal 10
10. Inflorescences verticillate, axillary or axillary with terminal or pedunculate heads 11
 11. Plants densely hairy *H. tomentosa*
 11. Plants glabrous or inconspicuously hairy, or at least leaves nearly or quite glabrous, or openly hirsute 12
 12. Leaves large, usually well over 9 cm, long- petiolate *H. cornifolia*
 12. Leaves less than 9 cm, shortly petiolate to sessile 13
 13. Stems stiff, erect, verticels and heads or glomerules usually densely flowered 14
 14. Shrubs, stems not sharply angled, terminal heads usually not present *H. sachetiana*
 14. Herbs or suffrutescent, stems 4-angled, terminal heads present *H. uncinelloides*
 13. Stems weak, tending to be decumbent or prostrate, often rooting at nodes, verticels small, usually few- flowered or if many flowered terminal heads usually present 15
 15. Veins very obscure on under side of leaves, terminal heads lacking *H. verticillata*
 15. Veins evident terminal head-like cymules present, or if not, plants hairy 16
 16. Stems glabrous, stipules with 7-11 setae, axillary pedunculate heads present *H. ponapensis*
 16. Stems pilose, stipules with 4 pilose setae, pedunculate heads absent *H. auricularia*
10. Inflorescence not verticillate, usually cymose or with peduncled heads or glomerules 17
 17. Flowers or fruits in heads or glomerules on axillary peduncles 18
 18. Plant notably hairy *H. vestita*
 18. Plant glabrous or nearly so *H. ponapensis*
 17. Flowers or fruits in axillary, axillary and terminal or terminal cymes, thyrses, or panicles 19
 19. Thyrses small, strictly axillary, peduncles slender to 1 mm thick, rhachis 2-4 internodes long 20
 20. Plant generally hirtellous *H. tuyamae*
 20. Plant glabrous except rarely some puberulence on smaller inflorescence branches 21
 21. Inflorescences open, flowers not glomerate *H. divaricata*
 21. Inflorescences condensed, glomerate *H. cushingiae*
 19. Thyrses branch-like, with heavy peduncles, in upper axils or, occasionally terminal 22
 22. Plant corymbosely branched at top, branches may be interpreted as separate thyrses, or the whole as a compound terminal inflorescence 23
 23. Branching of panicles ending in trichotomously branched cymules, stipules pectinate *H. laciniata*
 23. Branching of smaller panicle branches forking with a pedicillate flower in each fork, stipules entire or somewhat lobed *H. korrorensis*

22. Inflorescences elongate open thyrses in upper axils, the whole giving a paniculate appearance but not appearing corymbose 24
24. Distal branching of thyrses ascending, racemiform
 *H. scabridifolia*
24. Distal branching of thyrses divaricate 25
25. Inflorescence branchlets ending in small tight heads
 *H. suborthogona*
25. Inflorescence branchlets ending in few-flowered glomerules, flowers pedicellate 26
26. Stipules pectinate *H. fruticulosa*
26. Stipules entire to irregularly lobed *H. aimiriikensis*

Hedyotis aimiriikensis Kanehira

Hedyotis aimiriikensis Kanehira, Trans. Nat. Hist. Soc. Formosa, 25:4, 1935.—Hatusima, Trans. Nat. Hist. Soc. Formosa, 26:225, 1936.

Shrub, stem unbranched to slightly branched, subglabrous, about 1 m or more tall, when branched decussately so, internodes 4–6 cm long; leaves petiolate, chartaceous, olive-green, concolorous when dry, ovate-oblong to oblong, to 9 × 4 cm, apex obtuse to very shortly acuminate at apex, obtuse to subtruncate at base abruptly attenuate to a flattened petiole 7–9 mm long; stipules broadly ovate, entire to irregularly lobed, lobes linear; panicles terminal and axillary, up to 12 cm long, decussately branched, leaves grading smaller into bracts and to linear bractlets 4–5 mm long; calyx tube (hypanthium) obconic, glabrous, lobes linear-lanceolate, acuminate, 2–3 mm long scarcely 0.5 mm wide; “capitulis” (= capsules) stipitate, oblong about 3 mm long, thickly coriaceous, septicidally bilocular; seeds 2 in each locule, angulate (roughly translated from Kanehira).

Kanehira says apparently allied to *Hedyotis korrorensis*, but it differs by its petioled leaves with subtruncate base and nearly horizontally divaricating branched panicles and somewhat longer pedicels.

Hatusima reduces this outright to *H. korrorensis*, but the photo shows a plant with quite different inflorescence, and Kanehira’s description mentions this difference. We have not seen the type, Kanehira’s #2369, from Aimiriik, and no other material has, to our knowledge, been referred to this species. Thus it is, if maintained, a local endemic to Aimiriik, in southwestern Babeldaob.

For the time being, until more material becomes available, we will maintain it as a member of the *H. fruticulosa* group.

Hedyotis auricularia L.

Hedyotis auricularia L., Sp. Pl., 101–102, 1753.—Fosberg, Sachet, and Oliver, Micronesica, 15:266, 1979.—Fosberg et al., Vascular Pl. Palau, 41, 1980.—Fosberg, Allertonia, 6:215, 1991.

Oldenlandia auricularia (L.) F. v. Mueller, Syst. Census Austr. Pl., 1:74, 1882.—Volkens, Bot. Jahrb., 31:475, 1901.—Kanehira, Enum. Micr. Pl., 422, 1935.—Valeton, Bot. Jahrb., 63:297, 1930.

Hedyotis auriculata L. ex Hatusima, Trans. Nat. Hist. Soc. Formosa, 26:221, 1936 [an error for *auricularia*].

Variety *auricularia* is not known from Micronesia, originally described from Ceylon.

Hedyotis auricularia var. *dispersa* Fosberg

Hedyotis auricularia var. *dispersa* Fosberg, Allertonia, 6:208, 1991.

Young growth and usually under-sides of leaves spreading pilose or villous, leaves usually elliptic, about 5 × 2 cm, slightly or not acuminate, abruptly mucronate, petioles 5 mm or less; stipules low, triangular, pectinate with 5 (–7) very unequal pilose setae, the central one longer; cymes dense, axillary, rather few flowered; calyx lobes pilose, linear-lanceolate, persistent; corolla campanulate, lobes and tube subequal, lobes oblong-ovate; capsule indehiscent, nut-like, globose, 1.5 mm long, rugose, hard, crowned by calyx lobes; seed blackish, peltate-tetrahedral.

Ecology and geographical distribution: Growing in forest, or in semi-cultivated forest around dwellings, at 10–15 m elevation, in Yap and Palau. Similar forms, with smaller, less acuminate leaves and more abundant pubescence, are found from southeast Asia to India and Ceylon. First reported from Yap by Volkens.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Ngelwa, *Hosokawa 9181* (BISH); Ngerur I., NW Koror Mun., 15 m, *Canfield 675* (US).

Yap: Luej village, SE of Airstrip, 10–15 m, 27 July 1965, *Fosberg 46603* (US, holotype, BISH, POM, BM, isotypes); “Mabo” [Map], *Hosokawa 8812* (US, A); s. l., *Hallier s. n.* (HBG).

Hedyotis biflora (L.) Lamarck

Hedyotis biflora (L.) Lamarck, Tabl. Encycl., 1:272, 1791 [1792].—Fosberg, Occ. Pap. Bishop Mus., 15:214, 1940.—St. John, Pac. Sci., 5:285, 1951.—Anderson, Atoll Res. Bull., 7:iii, 1951.—Glassman, Bish. Mus. Bull., 209:93, 1952; Pac. Sci., 7:296, 301, 1953.—Catala, Atoll Res. Bull., 59:96, 1957.—Stone, Pac. Sci., 13:104, 1959.—Fosberg and Sachet, Atoll Res. Bull., 92:35, 1962.—Stone, Micronesica, 6:546, 1971.—Fosberg, Falanruw, and Sachet, Smith. Contr. Bot., 22:40, 1975.—Fosberg, Sachet, and Oliver, Micronesica, 15:266, 1979.—Fosberg et al., Vascular Pl. Palau, 41, 1980.—Fosberg, Allertonia, 6:216, 1991.

Oldenlandia biflora L., Sp. Pl., 119, 1753.—Merrill, Philip. Journ. Sci., Bot., 9:146, 1914.—Kanehira, Enum. Micr. Pl., 422, 1935.—Hatusima, Trans. Nat. Hist. Soc. Formosa, 26:220, 1936.

Oldenlandia paniculata L., Sp. Pl., ed. 2, 2:1667, 1763.—Endlicher, Ann. Wien. Mus. Naturgesch., 1:175, 1835.—Schumann and Lauterbach, Fl. D. Schütz., 55, 1901.—Volkens, Bot. Jahrb., 31:475, 1901; Notizbl., 4:91, 1903.—Safford, Contr. U.S. Nat. Herb., 9:337–38, 1905.—Valeton, Bot. Jahrb., 63:297, 1930.

Erect to spreading or almost prostrate herb, glabrous or nearly so, branched, sometimes diffusely much branched, to 3–4 dm tall or long, internodes quadrangular; leaves thin, up to 3 × 1.5 cm, ovate or elliptic, shortly acuminate or acute, few-veined; stipules triangular-acuminate, sometimes with one or more subordinate pairs of teeth, rarely bifid, adnate to petioles at base; cymes loosely few flowered, terminal, and axillary, or reduced to triads or to several, or even single, axillary pedicels, pedicels filiform, up to 1 cm or even 1.5 cm in fruit, lowest bracts foliaceous, reduced upward to scales or subulate vestiges; calyx-lobes triangular, acute, not much accrescent in fruit; corolla white, broadly tubular, about 2–3 mm long, lobes ovate, about 1 mm long, slightly spreading, tube sometimes swollen, the whole thin and readily caducous, usually lacking from specimens, throat in some with tufts of hair; anthers subsessile in throat; style subequal with tube, bifid, glabrous; fruit subglobose, slightly compressed, about 2.5–3 mm high; seeds subglobose, dull brownish to black, rugose.

Widely distributed from south Asia to Micronesia and western Polynesia in disturbed or weedy habitats, its pre-human range uncertain; obviously spread by human activities. An extremely variable species, but clear geographic or ecological varieties difficult to establish. Further field study would be desirable.

USES.—The leaves may be chewed, then the juice spit into the mouth of a baby to keep the baby strong. The chewed leaves are then spread on the joints and the lower back to make the baby strong (Sonsorol, *Berry* 109). Ingredient in medicine (Woleai, *Alkire* 57).

VERNACULAR NAMES.—

sechal kelelamalk (Palau: Fosberg et al., 1980)
warumaho (Sonsorol: *Berry* 109)
waleuionger (Ulithi: *Lessa* 87)
gobwusal (Woleai: *Alkire*, 1974)
hobwusal (Woleai: *Alkire* 57)
opusal (Ifaluk: *Abbott & Bates* 79, 58)
aloe mach (Namoluk: *Marshall* 23)
iupuonalo (Satawan: Moch I.; *Anderson* 965)
malite (Satawan: Satawan I., *Anderson* 1087)
kinoj (Arno: *Anderson*, 1951)
teu teute (Butaritari: Catala, 1957)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Agrigan: Midwest coast, 150 ft [45

m], *Falanruw* 2343 (US); trail around S side of island, 10–20 m, *Fosberg* 31580 (US, BISH, POM, L, NSW, NY).

Alamagan: SSW coast, 350 ft [106 m], *Falanruw* 1888 (US); s. l., *Anderson* 414 (US, BISH, POM, K, MO, CHR).

Anatahan: *Hosokawa* 78367 (BISH, A); W end of N coast, below 250 ft [76 m], *Falanruw* 1689 (US); NW corner of island, 200–300 ft [60–90 m], *Falanruw* 1612 (US); NW tip of island, 0–10 m, *Evans* 2454 (US); trail up from W anchorage, 15 m, *Raulerson* 1073 (US).

Saipan: Chalan-Kanoa, *Hosaka* 2983 (US, BISH, POM).

Guam: Voy. Astrolabe, s. l., s. coll. (P, 2 sheets); Astrolabe “*Le Cg*,” 1828 (P); *G.E.S.* 114 (BISH, US, NSW, K, BM), 62 (BISH, NSW, US); Agaña, *Safford & Seale* 1064 (US); Piti village, 4–50 ft [1–15 m], *G.C. Moore* 145 (US); college campus, Mangilao, *Stone* 4665 (GUAM, US); Kotod, S of cross island road, 100 m, *Fosberg* 39194 (US); Pipeline Road in Chaot River ravine, *Fosberg* 59667 (US); SE of Anao Pt., 200 m, *Fosberg* 31941 (US, BISH, POM, K, BRI); valley just back of Pago Bay, *Fosberg* 25356 (US, BISH, MO, A, L); Dan Dan, 110 m, *Fosberg* 35555 (US, BISH); plateau between Ylig and Talofof Rivers, 100 m, *Fosberg* 25324 (US, BISH, UC, P); S bank Talofof River, 300 m above mouth, *Fosberg* 35450 (US, BISH, P). E end of Bile Bay, Marizo, *Raulerson* 4836 (US).

CAROLINE ISLANDS.—Palau: s. l., *Ledermann* 13141 (B). Babeldaob: Border of NE Aimeliik and Ngetpang Munics., 10 m, *Canfield* 683 (US). Koror: *Blackburn* E 35 (US). Nge-rebe’ed: *Fosberg* 32486 (US). Aulupse’el [Oropsykaru]: *Hosokawa* 7443 (US), 7442 (US). Todai-san, *Hosokawa* 7528 (US). 70 Islands, Bkulomekerall I. (13), West Beach, 3 m, *Raulerson* 16603 (US).

Sonsorol: *Berry* 109 (US, BISH); *Salsedo* 364 (US).

Yap: *Hallier* 30 X .03 (HBG); Colonia, *Fosberg* 59976 (US); Ma’alai village, Mun. Kanifay, 3 m, *Fosberg* 46345 (US).

Ulithi: Mogmog, *Fosberg & Wong* 25529 (US, BISH, POM, MO, L, BRI, GUAM); *Lessa* 87 (BISH); Fassarai, *Hosaka* 3217 (US, BISH); Potangeras, 2 m, *Hosaka* 3238 (US, BISH, POM).

Sorol: Bigeliwol, *King* 35 (US).

Woleai: Falelis I., *Fosberg* 46997 (US); *Alkire* 57 (US); Falalop I., *Evans* 455 (US, BISH); Sholiap I., *Fosberg* 47029 (US); Utagal I., *Wong* 35 (US, BISH, POM, K, A, MO).

Faraulap: Faraulap I., *Fosberg & Evans* 47313 (US, BISH, US, CHR).

Ifaluk: Falarik I., *Abbott & Bates* 79 (BISH, US), 58 (BISH, US); Ifaluk I., *Fosberg* 47223 (US, BISH, POM, GUAM), 47228 (US).

Lamotrek: Lamotrek I., *Fosberg & Evans* 40750 (US).

Satawal Island: *Fosberg* 46873 (US).

Puluwat: Puluwat I., *Niering* 763 (BISH), 762 (US).

Namonuito: Piseras I., *Evans* 858 (US, BISH, POM); Ono I., *Evans* 1030 (US, BISH); Onara I., *Evans* 983 (US); Magur I., *Evans* 956 (US, BISH, MO, NSW).

Murilo: Murilo I., *Evans* 1244 (US); Ruo I., *Evans* 1168 (US).

Nomwin: Fananu I., *Evans 1113* (US, BISH); Nomwin I., *Fosberg 24574* (US, BISH).

Truk: *Wong 183* (BISH, US); "Ile Shix-archipel Hogoleu ou de rouge" *Hombron* in 1841 (P); petite ile de Rongi, groupe des Iles Hogoleu, *Hombron* in 1868 (G). Moen: *Takamatsu 197* (BISH); Mechetiu village, NE of Bou Bay, *Fosberg 24422* (US, BISH, BRI, B); near Moen village, *Anderson 731* (US, BISH, CHR, P, NY). Udot: Folomo (or Faloma) village, *Fosberg 24479* (US, BISH, POM). Pis: *Fosberg 24658* (US, BISH, POM, MO, BM, TI); *Evans 810* (US, BISH), 826 (US).

Nama: *Anderson 904* (US, BISH, POM, NY, L), *Evans 1309* (US).

Namoluk: *Namoluk I., Marshall 23* (BISH, US).

Lukunor: *Lukunor I., Anderson 2126* (US, BISH, POM, NY, L); *Oneop I., Anderson 2064* (US).

Satawan: *Moch I., Anderson 965* (US, BISH, POM, NY, L); *Satawan I., Anderson 1087* (US, BISH, POM, NY, L); *Ta I., Anderson 1044* (US, BISH, POM, NY, L).

Ponape: *Langar, Hallier 6 × .03* (HBG); "weg nach dem Scheuasstand," *Hallier s. n. 30. IX .03* (HBG).

Mokil: *Hallier s. n. 16. IX .03* (HBG); *Tarabus, Kalap I., Glassman 2622* (US, BISH).

Pingelap: *Pingelap I., Glassman 2655* (US, BISH); *Hallier s. n. 5. IX .03* (HBG); *Hallier 8. IV. 03* (HBG).

Kusaie: *Ualan, D'urville* in 1827 (P); *Lelehafen, Hallier s. n. 3. IX. 03* (HBG); *Lele I., sea level, Glassman 2713* (US, BISH); *Malemu, Hosokawa 6338* (BISH, A), 6342 (BISH, A), 6352 (US).

MARSHALL ISLANDS.—*Likiep, Lado I., Fosberg 33792* (US); *Likiep I., Fosberg 27041* (US, BISH, POM, L); *Aikini I., Fosberg 27049* (US, BISH, MO, BM, CHR); *Likiep I., Fosberg 36722* (US, BISH, POM).

Ailinglapalap: Enubing, Fosberg 26893 (US, BISH, A, K, NSW).

Majuro: Uliga I., St. John 21370 (US, BISH, NSW); islet at E end, *Fosberg 26933* (US, BISH, B, GUAM, MO); W end of *Majuro I., Fosberg 26968* (US, BISH, POM); *Dalap I., Fosberg 31191* (US, BISH, G, BM).

Arno: Ine I., Anderson 3686 (US, BISH, POM); *Langar I., Hatheway 862* (US, BISH, POM).

Jaluit: Fosberg and Sachet, 1962:35 (citing *St. John 21660*); *Imruj I., Fosberg 26768* (US, BISH, BRI, NY, CHR, TI); *Mejatto I., Fosberg 26784* (US, BISH, UC, P).

GILBERT ISLANDS.—*Butaritari: Butaritari I., Herbst & Allerton 2711* (US); *Catala 67* (P).

Hedyotis cornifolia Kanehira

Hedyotis cornifolia Kanehira, *Trans. Nat. Hist. Soc. Formosa*, 25:5, f. 6, 1935; *Enum. Micr. Pl.*, 418, 1935.—*Fosberg, Sachet, and Oliver, Micronesica*, 15:266, 1979.—*Fosberg, Allertonia*, 6:219, 1991.

Hedyotis macrophylla sensu *Hatusima, Trans. Nat. Hist. Soc. Formosa*, 26:224, 1936 [non *Wallich* in *Wight and Arnott, Prodr.*, 408, 1834].

Hedyotis corniphylloides Kanehira, *Enum. Micr. Pl.*, 418, 1935 [error for *cornifolia*].

Shrub or robust herb to 15 m tall, stem to 8 mm thick, slightly 4-sided, glabrous, youngest part fistulose, internodes to 6 cm long; leaves large, blades thin, broadly elliptic, to 13 × 9 cm, apex acuminate, base acutely narrowed to a long petiole, to 5 cm, young leaves sparsely but prominently pilose, glabrate when older, lateral nerves about 7 or 8 on a side; stipules large, thin, united, funnelform, 8–10 mm long, margins densely pectinate with strong, bristle-covered setae about 4 mm long, persistent (in *Takamatsu 1277* neither persistent nor bristly), stipules becoming distended by developing axillary heads of flowers and fruits, finally splitting and shrivelling; axillary heads densely many-flowered, hirsute (except in *Takamatsu 1277*); calyx and hypanthium shortly hirsute, calyx lobes linear-lanceolate acuminate; corolla funnel-form, 4–5 mm long, glabrous without, villous within, lobes 1.5 mm long, oblong-ovate; anthers linear-oblong, 1.2–1.5 mm long, dorsifixed on short filaments, conspicuously exerted, erect; capsules obovoid, hirsute, about 3 mm long, deeply septically dehiscent, then shallowly loculicidal; seeds dull blackish, suborbicular, peltate, basally substipitate, about 0.6 mm diameter.

This species is closely related to *H. macrophylla* Wallich of south and southeast Asia and *H. platyphylla* Merrill of Borneo. It is, so far as known, endemic to the volcanic parts of Babeldaob, Palau, where it grows in dense forests.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Babeldaob: Arumonogui, Kanehira, l.c. (1935) (his no. 2088, type; not seen); Ngatpang, *Takamatsu 1277* (US); ESE of Alomongui Pt., 80 m, *Canfield 614* (US), 616 (US); "Kyu-gasupin, Toki-hukin-sinrin" *Hosokawa 7007* (A).

Hedyotis corymbosa (L.) Lamarck

Hedyotis corymbosa (L.) Lamarck, *Tabl. Encycl.*, 1:272, 1791 [1792].—*Glassman, Bish. Mus. Bull.*, 209:93, 1952.—*Fosberg and Sachet, Atoll Res. Bull.*, 92:35, 1962.—*Stone, Micronesica*, 6:546–47, 1971.—*Fosberg, Sachet, and Oliver, Micronesica*, 15:266, 1979.—*Fosberg, Allertonia*, 6:219, 1991.

Oldenlandia corymbosa L., *Sp. Pl.*, 119, 1853.—*Merrill, Philip. Journ. Sci. Bot.*, 9:146, 1914.—*Valeton, Bot. Jahrb.*, 63:297, 1930.—*Kanehira, Enum. Micr. Pl.*, 422, 1935.—*Hatusima, Trans. Nat. Hist. Soc. Formosa*, 26:220, 1936.

Small slender herbaceous plant with wiry branching stems, glabrous to slightly scabridulous, prostrate to ascending, internodes usually 1–2 cm long; leaves lanceolate, often revolute so as to appear linear, about 1–1.5 cm long, apex acutish, sharply mucronulate, subsessile, base narrowed, slightly winged, margins glabrous or slightly ciliolate; stipules triangular, adnate to leaf-bases, margins with 3 to 5 unequal capillary setae; flowers in axillary irregularly branched often triflorous or several flowered filiform cymes, or these reduced to 1 to 3 axillary pedicels, flowering pedicels 1–4 mm,

elongating slightly but seldom over 5 mm, subtended by minute subulate bractlets; calyx of 4 separate but contiguous narrowly triangular-acuminate slightly aristate lobes, bases separating widely on fruit; corolla white to pinkish, slightly funnellform, lobes exceeding tube, throat inconspicuously hairy; anthers minute, visible in sinuses of corolla; capsules depressed globose, 2 mm wide, 1.2 mm high, slightly compressed, thin-walled, disk slightly elevated, loculicidal; seeds minute, elliptic-tetrahedral or sub-peltate, about 0.3 mm long, dull olive-brown, surface sub-papillate or sub-reticulate.

A pantropical weed, probably of Old World origin, known from Micronesia for many years but has become much more widespread and abundant in the last few years; found in open to somewhat shaded places on bare soil, in cultivated, disturbed or ruderal situations.

Hedyotis corymbosa var. *corymbosa*, as described above.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Rota: Songsong village, 20 m, *Herbst & Falanruw* 6774 (US); 1.3 mi [2.1 km] N of S curve, *Raulerson* 19100 (US).

Guam: Merrill, 1914:146; Naval Air Station, Agaña, 85 m, *Fosberg* 35511 (US); Agaña, 2 m, *Fosberg & Evans* 46205 (US); 1 m, *Fosberg* 35235 (US); 5 m, *Fosberg* 31248 (US); College of Guam, 50 m, *Evans* 244 (US); Northwest Field, 185 m, *Fosberg* 35383 (US); Tamuning, 15 m, *Fosberg* 35192 (US); beach below Bijia Pt., 5 m, *Evans* 1646 (US, BISH, POM, NY); Mt. Tenjo-Mt. Reconnaissance, 800 ft [244 m], *Moore* 81 (US); Pati Pt., *Necker* 329 (US); Andersen AFB, *Moran* 4411 (US, UC, POM); s. l., *G.E.S.* 89 (US, NSW, BISH); Ritidian Pt., 165 m, *Fosberg* 39265 (US, BISH); mouth of Laguas River, *Fosberg* 59708 (US); Dan Dan Radio Tracking Station, 3 mi [4.8 km] NW of Inarajan, *Fosberg & Raulerson* 59738 (US, BISH, POM, NY); university campus, Mangilao, *Fosberg* 59745 (US, BISH, POM); Mangilao, near university, *Fosberg* 59665 (US); agriculture station, *Scully* 194 (US).

CAROLINE ISLANDS.—Palau: Babeldaob: Above falls in Ngerdong River, Ngeremlengiu, *Raulerson* 5828 (US); Modenkgei School, Ibbang, 3 m, *Raulerson* 6073 (US). Koror: Entomology lab, *Blackburn* 275 (US, BISH). Ngerebe'ed: 10 m, *Fosberg & Evans* 47434 (US, BISH, POM, NY, L); 10 m, *Fosberg* 32488 (US, BISH, POM, NY, L); *Otobed* PW-10029 (US). Peleliu: Fish pond 0.3 mi [0.5 km] SSE of Mt. Amiagal, 2 m, *Canfield* 424 (US); Ngalkol village, 2 m, *Fosberg* 47630 (US, BISH). Angaur: N end of island, 3–4 m, *Fosberg* 25967 (US, BISH); E side of island, 3–5 m, *Fosberg* 31990 (US, BISH); 0.6 mi [0.9 km] due E of Pkulangelul, *Canfield* 233 (US).

Fais: Inland from S end of island, 15 m, *Fosberg* 46685 (US, BISH).

Truk: Moen: Moen village, *Fosberg* 60171 (US, BISH, POM, NY, L).

Ponape: Kolonia, agriculture experiment station, *Fosberg*

58435 (US); Kolonia, *Glassman* 2871 (US, BISH); agric. exper. station, *Glassman* 2423 (US, BISH); vicinity of Kolonia, *Glassman* 2753 (US); s. l., *Ledermann* 13923 (B); near Kolonia, *Stone* 1967 (GUAM); Kolonia, *Fosberg* 60420 (US, BISH, POM, NY), 58560 (US).

MARSHALL ISLANDS.—Kwajalein: Kwajalein I., *Fosberg* 41376 (US, BISH, POM), 48020, (US), 48018 (US, BISH, POM, NY, L). Ennylabegan: *Herbst* 8902 (US; Illiginni I., *Herbst* 8979 (US), 9033 (US); Omelek, *Herbst* 9020 (US).

Jaluit: *Fosberg* 41398 (US).

GILBERT ISLANDS.—Tarawa: Bairiki, *Raulerson* 3659 (US).

Hedyotis corymbosa var. *ampla* Fosberg

Hedyotis corymbosa var. *ampla* Fosberg, *Allertonia*, 6:220, 1991.

Erect to diffuse, sparsely branching delicate herb, to 30 cm tall, stems subglabrous, slightly minutely puberulent near nodes, weakly quadrangular, angles smooth to minutely scaberulous; leaves broadly lanceolate, 20–26 × 4–5 mm, becoming revolute and narrower on drying, bluntly acute, slightly mucronulate, sessile or subsessile, venation very obscure except midrib; stipules pectinate with very fine delicate setae, 2 usually much longer than the 1—several smaller ones at each side, capillary-caudate; flowers solitary in axils or in capillary 2 or 3 flowered cymes, pedicels capillary, 5–8 mm, turbinate, slightly campanulate, 0.6–0.7 mm long; calyx lobes ovate-acuminate, minutely scabrous on margin and midribs; corolla white, fading lavender, corolla tube 1 mm long and wide, lobes ovate-elliptic, bluntly acute, 1 mm long, margins minutely papillate-ciliate, throat closed by a beard of straight hairs; anther suborbicular, bluish, inserted about half-way down the tube; style about 1/2 as long as tube, stigma capitate, obscurely lobed; fruit hemispheric, about 1 × 2 mm, slightly compressed transversely to septum, disk only slightly elevated, very slightly carinate transversely to septum; placentae globose, attached to middle of septum; seeds many, about 0.3 × 0.2 mm, cuneoid, outer side convex, inner wedge-shaped, surface dark sooty brown, minutely foveolate-reticulate, scar not at all sunken in a pit.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Tinian: Airport, *Fosberg* 59861 (US); Marpo Well, *Fosberg* 59869 (US); House of Taga, San Jose village, *Fosberg* 59892 (US).

Guam: Chaot River Ravine, along pipe-line road, *Fosberg* 59668 (US, BISH, POM), 59839 (US, holotype, BISH, POM, isotypes); University of Guam, Mangilao, *Fosberg* 59736 (BISH, POM, US), 59941 (US).

MARSHALL ISLANDS.—Kwajalein: Roi-Namur I., *Herbst* 8956 (US).

Hedyotis cushingiae Fosberg

Hedyotis cushingiae Fosberg, *Allertonia*, 6:221, 1991.

Erect shrub, stems, leaves and stipules glabrous, stem somewhat squarish, internodes to 4 cm long; leaves elliptic, to 10 × 4 cm, firm chartaceous, apex slightly acuminate, base narrowed to a very short petiole, veins not prominent, 5 or 6 on a side; stipules broadly low triangular, pectinate with 5 to 7 linear gland-tipped processes, the middle one twice the length of the others; inflorescences axillary thyroid 3–5.5 cm long, subtended by reduced leaves or bracts to 6 cm long, peduncle moderately strong, stiff, spreading slightly ascending, upper part closely divaricately ramified, 2 internodes above peduncle, branches ending in globose glomerules, small ovate bractlets at bark of branches; inflorescence branches and glomerules sparsely hirtellous, calyx lobes oblong acute 1.5–2 mm long, recurved, persistent; “flowers violet”; capsules depressed globose, 2 × 2.5 mm, sparsely hirtellous, septicidally dehiscent; seeds peltate, orbicular to somewhat pentagonal, 0.7–0.9 mm across, black, reticulate, attachment on a low prominence.

This species known only from the type, seems to be rather intermediate between *H. tuyamae* and *H. divaricata*, also close to *H. fruticulosa*, from which it differs in its small, strictly axillary inflorescences.

It is named for Mrs. Marjorie Vernita Cushing Falanruw, eminent naturalist and self-taught ecologist, of Yap Island, collector of the type and many other important plant specimens in Micronesia.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

CAROLINE ISLANDS.—Yap: In savanna, Dinay, S Yap, *Cushing 319* (US, holotype).

Hedyotis cyanantha Kurz

Hedyotis cyanantha Kurz, Journ. As. Soc. Beng., 45(2):136, 1876.—Fosberg and Canfield, Micronesica, 16, 199, 1980.—Fosberg, Allertonia, 6:222, 1991.

Hedyotis coerulea Wight and Arnott, Prodr. Fl. Pen. Ind. Or., 412, 1834 [non *Hedyotis caerulea* (L.) Hooker, Fl. Bor. Am., 1:286, 1833].

Slender wiry-stemmed herb 10–20 cm tall, branched, especially near base, stems square, the angles puberulent or scabrous, rarely so on sides, internodes 1–3 (–3.5) cm long; leaves broadly linear but margins revolute so leaves appear very narrow, 1–2 (–3.5) cm long, sessile, apex slenderly cuspidate, or even somewhat aristate or spinescent, puberulent stipules low-triangular, sheathing, with 3 to 5 aristate setae with narrowly dilated bases on each side; flowers sessile, usually 1 or more (to 12 or 13) at summit of an ascending to somewhat spreading or curved filiform branch or peduncle, 1–2 (–3) cm long, closely subtended by 2 (if flower solitary) or more (if capitate) foliose bracts, hypanthium notably hirsutulous; calyx lobes 4, narrowly lanceolate-aristate, margins ciliate, a few hairs dorsally; corolla glabrous, 2–3 mm long, tubular to slightly funnellform, lobes 1–1.5 mm long, ovate to oblong, obtuse to acutish, pink (in Asia said to be blue); stamens

exserted, anthers ovate, cleft at base, white, 0.5–0.6 mm long; style glabrous, bifid stigmas spreading, well-exserted, linear, minutely puberulent; capsule globose, about 2–2.5 mm long, 3 mm when valves are open and erect, sparsely hirsute, crowned with calyx tube and lobes until dehiscence of capsule, then these caducous, capsule opening loculicidally; seeds dull brown, 0.3 mm in greatest diameter, roughly tetrahedral or wedge-shaped with outer side curved, hilum at point.

A South Asian and Ceylonese species apparently recently introduced in Palau; found there only twice.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Peleliu 0.5 mi [0.8 km] SW Mt. Amiangel, 2 m, *Canfield 426* (US) (the flowers of this collection were pink, according to the collector, rather than “blue” or “lilac” as in the Asiatic specimens.); roadside near small cemetery, *Rinehart LR 17038* (US).

Hedyotis divaricata (Valeton) Hosokawa

Hedyotis divaricata (Valeton) Hosokawa, Trans. Nat. Hist. Soc. Formosa, 24:204, 1934.—Kanehira, Enum. Micr. Pl., 418, 1935.—Hatusima, Trans. Nat. Hist. Soc. Formosa, 26:226, 1936.—Fosberg, Sachet, and Oliver, Micronesica, 15:267, 1979.—Fosberg, Allertonia, 6:223, 1991.

Oldenlandia divaricata Valeton, Bot. Jahrb., 63:292, 1930.

Hedyotis plurifurcata Hosokawa, Trans. Nat. Hist. Soc. Formosa, 24:203, 1934.—Kanehira, Trans. Nat. Hist. Soc. Formosa, 25:3, 1935; Enum. Micr. Pl., 419, 1935.—Hatusima, Trans. Nat. Hist. Soc. Formosa, 26:225, 1936.

Hedyotis laciniata var. *takamatsui* Fosberg, Occ. Pap. Bish. Mus., 15:215, 1940.

Slender erect shrub (or scandent?), glabrous, branched above, branchlets somewhat squarish but not angled, internodes 2–5 (–9) cm long; leaves, ovate to elliptic 3–10 cm long, 2–4.5 cm wide, apex acute to acuminate, base obtuse to rounded, nerves 4 to 6 on a side, rather prominent beneath, petiole slender 8–20 mm long; stipules rounded to triangular, adnate to bases of petioles, pectinate, setiform processes at least somewhat unequal, 5 to 7; cymes axillary, open, slender, up to 6–8 times divaricately branching, in each forking a sessile to distinctly pedicellate flower or fruit, 1–2–5 flowers at terminations; calyx united and cup-like at base, lobes ovate to triangular, firm, ciliate or glabrous, persisting; corolla 3.25 mm long, funnellform, lobes oblong to ovate, equalling tube, throat bearded; anthers sessile, included or slightly protruding; style equalling anthers, stigma capitate; capsule subglobose or globose, 2.5 mm long, septicidally completely separating, valves slightly loculicidally splitting; seeds dark brown to black, 0.6–0.8 mm across, subangularly peltate, slightly convex above, with a wedge-shaped base, surface prominently cellular-reticulate.

This is a rare species that has not shown up in recent Palau collections. It is undoubtedly close to *H. schlechteri* (Valeton) Merrill & Perry, as noted by Valeton. Two varieties are apparent, both probably confined to old volcanic soils.

Key to Micronesian Varieties of *Hedyotis divaricata*

Inflorescence branches elongate, zig-zag . . . var. *divaricata*
 Inflorescence branches forking twice, ending in triads
 var. *capillothyrsa*

Hedyotis divaricata (Valeton) Hosokawa var. *divaricata*

This is the Palauan variety as described above, with elongate zigzag cyme branches.

VERNACULAR NAME.—amudelach (Palau: Fosberg et al., 1980).

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: s. l., *Hosokawa 6834* (A). Babeldaob: Mt. Luis Almonugui, *Hosokawa 6915* (BISH); Kattelwe, *Hosokawa 9151* (BISH, US); Kamsetu, *Takamatsu 1115* (BISH, isotype of var. *takamatsui*). Koror: Narogulusang, 50–100 m, *Ledermann 14279* (B, isotype/lectotype of *Oldenlandia divaricata* Valeton).

Hedyotis divaricata var. *capillothyrsa* Fosberg

Hedyotis divaricata var. *capillothyrsa* Fosberg, *Allertonia*, 6:224, 1991.

Plant slender, glabrous, possibly shrubby? or sub-scandent, internodes to 6.5 m long, slightly squarish; leaves elliptic, to 6.5 × 2 cm, those subtending inflorescences much smaller, somewhat acuminate, base narrowed to a slender petiole less than 1 cm long; stipules low triangular, with a long central tooth and 2 much smaller ones on each side; inflorescences axillary, very slender, thyrsoid with slender peduncle about half total length of thyrses, rhachis with 2 or 3 internodes, each branch with a shortly pedicellate flower, and 2 lateral branches that again branch, branchlets ending in a triad with central pedicel short, at base of each peduncle is a tiny dwarfed branch, ending in a triad or cymule; calyx lobes lanceolate, more or less recurved, persistent; capsules globose, 2 mm diameter, septi-
 cidial, valves splitting somewhat loculicidally.

This plant, represented only by a slender branchlet, seems to belong with *H. divaricata* but lacks the elongate zigzag inflorescence branches and has narrower, elliptic leaves, and rhachises with 2 or 3 internodes. Its leaves more resemble those of *H. cushingiae*, to which one might assign it as a variety with an open inflorescence. Indications of affinities in this group are not to be taken very seriously.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

CAROLINE ISLANDS.—Yap: Moloai, 5 Aug 1937, *Hosokawa 8985* (A, holotype).

Hedyotis foetida (Forster f.) J.E. Smith

Hedyotis foetida (Forster f.) J.E. Smith in Rees, *Cyclop.*, 17(2): Sub H.,

1811.—Fosberg, *Occ. Pap. Bish. Mus.* 13:247, 1937; *Bish. Mus. Bull.*, 174:21, 1943; *Allertonia*, 6:224:1991.

Oldenlandia foetida Forster f., *Prob.*, 10, 1786.

Hedyotis foetida var. *foetida* not known from Micronesia.

Hedyotis foetida var. *mariannensis* (Merrill) Fosberg

Hedyotis foetida var. *mariannensis* (Merrill) Fosberg, *Phytologia*, 5(7):291, 1955; *Allertonia*, 6:225, 1991.—Stone, *Micronesica*, 6:547–48, 1971.—Fosberg, Falanruw, and Sachet, *Smith. Contr. Bot.*, 22:40, 1975.—Falanruw and Payne, *Life on Guam*, 67, 1976.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:267, 1979.

Hedyotis mariannensis Merrill, *Philip. Journ. Sci. Bot.*, 9:144–45, 1914.—Valeton, *Bot. Jahrb.*, 63:296, 1930.—Kanehira, *Enum. Micr. Pl.*, 419, 1935; *Trans. Nat. Hist. Soc. Formosa*, 25:3, 1935.—Hatusima, *Trans. Nat. Hist. Soc. Formosa*, 26:222, 1936.

Oldenlandia foetida sensu Prowazek, *D. Marianen*, 120, 1913 [non Forster]. *Hedyotis foetida* sensu Fosberg, *Occ. Pap. Bish. Mus.*, 15:214, 1940 [non (Forster) J.E. Smith].

Oldenlandia mariannensis (Merrill) Valeton, *Bot. Jahrb.*, 63:296, 1930.

Slender, glabrous shrub, up to 1 m tall, often not at all foetid, much branched near base, branches gray, terete, internodes to 3 cm long; leaves ovate-lanceolate to narrowly elliptic or oblong, up to 7 × 3 cm usually narrower, acute to slightly acuminate at both ends, at base slightly decurrent on petiole almost to its base, veins obscure, 4 or 5 pairs, strongly ascending, lower surface slightly paler than upper, petiole to 0.5 cm long, thickened at base; stipules very low, adnate to petiole bases, with a strong central beak and two subsidiary teeth at base, all three teeth black; inflorescence a trichotomous or pentachotomous corymbiform cyme on a peduncle up to 14 cm long, with two reduced leaves or bracts near the middle, these sometimes with reduced cymules in their axils, each branch of the main cyme 3–4 times trichotomously or pentachotomously branched, a pair of much reduced leaf-like bracts at main ramification, scale-like bractlets at each subsequent branching, all flowers shortly pedicellate; hypanthium turbinate, calyx lobes triangular acute, bases scarcely separated; corolla white, about 8 mm long, campanulate, lobes ovate, 3–3.5 mm long, bluntly acute, slightly cucullate; stamens inserted in or just below sinuses, filaments short, white, anthers black, sagittate, 1.5 mm long, erect; style white, glabrous, filiform, subequal with corolla, curved or hooked at summit, stigma subcapitate, slightly yellowish, glabrous, not at all bifid; immature fruit turbinate to obovoid-subglobose, minutely pale punctate, disk somewhat convex, calyx teeth somewhat incurved around it; capsule subglobose or slightly turbinate, about 2.5–3 mm high, 2–2.5 mm wide, with ring of persistent calyx around the somewhat elevated disk, endocarp rather hard, dehiscing loculicidally across disk, valves tardily showing slight dehiscence or not, curving out, leaving a roundish hole for escape of seeds, dried placenta deeply foveolate; seeds dull brown, slightly compressed into irregular polyhedrons with rounded angles and corners, surface prominently reticulate.

Found in open or partly open habitats at all elevations on all

of the Marianas except Uracas and tolerant of both limestone and volcanic substrata.

USES.—Used for “maipi” a disease believed to be contracted in the jungle and caused by anger of the spirits of the ancient Chamorrans, characterized by pain, fever, swelling, and delirium at night (Rota, *Fosberg 25002*).

VERNACULAR NAMES.—

pao dedo (Rota: *Fosberg 25002*)

paudedo (Rota: *Sachet 1740*)

paode'do (Guam: Falanruw and Payne, 1976)

podedo, pau-dedo (Guam: *Seale* in 1900)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—*Gaudichaud s. n.* (P).

Maug: Top of West Island, N of middle, 300 ft [92 m], *P.H. Moore 795* (US).

Asuncion: S slope of summit, 830 m, *Falanruw 3067* (US).

Agrigan: Trail around S side of island, 10–20 m, *Fosberg 31597* (US, BISH, POM).

Pagan: Mt. Pagan, *Moore 366* (US); 12 m, *Anderson 502* (US); isthmus, 4 m, *Anderson 550* (US); E coast, SSW of Mt. Pagan, below 20 m, *Falanruw 3003* (US), *3004* (US); S of Bandeira Peninsula, 100 ft [30 m], *Lamoureux 4869* (US); Liyan, W coast just S of Chalan Talu, 5 m, *Raulerson 1027* (US); Salafi, N of Puntan Diablo on W coast, 15 m, *Raulerson 1062* (US).

Alamagan: *Hosokawa 7898* (BISH); SSW coast, landing and village area, 0–200 ft [0–60 m], *Falanruw 1960* (US); around Partido village, *Fosberg 31682* (US); vicinity of Songsong village, 3–15 m, *Fosberg 31707* (US, BISH); *Anderson 414* (US).

Guguan: 320 ft [98 m], *Falanruw 1833* (US).

Anatahan: S of extreme NW tip of island, 0–10 m, *Evans 2445* (US, BISH, POM, NY); boulder-strewn beach area, sea level, *Falanruw 1668* (US).

Saipan: Kagman Pt., E coast of island, 150 m, *Fosberg 31793* (US, BISH); Mt. Tapotchau, S slope, 900 ft [275 m], *Hosaka 2917* (US, BISH, POM, NY); Bird Island Beach, 0–10 m, *Evans 2329* (US, BISH, POM, NY, L); *Lange 38* (BISH); *Höfer 72* (BISH); Kagman Peninsula just back of Kagman Pt., 120 m, *Fosberg 50537* (US, BISH); s. l., *Kanehira 1030* (KYO, US); 420 m, *Marche 17* (P, POM).

Tinian: *Hosokawa 7783* (BISH, US); Mt. Lasso, 500 ft [152 m], *Hosaka 2813* (US, BISH, POM, NY); former town, SW coast, 3–30 m, *Fosberg 24773* (US, BISH, F, NY); N end, 20 ft [6 m], *Hosaka 2848* (US, BISH); about 1 mi [1.6 km] S of Faibus Pt., *Fosberg 24714* (US, BISH, POM, NY, L).

Agiguan: WNW side, lower terrace, *Raulerson 7902* (US).

Rota: 1.5 mi [2.4 km] E of Songsong village, 10–20 m, *Sachet 1796* (US, BISH, POM); NW coast of W end of main part of island, *Fosberg 25002* (US); SW side of island, 0–5 m, *Evans 1895* (US, BISH, POM, NY, L); NW coast of W end of main part of island, 1–70 m, *Fosberg 25118* (US, BISH, POM,

NY); *Necker R18* (US, BISH), *R119* (US); Sabana, 1500 ft [460 m], *Kondo s. n.* in 1952 (BISH); E of Songsong village, 30 m, *Sachet 1740* (US, BISH, POM, NY); 0.5 km S of Songsong village, *Fosberg with Moore 58296* (US, BISH, POM); site of “old Japanese cannon,” 1–1.5 km SE of Songsong, *Fosberg with Moore 58326* (US, BISH, POM); Beach Road 2 mi [3.2 km] N of swimming hole, 5 m, *Quinata LR 19105* (US); beach road, 2 mi N of swimming hole, 5 m, *Quinata LR 19105* (US).

Guam: On rocks at Asan, *G.E.S. 239* (US, BISH); Ritidian Pt. near lighthouse, 185 m, *Bryan 1175* (BISH); Orote Peninsula, 30 m, *Bryan 1262* (US, BISH, 2 sheets); *Seale* in 1900 (BISH, 2 sheets); Cabras Island, *McGregor 572* (US, BISH, isotypes); Hilaan Pt., near beach, *Moore 502* (US); Andersen AFB, side of Pati Pt., 120 m, *Sachet & Moore 1824* (US, BISH); Fadian Pt., 115 m, *Fosberg 31218* (US); high ridge N of Talafofo Bay, 130 m, *Fosberg & Evans 46240* (US, BISH, POM); Ritidian Pt., *Anderson 197* (US, BISH, F, NY); Ritidian Pt., top of cliffs, 170 m, *Fosberg 24307* (US, BISH, POM, NY), *25308* (US, BISH, POM, NY), *25309* (US, BISH, POM, NY); Dos Amantes Pt., *Stone 3941* (GUAM), *3942* (GUAM); *Fosberg 43440* (US, BISH, POM, NY); s. l. *Thompson 239* (BISH); S of Tarague Bay, *Moran 4552* (US, UC, POM); Tailalo, *Moran 4586* (UC); Lujuna, 10–150 m, *Evans 1621* (US, BISH, POM); Iates Pt. Conservation Area, 60–90 m, *Evans 1825* (US, BISH); Ritidian Pt., 400 ft [122 m], *Hosaka 3102* (US); *Whiting R1* (US, POM); cliff above Tarague Beach, 140 m, *Fosberg 35669* (US, BISH, POM, NY, L); Ritidian Pt. Light, 185 m, *Anderson 99* (US, BISH, POM, NY, L); Ilo de Cabra, *Marche 132* (P, POM); Pati Pt., 160 m, *Necker 356* (US), *361* (US); Tvenjera, *Safford* in 1906 (US, 2 sheets), Two Lovers Pt., *Pedrus 33* (US); Mangilao, N of Pago Bay, ridge back of University, *Fosberg 59615* (US, BISH, POM, NY, L).

Hedyotis fruticulosa (Volkens) Merrill

Hedyotis fruticulosa (Volkens) Merrill, Philip. Journ. Sci. Bot., 15:544, 1919.—Kanehira, Enum. Micr. Pl., 418, 1935.—Hatusima, Trans. Nat. Hist. Soc. Formosa, 26:226, 1936.—Okabe, Journ. Anthr. Soc. Nippon, 56:413–426, 1941.—Otobed, m.s. list, 1967.—Stone, Micronesica, 6:548, 1970 (1971).—Fosberg, Sachet, and Oliver, Micronesica, 15:267, 1979.—Fosberg et al., Vascular Pl. Palau, 41, 1980.—Fosberg, Allertonia, 6:227, 1991. *Oldenlandia fruticulosa* Volkens, Bot. Jahrb., 31:475, 1902.—Valeton, Bot. Jahrb., 63:293, 1930.

Shrub to 1 (rarely 2) m tall, glabrous, stems square but angles not very sharp, sparingly branched; leaves ovate to elliptic, up to 13 × 4 cm, apex acuminate, base narrowly acute to slightly decurrent, blade chartaceous, nerves 4 or 5 on a side, petioles mostly 1–2 cm long; stipules very low triangular or very broadly ovate, pectinate with usually 5 to 7 very unequal setiform processes, glabrous; inflorescences axillary, thyrsoid with a stout peduncle and rhachis of usually 3 to 6 (9) internodes, the branches spreading to divaricate, rather short giving an outline several times as long as wide, often curved

upward, 10–25 or even 45 cm long, 5–10 cm wide, branches subtended by foliaceous bracts on rhachis, ramified 2–3 times, a shortly pedicellate or sessile flower frequently found in forkings, ultimate branchlets ending in a triad or small glomerule or even (*Fosberg 46310*) in dense heads, rarely (*Falanruw 3202*) the branchlets puberulent, or with only traces of puberulence; flowers sessile or very shortly pedicellate, hypanthium turbinate, calyx lobes ovate to oblong, 1.5–2 mm long, bluntly acute, persistent and elongating slightly and becoming recurved in fruit; corolla 3.5–5 mm long, lilac or purplish, funnelform, glabrous without, lobes ovate, 1.5 mm long, densely woolly within; anthers included or slightly exerted (Valeton); capsule globose or slightly depressed-globose, dehiscent septicidally into 2 cocci-like valves, these dehiscent slightly loculicidally; seeds black, peltate, 0.5–0.7 mm across, roughly orbicular or oblong, reticulate, attachment on a ventral wedge-shaped prominence.

This species is probably endemic on Yap, though it has been reported to occur on Guam (Merrill, 1919; Stone, 1971) and on Palau (Okabe, 1941; Kanehira, 1935; Otobed, 1967; Fosberg et al., 1980). We doubt its occurrence in either place. Marianas specimens thus determined have turned out to be *H. laciniata* Kanehira. Palau specimens seem to be either *H. tuyamae* Hosokawa or *H. korrorensis* (Valeton) Kanehira. Its principal habitat seems to be in savanna and disturbed areas.

Key to Micronesian Varieties of *Hedyotis fruticulosa*

1. Branches of cymules ending in open clusters, flowers notably pedicellate var. *yapensis*
1. Branches of cymules ending in dense clusters, pedicels very short, or flowers sessile, in triads or glomerules 2
2. Flowers in dense globose glomerules or heads, thyrses strongly ascending, narrow . . . var. *atrogglomerata*
2. Flowers solitary, in triads, or very small few-flowered clusters, almost sessile var. *fruticulosa*

Hedyotis fruticulosa Volkens var. *fruticulosa*

The main populations of the species, as described above, have inflorescence glabrous, thyrses large, with strong peduncle, this generally curving somewhat upward, ultimate ramifications usually triads or very small, few flowered glomerules, these neither spherical nor head-like.

VERNACULAR NAMES.—

athetieleu (Yap: *Alvis 101*)
 azkilo (Yap: *Fosberg 25560*)
 gumoynuteth (Yap: *Wong 355*)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Yap: Yabor, Kanid, 90 ft [27 m], *Wong 355* (US, A, BISH); Tora, 5 m, *Alvis 101* (US, BISH,

POM, NY, L); near agriculture station, *Blackburn 263* (US); 30. IX 03, *Hallier* (HBG, US); s. l., *Hallier 99* (US, HBG); near reservoir on road Colonia to airport, *Stemmermann 3131* (BISH); near airport, *Stemmermann 3612* (BISH); Maki, N end of Gagil Distr., 2–5 m, *Fosberg 25595* (US, BISH, POM, L, MO); SW of Maki, 30–50 m, *Fosberg 25602* (US, BISH, L) (dwarfed, stiff, 20–30 cm tall); Gorrer, central plateau, 20 m, *Hosaka 3311* (US, BISH, POM, MO); near Gaapan village, Dalipepinban Mun., *Fosberg 60093* (US, BISH, K, L); Dinay, 20 m, *Cushing 329* (US); 319 (US); Mt. Matade, E ridge, 20–40 m, *Fosberg 25560* (US, BISH, POM, G, CHR); Mt. Matade, S slope, 70 m, *Cushing 70* (US); Mt. Matade, 160 m, *Fosberg 25540* (US); between Muro and Mabu villages, E central Yap, 30–50 m, *Cushing 560a* and *560b* (US); hill SW of Gitam, S of Yap High School, 40 m, *Fosberg 46562* (US, BISH, BRI, POM, T), *46564* (US, BISH, NSW, MO, BM); Tabswol, near Bulochang, Fanif Mun., *Fosberg 60044* (US, BISH, L); Moloai, *Hosokawa 8985* (A); S slope Mt. Matada, *Cushing 469* (US).

Hedyotis fruticulosa var. *atrogglomerata* Fosberg

Hedyotis fruticulosa var. *atrogglomerata* Fosberg, *Allertonia*, 6:228, 1991.

Shrub, unbranched or scarcely branched, thyrses narrow, strongly ascending, cymules often black, strongly condensed, globose-glomerate.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Yap: S of Derikan, 15 m, *Fosberg 46310* (US, holotype, BISH, POM, MO, L, BM, isotypes); s. l., *Hallier 98* (HBG). The latter collection probably goes here according to notes made some years ago in Hamburg.

Hedyotis fruticulosa var. *yapensis* (Kanehira) Fosberg

Hedyotis fruticulosa var. *yapensis* (Kanehira) Fosberg, *Allertonia*, 6:228, 1991. *Hedyotis yapensis* Kanehira, *Trans. Nat. Hist. Soc. Formosa*, 25:5, 1935; *Enum. Micr. Pl.*, 420, 1935.—Hatusima, *Trans. Nat. Hist. Soc. Formosa*, 26:226, 1936.—Fosberg, *Sachet*, and Oliver, *Micronesica*, 15:269, 1979.

Robust erect herb, to 1 m tall, stem squarish, sulcate when dry, internodes of main stem to 6.5 cm long, glabrous; leaves elliptic to oblong, blades to about 16 × 7.5 cm, firm-chartaceous, glabrous, bluntly acuminate, base narrowing and sub-decurrent into a petiole to 4 cm long; thyrses to about 35 × 8 cm, peduncle to 14 cm, branching subdivaricately, branches to 5 cm long, branching divaricately with additional dwarfed branches at the main ramifications, secondary branches hirtellous, flowers in loose glomerules, pedicels 1–4 mm, hirtellous, hypanthium, calyx, and corolla-buds hirtellous, calyx lobes narrowly oblong; capsule depressed globose or globose, 2–2.5 mm long and wide, septicidal. The original description is here supplemented by observations on *Falanruw 3202*, the only collection known to us, except the type,

Kanehira 1230, which we have not seen. The Falanruw collection matches fairly well, but the glomerules are not as open as described for the type.

The few characters in which it differs from var. *fruticulosa* do not seem sufficient for more than varietal status.

GEOGRAPHIC RECORDS AND SPECIMEN EXAMINED

CAROLINE ISLANDS.—Yap: N of of airport, *Falanruw 3202* (US).

Hedyotis kanehirae (Hatusima) Fosberg

Hedyotis kanehirae (Hatusima) Fosberg, Smith. Contr. Bot., 45:28, 1980; Allertonia, 6:228, 1991.—Fosberg, Falanruw, and Sachet, Smith. Contr. Bot., 22:40, 1975.—Fosberg, Sachet, and Oliver, Micronesica, 15:267, 1979.

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

Hedyotis mariannensis sensu Kanehira, 1935 [pro parte; non Merrill, Philip. Journ. Sci. Bot., 9:144–145, 1914].

Dwarf shrub, 40–50 m tall, stems somewhat 4-angled, glabrous; leaves lanceolate, to 7 × 1.7 cm, apices somewhat acuminate, base attenuate, sessile, or decurrent on a short petiole, blade thin, glabrous, veins obscure, 3 or 4 very strongly ascending on a side; stipules very short triangular acuminate, adnate to petiole bases, near apex obscurely glandular denticulate, with a slight submarginal flange; cymes 3 at terminal node, umbelloid, branches 4 or 5, each branch ending in a triad or again umbelloid; flowers shortly pedicellate, bracts and bracteoles much reduced, triangular subulate; calyx with 4 triangular teeth, 1.5 mm long; corolla white, broadly funnelform or funnelform-rotate, 4 mm long and wide, tube 2 mm, throat glabrous, lobes ovate-oblong, apex acuminate, spreading; stamens inserted at base of corolla, anthers included, 1.5 mm long, dorsi-fixed; style “subclavatus” 5–6 mm long; capsule broadly ovoid, sides slightly sulcate along septum, walls firm, disk somewhat elevated and compressed, dehiscence loculidial across disk, valves slightly emarginate; seeds “minuta angulata, testa reticulato-punctata”; not seen.

This species superficially resembles *H. foetida* but may not be really very close. Its capsules are larger, thicker-walled, and differently shaped, and the inflorescence is smaller and much less complicated. We have not seen the type, *Kanehira 2181*, from the Marianas Islands, Alamagan Island, where it is apparently endemic.

GEOGRAPHIC RECORDS AND SPECIMEN EXAMINED

MARIANAS ISLANDS.—Alamagan: *Hosokawa 7798* (A, BISH).

Hedyotis korrorensis (Valeton) Hosokawa

Hedyotis korrorensis (Valeton) Hosokawa, Trans. Nat. Hist. Soc. Formosa, 24:204, 1934.—Kanehira, Enum. Micr. Pl., 418, 1935; Trans. Nat. Hist. Soc.

Formosa, 25:2–3, 1935 [as *H. korrorensis* sphalm.].—Hatusima, Trans. Nat. Hist. Soc. Formosa, 26:225, 1936.—Fosberg, Occ. Pap. Bish. Mus., 15:215, 1940; Allertonia, 6:229, 1991.—Fosberg, Sachet, and Oliver, Micronesica, 15:267, 1979.—Fosberg et al., Vascular Pl. Palau, 41, 1980.

Oldenlandia korrorensis Valeton, Bot. Jahrb., 63:294, 1930.

Hedyotis fruticulosa sensu Okabe, Journ. Anthropol. Soc. Nippon, 56:413–426, 1941; Nankyo, 2:20, 1943 [non (Volkens) Merrill].

Erect stiff shrub to 2 m tall, stems green, squarish, often with prominent nodes, scarcely branched except a corymbiform cluster of small branches at summit; leaves ovate to more rarely oblong or broadly elliptic, to 11 × 3.5 cm, mostly smaller, apex acute to somewhat acuminate, base narrowed to and decurrent on a short thick petiole less than 1 cm long, blade stiff, yellowish or light green, subcoriaceous, veins 6 to rarely 10 on a side; stipules large, broadly ovate to rounded, net-veined, not or little united with petioles, with or without one or two processes at base, margins otherwise entire or somewhat irregular, up to 1 cm long and wide; panicles purple or bluish, drying black, corymbiform to dome-shaped, terminal, and on small branches, extremely reduced ones occasional in upper axils, thyrroid, up to 5 internodes in main rhachis, subcordate foliaceous bracts and reduced stipules at main nodes, reduced ones distally, branches sometimes thyrroid, smaller branches forking 1–3 times with a pedicellate flower or fruit in each fork, branchlets terminating in a small umbell of flowers or a single flower, pedicels tending to be curved upward; hypanthium narrow, calyx lobes linear-lanceolate, margins revolute, making lobes look subulate, to about 3 mm, at first erect, soon curving outward and becoming recurved; corollas whitish to usually purple or bluish, tube somewhat dilated, lobes ovate, spreading to recurved or reflexed, woolly on inner surface, wool becoming shed or rubbed off in age; anthers oblong, exserted; style shortly exserted, stigma bifid; capsule about 2.5–3 mm long, subglobose to slightly obovoid or globose, not at all striate, dehiscing completely septically, valves splitting somewhat loculidially; seeds peltate, 3–5 angled, 0.6–1.0 mm in greatest diameter, brownish black, strongly reticulate, attachment on a wedge-shaped projection beneath.

USE.—Juice of crushed leaves said to be used to relieve lacquer poisoning (Palau: Okabe, 1943).

VERNACULAR NAMES.—

Emderaw (Palau: Okabe, 1943, as *H. fruticulosa*)

Emudelauih (Palau: Okabe, 1941, as *H. fruticulosa*)

Emudlach (Palau: Otobed list, 1967)

Omudlach (Palau: *Fosberg 47697*)

Two varieties were distinguished by Valeton, one glabrous, the other softly puberulent or hirtellous. To these may be added one that is glabrous but has the flowers in conspicuous subumbelloid glomerules, and another that has even more contracted, almost subcapitate hirtellous glomerules. We have not seen the type of var. *mollis*, but as described it seems distinguishable.

The entire species seems confined to the volcanic parts of

northern Palau. Further collecting may either strengthen or weaken these varieties, but they seem worth calling attention to. They may be separated by the following key.

Key to Micronesian Varieties of *Hedyotis korrorensis*

1. Plant entirely glabrous except interior of corolla 2
1. Plant puberulent, at least the ultimate glomerules of the inflorescences 3
 2. Terminal branchlets of inflorescence ending in single flowers or more usually small umbels var. *korrorensis*
 2. Terminal branchlets ending in subumbellate glomerules var. *subglomerata*
 3. Whole plant minutely hairy var. *mollis*
 3. Stipules and ultimate parts of the inflorescence and calyx hispidulous var. *hosokawana*

Hedyotis korrorensis (Valeton) Hosokawa var. *korrorensis*

The species as described above, but this variety includes only the completely glabrous form with umbelloid ultimate inflorescence components.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Babeldaob: Nekken, *Salsedo 106* (US); *Fosberg 50592* (US, BISH, POM, L, BRI, MO, CHR); Ngatpang [Gaspan], *Stone 4654* (US, GUAM, US); Ibobang, *Raulerson 5656* (US); Arumonogui-Sogen, near Arumaten, *Hosokawa 6783* (A, US, BISH); Garamiscan Colony, upper Ngarumiskang [Garamiscan; Almiokan] River, *Fosberg 25705* (US, BISH, POM, MO, BM, L, P); west coast, Ngeremtengel, *Fosberg 32455* (US, BISH, NY, K, MO); east coast, hills above Melekiok, *Fosberg 32523* (US); Lake Ngardok, 25 m, *Fosberg 32563* (US, BISH, GUAM, A, UC, T, B); hills between Melekiok and Lake Ngardok, 30–60 m, *Fosberg 32602* (US); Mizuko, S Aimeliik, 100 ft [30 m], *Hill 2* (US); Airai, *Hardy 119* (US, BISH, MO, L); *Cheatham 34* (BISH, UC, US); Airai (as Irrai) airfield region, *Woodrich 103* (US); *Fosberg 47697* (US, BISH, POM, S, NSW, AAU); Airai, just WSW of airport, *Raulerson 17113* (US); s. l., *Richardson 26* (US); Mt. Elsum, *Hosokawa 9250* (A); Ngarsul, *Hosokawa 9040* (A); Ngerikiil, Airai, *Fisher 153* (US). Koror: 20–30 m, *Ledermann 14038* (B, lectotype); as “Gortor,” *Herre 16* (BISH).

Hedyotis korrorensis var. *hosokawana* Fosberg

Hedyotis korrorensis var. *hosokawana* Fosberg, *Allertonia*, 6:230, 1991.

Dwarf shrub to 50 cm tall, unusually densely branching in habit, short internodes, lacerate hispidulous stipules, dome-shaped inflorescence, and hispidulous glomerules.

Tentatively placed here in spite of the lacerate stipules and

hispidulous glomerules because it agrees in most other respects with *H. korrorensis*. It was at first thought to be var. *mollis*.

Known only from the type.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

CAROLINE ISLANDS.—Palau: Babeldaob: East coast, hills between Melekiok and Lake Ngardok, on volcanic soil, 30–60 m, 9 Apr 1950, *Fosberg 32601* (US, holotype).

Hedyotis korrorensis var. *mollis* (Valeton) Hosokawa

Hedyotis korrorensis var. *mollis* (Valeton) Hosokawa, *Trans. Nat. Hist. Soc. Formosa*, 24:204, 1934.—Kanehira, *Enum. Micr. Pl.*, 418–419, 1935.—Hatusima, *Trans. Nat. Hist. Soc. Formosa*, 26:255, 1936.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:267, 1979.—Fosberg et al. *Vascular. Pl. Palau*, 41, 1980.—Fosberg, *Allertonia*, 6:230, 1991.

Odentandia korrorensis var. *mollis* Valeton, *Bot. Jahrb.*, 63:295, 1930.

Differs from var. *korrorensis* in being softly puberulent.

The type of this is from Palau, Koror, *Raymundus 208*, which we have not seen; probably lost in the bombing of Berlin.

This cannot be very common, as we have not found anything corresponding to it in the rather abundant material of this species that we have examined excepting the Hosokawa specimen cited below.

GEOGRAPHIC RECORDS AND SPECIMEN EXAMINED

CAROLINE ISLANDS.—Palau: Koror: Valeton, 1930. Babeldaob: Arumonogui-sogen, near Arumaten, *Hosokawa 6785* (BISH).

Hedyotis korrorensis var. *subglomerata* Fosberg

Hedyotis korrorensis var. *subglomerata* Fosberg, *Allertonia*, 6:231, 1991.

Differs from var. *korrorensis* in having the cymules on the panicle-branches condensed into globose subglomerate umbels.

This plant, though not geographically separated, stands out as so distinct in appearance that it is described as a variety. The collector says it is common, but he may have been referring to the common var. *korrorensis*.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

CAROLINE ISLANDS.—Palau: Babeldaob: Airai, 500 ft, [150 m] *Hosaka 3419* (US, holotype, BISH, POM, L, isotypes).

Hedyotis laciniata Kanehira

Hedyotis laciniata [as *lacinata*] Kanehira, *Trans. Nat. Hist. Soc. Formosa*, 25:6, f.7, 1935; *Enum. Micr. Pl.*, 419, 1935.—Hatusima, *Trans. Nat. Hist. Soc. Formosa*, 26:225, 1936.—Fosberg, *Occ. Pap. Bish. Mus.*, 15:215, 1940; *Allertonia*, 6:231, 1991.—Walker and Rodin, *Contr. U.S. Nat. Herb.*, 30:466, 1949.—Stone, *Micronesica*, 6:548–49, 1971.—Fosberg, Falanruw, and

Sachet, Smith. *Cont. Bot.*, 22:40, 1975.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:268, 1979.

Hedyotis alamanensis Hosokawa, *Journ. Soc. Trop. Agr.*, 6:669, 1934 [nomen nudum]; *Trans. Nat. Hist. Soc. Formosa*, 25:37, 1935.

Hedyotis sariganensis Hosokawa, *Journ. Soc. Trop. Agr.*, 6:669, 1934 [nomen nudum]; *Trans. Nat. Hist. Soc. Formosa*, 25:36, 1935.—Kanehira, *Enum. Micr. Pl.*, 419, 1935.—Hatusima, *Trans. Nat. Hist. Soc. Formosa*, 26:226, 1936.—Fosberg, Falanruw, and Sachet, Smith. *Contr. Bot.*, 22:40–41, 1975.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:268, 1979.

Hedyotis scabrifolia sensu Fosberg, Falanruw, and Sachet, Smith. *Contr. Bot.*, 22:41, 1975 [non Kanehira, *Trans. Nat. Hist. Soc. Formosa*, 25:7, f. 8, 1935].

Dwarf shrub or suffrutescent herb, to 40 cm tall, often somewhat decumbent at base and rooting at nodes, glabrous except slightly pilosulous at nodes, on stipules and smaller branchlets of cymes and hypanthium, stems slightly squarish, angles cord-like; leaves ovate, up to 6.5 × 3 cm, acute or very slightly acuminate, contracted to a narrow base or very short petiole, firm chartaceous, lateral nerves 3 or 4 on a side, impressed above, prominent below; stipules triangular, margins with 1 or 2 low flanges, and pectinate with 5 to 9 unequal setiform glandular processes; plant corymbosely branched above with each branch ending in a trichotomously branched few-flowered cyme, each branch of cyme once or twice more ramified, the central branchlet reduced to a pedicellate flower or fruit, the lateral to a triad or once more branched; hypanthium glabrous to pilosulous, obovoid to turbinate, calyx lobes 2.5–3 mm long, ovate-lanceolate to narrowly oblong-lanceolate erect, coriaceous, persistent on fruit; corolla pilosulous externally in bud, at anthesis 4–5 mm long, lobes ovate sparsely hairy without, densely woolly within; anthers exerted from sinuses; style with bifid stigma exerted just beyond corolla lobes; capsule globose or subglobose, about 3 mm long, crowned by the persistent erect calyx-lobes; seeds black, peltate, pentagonal, reticulate.

This species seems to be confined to the northern Marianas volcanoes.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Pagan: Mt. Pagan, crater floor, *P.H. Moore* 383 (US).

Alamagan: s. l., *Hosokawa* 7924 (A, US, isotypes of *H. alamanensis*).

Sarigan: s. l., *Hosokawa* 7888 (US, isotype of *H. sariganensis*).

Hedyotis lancifolia Schumacher

Hedyotis lancifolia Schumacher in Schumacher and Thonning, *Beskr. Guin. Pl.*, 73, 1827.—Fosberg et al., *Vascular Pl. Palau*, 41, 1980.—Fosberg, Allertonia, 6:232, 1991.

Oldenlandia herbacea sensu Volkens, *Bot. Jahrb.*, 31:475, 1901.—Valeton, *Bot. Jahrb.*, 63:297, 1930.—Kanehira, *Enum. Micr. Pl.*, 422, 1935.—Hatusima, *Trans. Nat. Hist. Soc. Formosa*, 26:220, 1936 [non (L.) Roxburgh, *Fl. Ind.*, 1:445, 1820].

Hedyotis herbacea sensu Fosberg, Sachet, and Oliver, *Micronesica*, 15:267, 1979 [non L., *Sp., Pl.*, 102, 1753].

A slender, prostrate or reclining to somewhat ascending glabrous herb, stems squarish or, when dry, somewhat sulcate, internodes 1–3 (–5) cm; leaves linear to linear lanceolate, sessile, 1.5–3 cm long, apices acutish, scaberulous; stipules membranous, triangular to rounded, with 3 to 5 short setiform teeth; pedicels axillary, one, occasionally two, or even 3 per node, in flower 5–6 mm long, elongating to 10 or 12 (–15) mm in fruit, capillary, often arcuate; flowers small, calyx lobes triangular, about 1 mm long, acute, corolla to 2–3 mm, tubular or funnelform, lobed about half-way, lobes ovate; anthers exerted in the sinuses, 0.6–0.8 mm long, sagittate; pistil about equalling corolla lobes, bifid, stigmas puberulent; capsule globose, about 3 mm diameter, very thin-walled, dehiscing loculicidally, then breaking irregularly or somewhat circumscissile, seeds minute, angular, yellowish brown, irregularly wedge-shaped, cellular-reticulate.

Native of Africa, widely introduced in warm countries. Known in Micronesia from Palau, Yap, and Truk; weedy, in disturbed places, infrequent.

VERNACULAR NAME.—redil kelemalk (Palau: Fosberg et al., 1980).

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Babeldaob: Ngerelong Munic., taro patch 0.8 mi [1.3 km] NE of Ngerelong, 5 m, *Canfield* 399 (US). Koror: Weed in taro patches, *Otobed* PW-10133 (US).

Yap: Volkens, 1901:475; *Hallier s. n.*, 30.X.03 (HBG).

Truk: Moen: *Stemmermann* 3110 (BISH).

Hedyotis megalantha Merrill

Hedyotis megalantha Merrill, *Philip. Journ. Sci. Bot.*, 9:143–144, 1914.—Kanehira, *Enum. Micr. Pl.*, 419, 1935.—Hatusima, *Trans. Nat. Hist. Soc. Formosa*, 26:225, 1936.—Stone, *Micronesica*, 6:549, 1971.—Falanruw and Payne, *Life on Guam*, 44, 1976.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:268, 1979.—Fosberg, Allertonia, 6:233, 1991.

Oldenlandia megalantha (Merrill) Valeton, *Bot. Jahrb.*, 63:298, 1930.

Suffrutescent herb or shrub, to 1 m tall, with stiff sharply square stems, corymbosely or paniculately branched above, glabrous; leaves ovate to oblong-ovate, to somewhat elliptic, acute to acuminate, 4–8 (–11) × 2–3.5 (–4.5) cm, rounded to subcordate at base, appearing sessile, petioles mostly less than 5 mm, rarely to 1 cm; stipules triangular, strongly and stiffly pectinate, tending to be reflexed; inflorescences stiff divaricate thyrsoid panicles, rhachis 2–5 internodes long, branches forking at wide angles 1–3 times, each forking with a pair of reduced leaves or foliaceous cordate bracts, in each fork a pedicellate flower, ultimate forkings tending to be slightly woolly-hirtellous, flowers tending to be crowded distally on branches of cymes, these thyrses terminal and/or on a series of spreading branches arranged corymbosely near summit of main stem; flowers with hypanthium turbinate, slightly hirtellous or glabrous, with 4 strong and often 4 weak costae; calyx lobes

prominent, up to 7 × 2 mm, ovate, acute, foliaceous, persistent, erect; corolla tubular, 12–24 mm long, to 10 mm wide, lobes ovate, to 6 mm long, spreading or tips reflexed, the whole white or with bluish veins and tips of lobes; stamens attached at sinuses, anthers exerted to over half the length of corolla lobes, linear, 1.5–2 mm long, attached at about middle, becoming twisted when dry; style to 2.5 cm long, stigmas bifid, lobes 1 mm or less long, divergent or recurved; capsule globose, about 3 mm diam, walls hard, septicidal, then valves splitting about 1/3, the valves weathering out; seeds irregularly peltate, angular, sooty-brown, scar on a wedge-like projection beneath, surfaces reticulate, 0.6–1.0 mm across.

A striking species, its close relationships are not obvious, probably belonging to section *Diplophragma*, its flowers among the largest in the genus.

Apparently endemic to Guam, areas of weathered volcanic soil, savanna vegetation.

VERNACULAR NAME.—paode'do (Falanruw and Payne, 1976).

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: *Hombroen* in 1841 (P); near top of Mt. Tenjo, *Rodin 751* (US); *Facpi Pt.*, 100 m, *Necker 396* (US); Manengon, Tarzan River area, *Stone 5137* (US, GUAM); Manengon-Apra Heights Road, *Stone & Fletcher 5025* (GUAM); hills back of Piti, 100 m, *McGregor 458* (US, BISH, isotypes); S of Asan Pt. and Piti, 100 m, *Anderson 67* (US, BISH, POM, L, MO); Com-Marianas fuel storage area, El Patio Road entrance, 100 m, *Fosberg 35210* (US); above Tenjo Vista, 150 m, *Fosberg 35216* (US); near top of Mt. Tenjo, *Rodin 751* (US); hills near Sagua River, W of Mt. Lamlam, 100 m, *Stone 4391-1* (GUAM, US), *4391-2* (US), *4391-3* (US); Chalandaog Mt., 1 km SE of Jumulong Manglo Mt., 320 m, *Fosberg 35373* (US, BISH, A, K); Chalandaog, 300–375 m, *Evans 1795* (US, BISH, POM, K, MO); SE of Dan Dan Basin, *Raulerson 10988* (US); s. l., *N. J. Andersson* in 1852 (US); s. l., *Anderson 348* (US, BISH, NY).

Hedyotis ponapensis (Valeton) Kanehira

Hedyotis ponapensis (Valeton) Kanehira, Fl. Micr., 463, 1933; Enum. Micr. Pl., 419, 1935; Trans. Nat. Hist. Soc. Formosa, 25:3, 1935.—Hatusima, Trans. Nat. Hist. Soc. Formosa, 26:225, 1936.—Fosberg, Occ. Pap. Bish. Mus., 15:215, 1940; Allertonia, 6:234, 1991.—Glassman, Bish. Mus. Bull., 209:93, 1952.—Fosberg, Sachet, and Oliver, Micronesica, 15:268, 1979. *Oldenlandia ponapensis* Valeton, Bot. Jahrb., 63:296, 1930.

Elongate, tangled, somewhat suffrutescent, glabrous herb, rooting at lower nodes, stems somewhat 4-angled, internodes tending to exceed leaves; leaves elliptic or ovate-elliptic, acuminate, narrowed at base to a short somewhat winged petiole, blade flat, with (1) 3 or 4 strongly ascending, not prominent, nerves on a side; stipules elongate triangular with 7 to 11 strong gland-tipped setae on margin, the middle one longest; flowers in condensed capitulate or glomerulate cymes sessile and/or on slender peduncles in axils, capitulae sub-

tended by reduced bracts forming an involucre, flowers subtended by filiform bracteoles; calyx prominent, of 4 ovate-lanceolate caudate-acuminate lobes united at base, spreading, strongly recurved, base forming a neck, or scarcely so, crowned with curved lobes; corolla funnelliform-campanulate, tube subequal with calyx, throat somewhat or not exerted, lobes ovate, recurved; anthers sessile in throat, style and stigma about equalling anthers, or longer; fruit globose, thin-walled, strongly septicidal, the two halves separating, hemispherical, almost closed by the split halves of the septum; seed peltate suborbicular, blackish, 0.7–0.8 mm wide, with a prominent ridge on the attachment side.

Apparently belonging to sect. *Diplophragma*, even though herbaceous.

Apparently endemic to the mountains of Ponape (with a variety on Truk), growing in the undergrowth in montane rainforest and on exposed mossy peaks and crests.

Hedyotis ponapensis (Valeton) Hosokawa var. *ponapensis*

This species, sensu stricto, as described above.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Ponape: Montesanto, 800 m, *Leder-mann 13783* (B, isotype); Mt. Niunioanii, *Hosokawa 5617* (US, A, BISH), *9523* (A); Mt. Nanaraut, *Hosokawa 5960* (US); s. l., *Kanehira 1611* (KYO, NY, BISH), *1640* (NY, US); Matalanim, *Nakao* in 1941 (KYO, 4 sheets); top of Mt. Ninani, 2550 ft [780 m], *Glassman 2886* (US, BISH); Mt. Nanalaut, 220 ft [670 m], *Glassman 2360* (US, BISH); *Stone 5475* (US); Mt. Poaipoi, 1500 ft [460 m], *Glassman 2481* (US, BISH); Mt. Trunaushapoi (Nanaraut-san), *Hosokawa 5980* (A, BISH); Nipit-one, *Hosokawa 5820* (A, BISH); Mt. Nanaraut-Nampil, *Hosokawa 6027* (A, BISH); Mt. Troton (Tolotom), *Hosokawa 5792* (BISH, BM, A); Mt. Beirut, 2100 ft [640 m], *Glassman 2549* (US); Nan-a-laut, *Takamatsu 1088* (BISH); Mt. Selen-tereh, NW face, *Stone 5432* (US); s. l., *Nakao* in 1941 (KYO); below reservoir, above Nampil Valley, *Stemmermann 2909* (BISH); trail from Awak to Mt. Tolonshappu, 350 m, *Stemmermann & Haun 6559* (BISH).

Hedyotis ponapensis var. *robusta* Hosokawa

Hedyotis ponapensis var. *robusta* Hosokawa, Jour. Jap. Bot., 13:616, 1937; Bull. Biogeogr. Soc. Jap., 7:210, 1937.—Fosberg, Allertonia, 6:235, 1991.

Differs from var. *ponapensis* in more robust erect habit and entire or irregularly dentate stipules, corolla more densely pubescent within.

Endemic to Truk, growing in open grassland on a mountain top. Known only from type collection from "Truk, islet Wara (Moen), on an open grassland on Mt. Witipen." *T. Hosokawa 8438*. (US, A, BISH).

Hedyotis pumila L. f.

Hedyotis pumila L. f., Suppl., 119, 1781.—Fosberg, Allertonia, 6:235, 1991.

Prostrate herb, forming small mats a few cm across, stems square, minutely puberulent, especially near nodes; leaves ovate, subsessile, 5–6 × 3.5 mm, acute, very slightly cuspidate, margins and midrib scabrous, blade very sparsely so or subglabrous, veins obscure, even the midrib, which is visible because slightly carinate beneath; stipules with 2 prominent subulate-setiform teeth, with or without several lateral much reduced ones; peduncles and pedicels axillary, 1.5–4 mm long, 1 at a node except 2 to 4 sometimes terminally, or rarely 2 in same axil, occasionally a peduncle with 2 pedicellate flowers, but more usually a single pedicellate flower; hypanthium campanulate-turbinate somewhat compressed, calyx lobes 1.5 mm long, ovate to triangular acuminate, margins scabrous midrib slightly so; corolla tube cylindrical, 1–1.2 mm long, greenish white, lobes ovate, 1 mm long, spreading, pink or pale lavender with 2 purple spots at base, throat with a few hairs; anthers scarcely exerted, white, ovate; stigmas 2, white, fleshy, oblong, slightly more exerted than anthers; capsule broadly ellipsoidal, about 2 × 1.3 mm, with 4 strong costae and 4 weak or incomplete ones, disk in fruit elevated, compressed transversally to septum, dehiscing loculicidally across disk, fruit walls firm-chartaceous; seeds brownish black, rounded on outer side, sub-angular inward, about 0.3 mm greatest diameter, surface shallowly foveolate reticulate, scar minute, not at all sunken in a pit.

This tiny prostrate herb, collected on the University of Guam campus, growing on bare or somewhat grassy soil, seems to be new to Guam as well as to Micronesia and probably to the Pacific Islands. It is said to be native to south and southeast Asia, and seems to be rather weedy in its occurrence. It must have arrived in Guam rather recently. The Guam plants differ from the descriptions of the Asiatic ones in having pink or lavender rather than white flowers.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

MARIANAS ISLANDS.—Guam: Mangilao, University of Guam campus, pioneer on bare scraped limestone soil in full sun, 19 Jun 1984, Fosberg 59624 (US, BISH, GUAM, POM, L).

Hedyotis sachetiana Fosberg

Hedyotis sachetiana Fosberg, Allertonia, 6:235, 1991.

Shrub with thickish subglabrous, somewhat fistulous main stems, much more slender branches, branching at above 45° angles, at least near summit, smallest branches tending to be slightly hirtellous; leaves broadly elliptic, blades to 8.5 × 4.5 cm, abruptly sharply short acuminate, base acutely contracted slightly decurrent, both surfaces appressed-hirsute especially

the lower, rather densely so when young, more sparsely when older, main veins 4–6 on a side, network rather coarse, petiole rather slender, hirsute, to 2 cm long; stipules about 5–8 mm long, almost truncate except for pectinate margin with setiform processes unequal, about 11 on a side, 1–3 mm long, entire stipule and setiform processes strongly hirsute, becoming less so in age, stipules connate into a funnellform cup, adnate to petiole bases; inflorescences appearing verticillate but clearly condensed branched cymes forming glomerules about 1 cm wide, these axillary, from almost sessile to strongly pedunculate, peduncles to 2 cm long, or proliferating to a second peduncle, the whole prominently hirsute, flowers almost sessile to very shortly pedicellate; hypanthium hirsute, calyx-lobes broadly linear, to 2.5 mm long, 0.5 mm wide, prominently hirsute, tending to become recurved, persisting on fruit until after dehiscence; capsule obovoid-subglobose, about 2.5 mm long, hirsute, dehiscing completely septically, then about half-way loculicidally; seeds conspicuously peltate, circular, cellular-margined, reticulate, dark brown, base widely cuneate-compressed, prominent.

This species is known only from the fairly complete type specimen (which, unfortunately, lacks corollas). It seems clearly related to *H. tomentosa*, with which it grows, but differs in being much less densely, but more coarsely hirsute, not at all white sericeous, in its broader, thinner, much less venulose, much longer-petiolate leaves, in its strongly united almost truncate (in general outline), rather than triangular scarcely united, stipules, these not white sericeous, in its looser glomerules, and in being a much larger plant, more leafy distally. It could have been described as a variety of *H. tomentosa*, but does not look like that species, which is quite coherent and not particularly variable.

It is named for Dr. Marie-Hélène Sachet, our late colleague in Pacific island botany.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

CAROLINE ISLANDS.—Palau: Babeldaob: Arumonoguisogen, Arumaten IX. 15, 1933, Hosokawa 6785 (US, holotype).

Hedyotis scabridifolia Kanehira

Hedyotis scabridifolia Kanehira, Trans. Nat. Hist. Soc. Formosa, 25:7, f. 8, 1935; Enum. Micr. Pl., 419, 1935.—Hatusima, Trans. Nat. Hist. Soc. Formosa, 26:224, 1936.—Fosberg, Falanruw, and Sachet, Smith. Contr. Bot., 22:41, 1975.—Fosberg, Sachet, and Oliver, Micronesica, 15:268, 1979.—Fosberg, Allertonia, 6:236, 1991.

Hedyotis saipanensis Hosokawa, Journ. Soc. Trop. Agr., 6:669, 1934 [nomen nudum]; Trans. Nat. Hist. Soc. Formosa, 25:38, 1935.

Shrub or suffutescent herb, stems sharply quadrangular, sulcate when dry, branched near base, fertile branches or inflorescences near summit; leaves ovate to ovate-elliptic, 4–7 × 1.3–2 cm, veins 3 or 4 on a side, somewhat impressed above, prominent below, apex acute to acuminate, base subsessile to

shortly petiolate; stipules triangular, with a heavy intermarginal flange, margin strongly pectinate with many stiff setiform gland-tipped processes; upper branches, rarely the terminal shoot, prolonged into racemiform panicles, the bracteate branches of these panicles divergent ascending, ending in a small glomerule, or branching, branches ending in such small glomerules, main ramifications with cordate foliaceous bracts; hypanthium puberulent, calyx lobes erect, triangular, becoming involute, persistent; corolla white or pale lavender, about 6 mm long, tubular funnellform, lobes ovate, 3 mm, inside margins woolly; anthers 1.5 mm long, well-exserted from sinuses; style elongate, exserted about 5 mm, stigma lobes divergent recurved; capsule depressed globose, 1.5 mm × 2 mm, crowned by persistent calyx, septicidal; seed dark-brown or black, peltate, somewhat pentagonal or rectangular, reticulate.

Close to *H. laciniata* but with inflorescence pattern more like that of *H. fruticulosa*. Notable for its long-exserted style. Has been confused in herbaria with both of these species. Two varieties may be distinguished.

Key to Micronesian Varieties of *Hedyotis scabridifolia*

Whole plant puberulent or hispidulous . . . var. *scabridifolia*
Vegetative parts glabrous var. *stonei*

Hedyotis scabridifolia Kanehira var. *scabridifolia*

Whole plant puberulent or hispidulous, ultimate inflorescence branchlets and hypanthia pilosulous.

Known only from Saipan.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Saipan: *Kanehira 45* (FUK, type, not seen); *Marche 19* (P, US), *20* (P, US); Raishingan, *Hosokawa 8025* (BISH, A, isotypes of *H. saipanensis*).

Hedyotis scabridifolia var. *stonei* Fosberg

Hedyotis scabridifolia var. *stonei* Fosberg, *Allertonia*, 6:237, 1991.

As in var. *scabridifolia* but stems and leaves glabrous.

The material from Rota and Guam is glabrous except the ultimate inflorescence branches and flowers. Found in savannas and disturbed places.

It is named for Prof. B.C. Stone, one of the collectors.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Rota: s. l., *Necker R518* (US); trail up to Sabana, near highest point of island, 500 m, *Evans 2107* (US).

Guam: Approach to Mt. Lamlam, 100 m, *Gregory and Necker 394* (US); near Sagua River, due W of Mt. Lamlam, *Stone 4192* (US); just W of NASA Station, Dan Dan, 80 m,

Fosberg 59747 (US, BISH, POM, L); ridge SE of Umatac, 60–70 m, *Anderson 283* (US, BISH, MO); S to SE of Umatac, 80–100 m, *Fosberg 35439* (US holotype, BISH, POM, K, A, isotypes).

Hedyotis strigulosa (Bartling ex de Candolle) Fosberg

Hedyotis strigulosa (Bartling ex de Candolle) Fosberg, *Smith. Contr. Bot.*, 45:28, 1980; *Allertonia*, 6:237, 1991.—Fosberg et al, *Vascular Pl. Palau*, 41, 1980.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:268, 1979.—Fosberg et al., *Micronesica*, 16:213, 1980.

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

Oldenlandia albido-punctata Merrill, *Philip. Journ. Sci. Bot.*, 9:297, 1930.—Valeton, *Bot. Jahrb.*, 63:297, 1930.—Kanehira, *Enum. Micr. Pl.*, 422, 1935.—Hatusima, *Trans. Nat. Hist. Soc. Formosa*, 26:219, 1936.

Hedyotis albido-punctata (Merrill) Fosberg, *Lloydia*, 3:123, 1940.—*St. John. Pac. Sci.*, 2:273, 1948.—Walker and Rodin, *Contr. U.S. Nat. Herb.*, 30:465, 1949.—Stone, *Micronesica*, 6:546, 1971.—Fosberg, Falanruw, and Sachet, *Smith. Contr. Bot.*, 22:40, 1975.

Branched glabrous herb, stems to 3 dm long, prostrate to decumbent or ascending, in all parts tending to be subfleshy and marked by tiny white linear raphid bundles (probably giving rise to the epithet “strigulosa” and perhaps also to the epithet “albido-punctata”), leaves spatulate to oblong, obovate or elliptic, 1–3 (–4) cm long, apex obtuse but slightly mucronate, sub-fleshy or sub-coriaceous, base gradually narrowed to a broad attachment or a short slightly winged petiole, veins except midrib obscure; stipules linear with an abruptly broadened base that is adnate to the petiole-base, frequently one (or even 2) pairs of subordinate lateral linear teeth; flowers borne in open few-flowered (3 to 10), somewhat irregular cymes, terminally and in upper axils, the plant in extreme cases appearing paniculate, lowest bracts reduced leaves, upper ones thick scale-like ovate to linear or subulate, carinate, distal “pedicels” sometimes bracteolate, pedicels usually thick, scarcely filiform; hypanthium fleshy, calyx-lobes narrowly to broadly ovate, obtuse to acute or cuspidate, erect, persistent, 1–1.5 mm long, united at base, scarcely enlarging in fruit; corolla tube shorter than calyx, swollen, throat contracted, lobes ovate to oblong ovate, somewhat exceeding calyx, bearded at base in throat; capsules broadly obovoid, about 3 × 3.5 mm, loculididal, slightly compressed; seeds minute, about 0.3 mm high and wide, somewhat obpyramidal, top convex, angles not sharp, surface dull blackish brown, papillate.

This species is related to *H. biflora*, being sometimes hard to distinguish from it when dry, but when fresh notable for its firm fleshy leaves and stiffish stems and cymes, and larger fruits.

Found on limestone shores and sea-cliffs throughout the western Pacific.

VERNACULAR NAME.—ngesil (Palau: Angaur; *St. John 21503*).

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—*Haenke* (G, type). Sarigan: NW

coast, sea level to 75 ft [22 m], *Falanruw 1779* (US); 1797; 300 ft [90 m], *1763* (US); coastal bluffs about anchorage, on NW coast sea level to 75 ft [22 m], *Falanruw 1794* (US).

Anatahan: s. l., *Kanehira 2152* (US); NW tip of island, 0–10 m, *Evans 2450* (US, BISH, POM, NY).

Saipan: *Stephens 39, 52* (POM); Agingan Pt., S end of island, *Townes* in 1946 (US, BISH); Marpi Pt., 30 m, *Fosberg 31332* (US, BISH, POM); S side of Kagman Peninsula, W of Kagman Pt., 30 m, *Fosberg 31302* (US, BISH, POM, NY); sea cliffs on Tsukiki Bay, E of Mt. Petosukara, E side of northern end of island, 75 m, *Fosberg 25211* (US, BISH); Laulau Katan Pt., 30–50 m, *Fosberg 31924* (US); Bird (Sukimi) Island Beach, 0–10 m, *Evans 2322* (US).

Tinian: *Hosokawa 7727* (BISH), *7767* (A, BISH), *7741*, (A, BISH); Taga Beach, *Fosberg 59886* (US, BISH, POM); Tinian (former town), SW coast of island, 3–30 m, *Fosberg 24771* (US, BISH, POM, NY, L); north end, 10 ft [3 m], *Hosaka 2846* (US, BISH, POM); “Palm Beach,” about 1 mi [1.6 km] S of Faibus Pt., *Fosberg 24863* (US); terrace on SE coast of island NE of Carolina Pt., 60–80 m, *Fosberg 24844* (US, BISH, POM, NY); E of North Air Field, *Fosberg 24919* (US, BISH); Lake Hagoya, N end of island, 1–10 m, *Fosberg 24788* (US, BISH, POM); “Yellow Beach,” E of Mt. Lasso, E coast of island 1–10 m, *Fosberg 24908* (US, BISH); Liyang area, *Herbst & Falanruw 6814* (US); N of Unai Chigget, *Fosberg 64531* (US, BISH).

Agiguan: *Kondo* in 1952 (BISH).

Rota: 1 mi [1.6 km] NE of Sonson, NW coast of W end of island, *Fosberg 25134* (US, BISH, POM); *Necker R34* (US); Peace Memorial Park, *Raulerson 17063* (US); SW side of island, 0–5 m, *Evans 1910* (US, BISH, POM, NY); beach at Swimming Hole, N tip of island, 1 m, *Sachet 1787* (US); NW coast of W end of main part of island, between Rota and Tataacho Pt., 1–70 m, *Fosberg 25134* (US, BISH); N coast near Teteto Beach, 2 m, *Fosberg with Moore 58223* (US, BISH, POM); Coconut Village resort, 5 m, *Raulerson 19002* (US).

Guam: s. l., *Marche 90* (P, POM); *Le Guillou 34* (P); *Fosberg 43504* (US, BISH, POM); s. l., *McGregor 375* (BISH, BM, isotypes) *Gaudichaud s.n.* (P); beach E of Barrigada village, *Steere 143* (US), *130a* (US); N of Agena Bay, *Rodin 709* (US); sandspit at Apra Harbor, *Stone 3848* (GUAM); Cocos Island, *Stone 4241* (GUAM); E coast, Talofofu Bay, Ypan Pt., *P.H. Moore 343* (US); Agfayan Pt., *Necker 375* (US); Pati Pt., 160 m, *Necker 362* (US); Anao Pt., *Moran 4547* (UC, POM, US); Guae, *Moran 4618* (UC, POM, US); SW coast, *Moran 4623* (UC, POM, US); Agat, *Nelson 205* (BISH); Pati Pt., 160 m, *Necker 362* (BISH); between Pugua and Haputu Pts., *Fosberg & Aguon 59777* (US, BISH, POM, NY, L); Tarague Beach, *Fosberg 59818* (US); between Agfayan Bay and Inarajan, *Fosberg 59821* (US, BISH, POM, NY, L); Oca Pt., *Glassman 55* (US); Tumon Bay, S end of beach, 0–5 m, *Evans 218* (US, BISH, POM, NY, L); Tumon bay, Ypao Beach, 1 m, *Sachet 1723* (US, BISH, POM); Inarajan SE coast,

Fosberg 25368 (US, BISH, POM, NY); Tarague Beach, W end, near caves, 3–4 m, *Anderson 232* (US, BISH, POM, NY, L); Umatac, 1 m, *Fosberg 35415* (US); just N of Campanaya Pt., 10 m, *Fosberg 35466* (US, BISH, POM); Ritidian Pt., *Anderson 202* (US); Campanaya Pt., 0–5 m, *Evans 258* (US); Ylig Bay, 1 m, *Fosberg 43445* (US).

CAROLINE ISLANDS.—Palau: *Kanehira 2016* (US, P). Babeldaob: Gatulel-to, Ailai-son, *Hosokawa 7313* (A, BISH, US). Aulupse’el: Ngerenchol, Lee Marvin Beach, 1 m, *Canfield 451* (US); Oropusyakaru-to, *Hosokawa 7442* (BISH). Urukthapel: Middle of NE coast of Magaiald, 1 m, *Fosberg 25865* (US, BISH, POM, NY, L); S side of SW peninsula, 1–2 m, *Fosberg 32227* (US, BISH, POM, NY, L); Todai-san, *Hosokawa 7528* (BISH, US); Risong, Matuker Bay, 2 m, *Fosberg 47568* (US). Ngeanges: 2–25 m, *Fosberg 25835* (US, BISH, POM, NY, L). Peleliu: N end of strip of land on E side of island called “Purple Beach,” 0–2 m, *Fosberg 26003* (US, BISH, POM). Aulong (rock island): *Salsedo 10* (US). Mecherchar: *Otobed P-10122* (US). Angaur: *St. John 21503* (BISH, US); WNW coast rd., 7 m, *Canfield 174* (US). NW coast, 30 m, *Fosberg 25921* (US, BISH, NY, POM, L).

Ulithi: Falalop, *Lessa s.n.* (BISH); Falalap Islet, 1–3 m, *Fosberg 46633* (US, BISH, POM); Asor Islet, 1–2 m, *Fosberg 46458* (US, BISH).

Fais: Fatadol, S end of island, 10 m, *Fosberg 46731* (US, BISH); Yldow, W coast near S end of island, 1 m, *Fosberg 46728* (US, BISH, POM, NY, L).

Hedyotis suborthogona Hosokawa

Hedyotis suborthogona Hosokawa, Trans. Nat. Hist. Soc. Formosa, 28:66, 1938.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:268, 1979.—Fosberg et al., *Vascular Pl. Palau*, 1980.—Fosberg, *Allertonia*, 6:239, 1991.

“Herbaceous,” to 1 m tall, stem slender, sharply 4-angled and sulcate when dry, glabrous; leaves narrowly elliptic to ovate-elliptic, to 10 × 3 cm, apex bluntly acuminate, base cuneate-attenuate, main veins 5 to 7 on a side, somewhat impressed above, prominent beneath, glabrous, petiole slender, to 1 cm long; stipules triangular, with 2 dorsal flanges, margins adnate to petioles at base, pectinate with linear gland-tipped hirtellous processes; inflorescences terminal and in upper axils, 3 at terminal node, 15–18 cm long, racemiform-thyrsoid, hirtellous, especially distally, branching divaricate to slightly ascending, rachis of 3–7 internodes, branches subtended by elliptic foliaceous, petiolate to subpetiolate bracts connected by diminutive stipules, becoming smaller at distal nodes, flowers and fruits sessile in small tight heads, these sessile or pedunculate, flowers 1 to 10 in a head; calyx lobes linear, persistent, becoming conspicuously recurved, strongly hirtellous, about 2 mm long; corolla funnelliform, 4–5 mm long, pilose or villous within, lobes ovate, involute, 2 mm long; stamens included, filaments very short, anthers linear, about 1 mm long; style exerted, about 4 mm long; “clavate”; capsule

subglobose to globose, to 2 mm long and wide, hirsutulous, dehiscing completely septically, then slightly loculicidally; seeds peltate, 0.6–0.8 mm across, rounded to quadrangular or hexagonal, dull brownish black, attachment on a sharp wedge-like ridge or projection, testa obscurely reticulate.

Related to *H. fruticulosa*, differing in leaf shape, more slender and divaricately branched inflorescence, which is much more strongly hirsutulous, calyx lobes linear, flowers and fruits much more tightly capitulate. Perhaps even more closely related to *H. scabridifolia*, as suggested by Hosokawa, differing in narrower bracts, shorter petioles, narrower leaves, more strongly hirsutulous inflorescence, tighter capitulae, linear strongly recurved calyx lobes, included stamens, and less reticulate seeds. These three, perhaps with *H. laciniata*, form a closely related group, and are more remotely related to the *H. divaricata* group.

Known only from Palau, and only definitely from the type collection and one other. Possibly some of the plants from Palau earlier referred to *H. fruticulosa* belong here.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Babeldaob: Ngarsul, 22 Aug 1937, *Hosokawa 9024* (A, isotype, holotype not seen); near Airai Airfield along "Nakken Road," *Cheatham 87* (US, POM, BISH).

Hedyotis tomentosa (Valeton) Hosokawa

Hedyotis tomentosa (Valeton) Hosokawa, Trans. Nat. Hist. Soc. Formosa, 24:204, 1934.—Kanehira, Enum. Micr. Pl., 419, 1935; Trans. Nat. Hist. Soc. Formosa, 25:3, 1935.—Hatusima, Trans. Nat. Hist. Soc. Formosa, 26:224, 1936.—Fosberg, Occ. Pap. Bish. Mus., 15:215, 1940; Allertonia, 6:240, 1991.—Fosberg, Sachet, and Oliver, Micronesica, 15:268, 1979.—Fosberg et al., Vascular Pl. Palau, 41, 1980.

Oldenlandia tomentosa Valeton, Bot. Jahrb., 63:292, 1930.

Shrub or dwarf-shrub to 0.8 m tall, more or less yellowish velvety-pilose in all parts, stems nodose, shortly soft pubescent to tomentose, somewhat 4-angled, sparsely branched, many small fertile branches above, tending to give a paniculate appearance; leaves ovate to elliptic, to 8 cm long, apex acute or tending to be acuminate, base acute, strongly nerved, especially beneath, 4 to 6 nerves on a side, petiole short; stipules white-sericeous, triangular, with 5 to 11 densely appressed pilose setae; flowers in dense globose heads, about 1 cm in diameter, these sessile at nodes of main stems and of slender axillary branchlets near top of plant, and on stiff strong spreading to ascending peduncles from some upper axils, sessile heads tending to be subtended by leaves, these full-sized or variously reduced, heads blackish purple; calyx deeply lobed, lobes triangular lanceolate, mucronate, inner faces less pilose than outer; corolla purple, funnellform, about 4–5 mm long, tube included in calyx, throat exerted, lobes ovate, acute tips very slightly cucullate, exterior of corolla only slightly

pilose, interior of lobes densely so, lobes recurved; anthers broadly linear, almost completely exerted; capsules broadly obovoid, septicidal into two coccus-like valves, these splitting somewhat loculidally at apex; seeds brown to black, polygonally peltate, base obpyramidal, outer surface notably reticulate, greatest diameter as much as 1 mm.

Endemic to Caroline Islands: Palau: Babeldaob, Koror, and Ngarakabesang islands, growing in savannas on deeply weathered volcanic areas.

VERNACULAR NAMES.—

lebleb (Palau: Fosberg et al., 1980)

leblebul (Palau: Fosberg et al., 1980)

leblebuul (Palau: Otobed, ms, 1967)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: s. l., *Ledermann 14171* (B, isotype); s. l. *Richardson 80* (US). Babeldaob: Aru-monoguisogen, near Arumaten, *Hosokawa 6786* (A); Ngerem-tengel, *Fosberg 32462* (US, BISH, POM, MO, BRI, NSW, CHR, T, L, K); Ngerumongui, *Fosberg 50573* (US, BISH, NY, P, GB); road to Iboang, *Rinehart (Raulerson's) 17140* (US); Ngardok Lake, Melekeok [Melekiok] Mun., 25 m, *Canfield and Bright 289* (US); hills between Melekeok [= Melekiok] and Lake Ngardok, 30–60 m, *Fosberg 32600* (US), *32598* (US, BISH, POM, MO, BM, BRI); Garudokku (Ngardok), *Takamatsu 1349* (BISH); Airai, airport, *Salsedo 167, 168* (US); *Cheatham 187* (US, BISH, UC, S); hills between Melekeok [= Melekiok] and Lake Ngardok, 30–60 m, *Fosberg 32598* (US, BISH, POM, MO, BM, BRI). Koror: s. l., *Blackburn and Bechesnak E59* (US); Savannah Ngessol, *Salsedo 94* (US). Arakabesan (Ngarakabesang): *Blackburn 216* (US); western peninsula, 10–20 m, *Fosberg 32469* (US, BISH, POM, A, L, AAU, T).

Hedyotis tuyamae Hosokawa

Hedyotis tuyamae Hosokawa, Trans. Nat. Hist. Soc. Formosa, 28:67, 1938.—Fosberg, Sachet, and Oliver, Micronesica, 15:268, 1979.—Fosberg et al., Vascular Pl. Palau, 41, 1980.—Fosberg, Allertonia, 6:240, 1991.

Shrub, to 2 m tall, erect or tangled, hirtellous, to densely so, branched especially near top, stems squarish but not angled, slightly sulcate when dry, internodes to 5 cm long; leaves elliptic to somewhat ovate, 6–10 (–11) × 2–4 cm, nerves 4 to 6 on a side, chartaceous to stiffly so, hirtellous or hispidulous, especially on nerves on lower surface, acuminate, acute to contracted at base to a petiole about 1 cm or less, rarely to 2 cm; stipules triangular to low triangular, margined, pectinate with 7 unequal strongly hirtellous setiform processes, center one longest; inflorescences axillary slender open thysoid cymes, shorter to much longer than leaves, main axis 2 to 4 internodes, pairs of reduced leaves or bracts at nodes of well-developed thyrses, bracts of small thyrses and ramifications of larger ones

much reduced to obsolete, main branches divaricate from nodes of thyrses axis, next 2 or 3 ramifications with 2 somewhat ascending branches and a sessile or subsessile flower in the middle, subsequent branches either ending in a triad or glomerule of sessile or subsessile flowers, or elongating in a zig-zag fashion with 1 or rarely 2 flowers or fruits at a node, ending in a small glomerule, the whole strongly hirtellous, internodes square in section; flowers with hypanthium turbinate, hirtellous, calyx lobes ovate, hirtellous, erect to reflexed, persistent; corolla externally sparsely hirtellous, funnelliform, 3–4 mm long, lobes ovate, about $\frac{1}{3}$ the corolla length, woolly within, becoming spreading to recurved; anthers well included, at about the middle of the corolla tube, protruding very slightly when corolla lobes are fully reflexed; style at anthesis just exceeding corolla lobes, but elongating so that the irregularly capitate stigma becomes well-exserted; capsule globose, 1.5–2 mm diameter, hirtellous, splitting septically, valves finally separating, dividing slightly loculidally; seeds dull brown, peltate, about 0.6–0.8 mm across, reticulate, attachment on a wedge-shaped projection.

Apparently endemic in the volcanic soil areas of Palau, where it is quite common. It was even found on a tiny volcanic exposure in a sink-hole bay on the south coast of Aulupse'el Island surrounded by high limestone slopes.

VERNACULAR NAMES.—

lebleb (Palau: Fosberg et al., 1980)

leblebul (Palau: Fosberg et al., 1980)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Babeldaob: W coast, Itau, first estuary S of Me'ebe'ubul, 1 m, *Fosberg 32404* (US, BISH, POM, L). Ngarakabesang [= Arakabesan]: W side near old Japanese seaplane base, 1–20 m, *Fosberg 25619* (US, BISH, POM, MO, K), 25670 (US, BISH, A, BM, CHR, T, NSW); S side of W peninsula, 10–30 m, *Fosberg 32119* (US, BISH, POM, MO, NY, CHR, BRI, G, P, L). Aulupse'el: Landlocked bay at SE corner of island, 0–4 m, *Fosberg 32357* (US, BISH, L, MO).

Hedyotis uncinelloides (Valeton) Hosokawa

Hedyotis uncinelloides (Valeton) Hosokawa, Trans. Nat. Hist. Soc. Formosa, 24:204, 1934.—Kanehira, Enum. Micr. Pl., 419, 1935 [as *Hedyotis uniselloides*]; Trans. Nat. Hist. Soc. Formosa, 25:3–4, 1935.—Hatusima, Trans. Nat. Hist. Soc. Formosa, 26:224–225, 1936.—Glassman, Bish. Mus. Bull., 209:93, 1952.—Fosberg, Sachet, and Oliver, Micronesica, 15:269, 1979.—Fosberg, Allertonia, 6:241–242, 1991.

Oldenlandia uncinelloides Valeton, Bot. Jahrb., 63:295–296, 1930.

Oldenlandia uncelloides (Valeton) Kanehira, 1935:419 [sphalm.].

Hedyotis uncelloides (Valeton) Hosokawa ex Kanehira, 1935:419 [sphalm.].

Low herb or suffrutescent, to 25 cm tall, stems glabrous, 4-angled, internodes short, at most 2.5 cm long; leaves narrowly ovate or elliptic, up to 4.5 × 1.2 cm long, apices acute,

slightly cuspidate, base attenuate to very short petiole or subsessile, margins revolute, veins 4 on a side, very weak below; stipules triangular, obscurely toothed or with 3 to 5 linear teeth, to sharply pectinate, glabrous; inflorescences axillary and terminal, densely verticillate or capitate, terminal heads to 1.7 mm across, glabrous, flowers very crowded; calyx lobes ovate to lanceolate, acute, 1.5–2 mm, becoming recurved, from a united tubular base slightly exceeding capsule in fruit; corolla, white, glabrous, funnelliform, 3–4 mm long, tube included in calyx, throat exserted, lobes ovate erect to recurved, twice length of tube; anthers included, sessile in throat, style short, glabrous; fruit very firm, globose, about 2 mm long, septical, separating into 2 cocci, septum splitting, enclosing seeds, opening tardily by a ventral slits; seeds peltate, about 0.6 mm diam., rounded to obscurely pentagonal, testa brown, reticulate, attachment on a prominent wedge-shaped projection, seeds several in a cell, rather than 2 as stated by Valeton.

Found on wet mountain ridges at moderate elevations, uncommon.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Ponape: s. l., *Ledermann 13538b* (B); hill between Nanpil and Palikir, NW ridge of Mt. Tamataman-sakir, 100–150 m, 9 Aug 1946, *Fosberg 26268* (US). (Type *Ledermann 13537* not seen, probably lost in Berlin bombing.)

Hedyotis verticillata (L.) Lamarck

Hedyotis verticillata (L.) Lamarck, Tab. Encycl., 1:271, 1791 [1792].—Merrill,

Int. Rumph. Herb. Amb., 479, 1917.—Fosberg, Allertonia, 6:242, 1991.

Oldenlandia verticillata L., Mant., 1:40, 1767.

Hedyotis hispida Retzius, Obs., 4:23, 1786.

Herbaceous, diffuse, depressed to ascending, stems 4-angled or at least with 4 costae, usually hispid-pilose; leaves ovate to elliptic (or linear-lanceolate), acute or slightly acuminate, sessile or subsessile, veins so obscure as to be not easily noticed; stipules low, divided into 5, 7, or more stiff slender setae; flowers in small, condensed verticels in usually middle to lower axils; calyx lobes ovate-lanceolate, about 2 mm long, hispid-ciliate, apex somewhat produced and very sharp, persistent on fruit, erect; corolla funnelliform campanulate, about 3 mm long, bearded within, anthers included; fruit globose or sub-globose, tardily dehiscent, loculicidal; seeds minute, angulate, wedge-shaped.

This species is widespread in south and east Asia and Malesia. It is variable and can be separated into several varieties.

Key to Micronesian Varieties of *Hedyotis verticillata*

Stems hirsute or hirsutulous var. *verticillata*
Stems scabrous var. *scaberrima*

Hedyotis verticillata* (L.) Lamarck var. *verticillata

The plant as described above, with stems hirsutulous or hirsute-pilose, leaves ovate or elliptic, tending to be scabrous.

Known from China to India and Assam, Thailand, the Philippines, Sumatra, Java, the Moluccas, and Palau.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

CAROLINE ISLANDS.—Palau: *Canfield 675* (US).

***Hedyotis verticillata* var. *scaberrima* Hatusima**

Hedyotis verticillata var. *scaberrima* Hatusima, Trans. Nat. Hist. Soc., Formosa, 26:224, 1936.—Fosberg, Sachet, and Oliver, Micronesica, 15:269, 1979.—Fosberg et al., Vascular Pl. Palau, 41, 1980.—Fosberg, Allertonia, 6:243, 1991.

Hedyotis verticillata sensu Kanehira, Enum. Micr. Pl., 420, 1935; Trans. Nat. Hist. Soc. Formosa, 25:4, 1935 [non (L.) Lamarck].

Plant scabrous.

Recorded only from Palau, but scabrous plants are known from Sumatra.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

CAROLINE ISLANDS.—Palau: Babeldaob: Marikyoku (Malekiok) [= Melekiok], *Kanehira 489* (BISH, isotype).

***Hedyotis vestita* R. Brown ex G. Don**

Hedyotis vestita R. Brown ex G. Don, Gen. Syst., 3:527, 1834.—Hatusima, Trans. Nat. Hist. Soc. Formosa, 26:222, 1936.—Fosberg, Allertonia, 6:243, 1991.

Oldenlandia vestita (R. Brown ex G. Don) Drake, Jour. de Bot., Morot, 9:216, 1895.

Hedyotis costata (Roxburgh) Kurz, Jour. Asiatic Soc. Bengal, 45(2):135, 1876.—Kanehira, Bot. Mag. Tokyo, 50:607, 1936.—Fosberg and Sachet, Smith. Contr. Bot., 45:27, 1980 [non R. Br. ex G. Don, 1834].

Diffusely branched villous herb with square sulcate stems, more prominently villous in the sulci; leaves thin, ovate to ovate-lanceolate, strongly acuminate, about 5–9 × 2–2.5 cm, 4 or 5 nerves on a side, prominent beneath, impressed above, blade sparsely appressed hirsute on both surfaces, spreading hirsute on nerves beneath, petiole about 5 mm, densely pilose; stipules low triangular, with 3, rarely more, long very slender pilose setae; inflorescences pedunculate, several in an axil, usually also on a dwarf axillary branchlet, peduncles rarely unbranched, usually once or twice umbellately branched, each ultimate branch ending in a small globose glomerule or head of flowers, subtended by filiform bractlets; calyx lobes linear, persisting on fruit; corolla tubular to slightly campanulate, tube about 1 mm long, lobes subequal with it, oblong-ovate, pilose externally, especially toward apex, glabrous within; stamens in sinuses, anthers oval, slightly exerted; fruit a small globose nut, rugose externally, with a hard bony indehiscent endocarp, 8 or 10 seeds irregularly angular, notably reticulate.

Related to *Hedyotis auricularia*, but differing notably in the

pedunculate inflorescences several in an axil, the peduncles branched. Several varieties are apparent, based on pubescence and leaf-shape; var. *vestita* not known from Micronesia, but one variety described (as a species) from Palau.

***Hedyotis vestita* var. *lutescens* (Kanehira) Fosberg**

Hedyotis vestita var. *lutescens* (Kanehira) Fosberg, Allertonia, 6:244, 1991.

Hedyotis costata var. *lutescens* (Kanehira) Fosberg, Smith. Contr. Bot., 45:28, 1980.—Fosberg, Sachet, and Oliver, Micronesica, 15:267, 1979.

Hedyotis lutescens Kanehira, Trans. Nat. Hist. Soc. Formosa, 25:4, 1935; Enum. Micr. Pl., 419, 1935.

Oldenlandia vestita (G. Don) Drake, Journ. Bot., 9:24, 1895.—Valeton, Bot. Jahrb., 63:297, 1930.—Kanehira, Enum. Micr. Pl., 422, 1935.

Hedyotis costata sensu Kanehira, Bot. Mag. Tokyo, 50:607, 1936 [non (Roxburgh) Kurz, Jour. As. Soc. Beng., 45(2):135, 1876].

Hedyotis vestita sensu Hatusima, Trans. Nat. Hist. Soc. Formosa, 26:222, 1936.—Fosberg, Occ. Pap. Bish. Mus., 15:215, 1940 [non R. Br. ex G. Don, Gen. Syst., 3:527, 1834].

Differs from var. *vestita* principally in the much denser pubescence, shorter, and simpler inflorescences.

Reduced outright by both Kanehira and Hatusima to *H. vestita*, but the characters given above seem to justify retaining it as a variety.

In Micronesia known from savannas on Babeldaob Island, Palau; similar specimens seen from Hainan and Indo-China.

The type is from Aimiriik, *Kanehira 1980*, not seen.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Babeldaob: Ngatkip, *Ledermann 14488* (B); *Takamatsu 1512* (BISH); Ngatsul (Ngarsul?), *Ledermann 14352* (B); savanna at edge of playing field, Modekngi School of Iboband, *Raulerson 5550* (US).

***Hydnophytum* Jack**

Hydnophytum Jack, Trans. Linn. Soc. London, 14:124, 1823.

Epiphytic glabrous subshrub with unarmed tuber at base of stem, containing galleries inhabited by ants; leaves simple, opposite, usually subcoriaceous to fleshy; stipules triangular herbaceous or coriaceous, persistent or caducous; inflorescence axillary dichotomously branched or glomerate or contracted, with or without crowded scaly bracts; flowers tetramerous; calyx truncate to 4-dentate; corolla tubular, funnelliform or salverform, 4-lobed, lobes recurved or reflexed, throat usually bearded; stamens attached in throat; ovary 2-(rarely 4)celled, style usually 2-lobed at apex; fruit a 2-(rarely 4)stoned drupe with juicy sticky flesh, seed 1 in a locule, basally attached.

A Malayo-Pacific genus, reaching Fiji and Palau. Noted for its symbiosis with ants. One species reported from Palau.

***Hydnophytum horneanum* Beccari**

Hydnophytum horneanum Beccari, Malesia, 2(3):168, t. 43, f.15–25, 1885.—Valeton, Bot. Jahrb., 63:321, 1930.—Kanehira, Enum. Micr. Pl., 420,

1935.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:269, 1979.—Fosberg et al., *Vascular Pl. Palau*, 41, 1980.—Smith and Darwin in Smith, *Fl. Vit. Nova*, 5:244, 1988.

Stems articulate-nodose, 4-sided when very young; leaves to 7 × 2 cm, oblong, rounded at both ends, very shortly petioled, chartaceous, lateral veins 4 or 5 on a side, visible on both sides, inflorescence tuberculiform, very small; flowers crowded, sessile, clavate in bud, calyx truncate, ciliolate; corolla tubular, about 7 mm long, throat glabrous, lobes ovate, slightly cucullate, anthers broadly elliptic, subsessile, fertile in brevistylous flowers, smaller in longystylous flowers, possibly sterile; disk elongate exceeding calyx, style filiform, stigma slightly 4-lobed; fruit about 7 mm long, obovoid; pyrenes obovate, plano-convex.

Distribution Fiji to Palau. Apparently very rare in Palau, found only by Kraemer in 1910. We have not seen the specimen, probably destroyed in Berlin in World War II.

Smith and Darwin (1988:244) reduced this species to *Hydrophytrum longiflorum* A. Gray, which they regard as a Fijian endemic, though mentioning with doubt the Caroline Island report. Because we have seen no Palau specimen and because the Kraemer collection on which Valeton based the report was probably destroyed, we hesitate to follow the inclusion of *H. horneanum* in *H. longiflorum*, and to report the latter from Micronesia. We are, therefore with strong reservations simply including the plant, as originally reported by Valeton. We have little doubt that a tuberous myrmecophilous Rubiaceae was found by Kraemer, and hope that, by including and discussing it, we may interest collectors in searching for it. If found again, it would be one of the most interesting of Palauan plants.

***Ixora* L.**

Ixora L., *Sp. Pl.*, 110, 1753; *Gen. Pl.*, ed. 5, 48, 1754 [= 1753]

Shrubs and small trees; leaves simple, entire, sessile or, usually, shortly petiolate; stipules usually ovate-triangular and aristate-mucronate, or ovate-lanceolate, stiff, tardily caducous or persistent; inflorescence thyrsoid, decussately branched, or trichotomous, sometimes congested or much reduced, terminal or rarely pseudo-axillary (on reduced branchlets); calyx cup-shaped often very short, 4-dentate or lobed; corolla salverform, tube slender, lobes 4 (rarely 5), contorted; stamens attached at or below sinuses, exerted and reflexed, anthers pointing downward outside the sinuses; style elongating tardily and becoming well exerted, bifid, branches flattened, stigmatic within, becoming recurved after style elongates; ovary 2-(very rarely 4) loculed, one ovule in each locule, attached to septum; fruit a drupe with 2, rarely 4, stones, endocarp indurate, thin, plano-convex, with a narrow ventral groove, seed plano-convex.

A large pan-tropical genus, often with showy flowers. A number of species widely cultivated as ornamentals; two species native, at least three cultivated in Micronesia, including one the natives. Of the five valid species previously recorded for Micronesia one, *I. amplexifolia*, can definitely be excluded from the flora as a misidentification; another *I. chinensis*, is considered doubtfully present in cultivation, as no specimens of this species from the area have been seen by us. A number of species and varieties, described from Micronesia, are here regarded as belonging to *I. casei* Hance. Valeton's record of *Ixora amplexifolia* Lauterbach & Schumann seems to be based on a very fragmentary specimen of *Eugenia stelechantha* (Diels) Kanehira. Hosokawa (1937:202) was the first to suggest this. The Kramer specimen on which this record of a New Guinea species was based was very fragmentary, only a pair of leaves and an incomplete fruit, which, from Valeton's description, could better be a *Eugenia*. It was probably destroyed in the Berlin herbarium. We have no hesitation in excluding *I amplexicaulis* from the Micronesian flora.

Key to Micronesian Taxa of *Ixora*

- 1. Inflorescence of 3 sessile flowers enclosed between 2 cordate or broadly ovate bracts *I. triantha*
- 1. Inflorescence a thyse or cyme 2
 - 2. Leaves mostly cordate at base 3
 - 3. Leaves shortly acuminate *I. coccinea* var. *intermedia*
 - 3. Leaves obtuse or rounded, or somewhat mucronate at apex 4
 - 4. Corolla lobes acute *I. coccinea* var. *coccinea*
 - 4. Corolla lobes blunt or obtuse *I. coccinea* var. *bandhuca*
 - 2. Leaves cuneate or acute at base 5
 - 5. Inflorescence small (without corollas usually 2 cm or less wide), compact, corolla lobes 5–6.5 mm long, rounded at apex *I. chinensis*
 - 5. Inflorescence open or if dense, over 2 cm wide, much branched, thyrsoid, corolla lobes usually acute, occasionally obtuse (if obtuse white or pink) 6

6. Thyrses dense or compact, main axis of 2–3, rarely 4, internodes, flowers white or pink 7
7. Calyx lobes several mm long, flowers white *I. finlaysoniana*
7. Calyx lobes at most 1.5 mm long, flowers pink or old rose
. *I. siamensis*
6. Thyrses much branched, open to somewhat condensed, main axis of 4–6 internodes (*Ixora casei*) 8
8. Corolla lobes 9–11(–15) mm long *I. casei* var. *casei*
8. Corolla lobes less than 9 mm long 9
9. Corolla lobes 5–6 mm long, leaves lanceolate or narrowly oblong . . .
. *I. casei* var. *lanceolata*
9. Corolla lobes 7–8 mm long, leaves elliptic to oblong
. *I. casei* var. *medialoba*

Ixora casei Hance

Ixora casei Hance in Walpers, Ann. Bot. Syst., 2:754, 1852.—Volkens, Notizbl., 4:91, 1903 [as *Ixora* sp.]—Okabe, Joursea n. Jap. For. Soc., 23:270, 1941 [as *Ixora* sp.]—Glassman, Pac. Sci., 7:296, 301, 1952.—Fosberg and Sachet, Atoll Res. Bull., 92:36, 1962.—Stone, Micronesica, 6:550, 1971.—Souder, In Guam Gardens, 54, 1974.—Niering, Atoll Res. Bull., 76:1976 [as *Ixora* sp.]—Fosberg, Sachet, and Oliver, Micronesica, 15:269, 1979.—Fosberg et al., Vascular Pl. Palau, 41, 1980.—Fosberg and Sachet, Baileya, 23:82–85, 1989.

Ixora duffii Baine, Garden, 13:312, 1 pl., 1879.—T. Moore, Flor. et Pomol., 90:76, 2 f., 1878.—Bremekamp, Bull. Jard. Bot. Buitenzorg, III, 14:278, 355, 1937. [Based on cultivated plants from stock brought by Duff to the Sydney Botanic Garden.]

Ixora carolinensis Hosokawa, Trans. Nat. Hist. Soc. Formosa, 25:268, 1935; Bull. Biogeogr. Soc. Jap., 7:201, 1937.—Kanehira, Enum. Micr. Pl., 420, 1935.—Fosberg, Occ. Pap. Bish. Mus., 15:220, 1940.—Riesenberg, Journ. Anthropol., 4:427, 1948.

Ixora carolinensis var. *chartacea* Fosberg, Occ. Pap. Bish. Mus., 15:222, 1940.

Ixora carolinensis var. *typica* Fosberg, Occ. Pap. Bish. Mus., 15:221, 1940.—St. John, Pac. Sci., 2:112, 1948.

Ixora carolinensis var. *volkensisii* (Hosokawa) Fosberg, Occ. Pap. Bish. Mus., 15:222, 1940.

Ixora macrothyrsa sensu auct. plur.—Master, Gard. Chron., n. s. 22:267, 1884.—Hooker, Bot. Mag., t. 6853, 1886 [non (Teymann and Binnendijk) Moore, Flor. et Pomol., 76:1878].

Ixora pulcherrima Volkens, Bot. Jahrb., 31:476, 1901.—Kanehira, Fl. Micr., 360–361, 1933.—Okabe, Nankyo, 2:45, 1943.

Ixora confertiflora Valetton, Bot. Jahrb., 63:313, 1930.—Kanehira, Bot. Mag. Tokyo, 45:349, 1931; Fl. Micr., 362, 1933; Enum. Micr. Pl., 420, 1935.—St. John, Pac. Sci., 2:112, 1948; 5:285, 1951 [non Merrill, Phil. Journ. Sci. 17:321, 1921].

Ixora volkensisii Hosokawa, Trans. Nat. Hist. Soc. Formosa, 25:269, 1935.—Kanehira, Enum. Micr. Pl., 420, 1935.—Hosokawa, Bull. Biogeogr. Soc. Jap., 7:201, 1937.

Ixora longifolia sensu A.C. Smith and S. Darwin in A.C. Smith, Fl. Vit. Nova [not J.E. Smith in Rees, Cyclopaedia, 19:1811].

Shrub, becoming almost tree-like and up to 6 m tall, glabrous, sparsely branched; leaves oblong to elliptic or broadly lanceolate, up to 30 × 12 cm, usually smaller, often much smaller, firm chartaceous, 12 to 18 veins on a side, arching slightly forward, usually weaker veins alternating with them, anastomosing toward margin, apex somewhat acuminate, base acute to attenuate, petiole 0.5–2 cm; stipules sheathing,

free portion broadly ovate, acuminate or mucronate; cymes red, ample, terminal, quite varied in size, from flattish or hemispheric to almost globose-thyrsoid, main axis with 4 to 6 internodes, trichotomously branched at each node, branches 3–5 times trichotomous, a pair of scale-like tracts connected by stipules at each ramification; flowers very many, brilliant scarlet to orange red, calyx short, margin undulate to broadly and very obtusely 4-toothed; corolla tube slender, 2.5–3.5 cm long or often shorter, lobes 4, ovate, about 1 cm long, slightly acuminate or acute, sometimes considerably smaller; anthers linear, exerted from sinuses on fairly long filaments, style later strongly exerted, stigma bifid, the lobes becoming recurved; fruit subglobose 6–7 mm long, red turning dark, few setting in an inflorescence.

The leaves of this species vary remarkably in size, and somewhat in shape. The size of the thyrses varies also, sometimes reaching 15 or even 20 cm wide.

The plant is native on at least all the high Carolines and introduced into cultivation in Australia long ago from Kusaie, distributed from Sydney or Melbourne and now cultivated under various names throughout the tropics. Frequently confused with *Ixora coccinea*. It is introduced at least into the Marianas and northern Marshalls in Micronesia.

USES.—Spear shafts were made of the stems, also punting poles and rafters. Medicinally for stomach ache: Leaves of “gachuw” are mixed with crumbs of copra, and taken with coconut milk; for nausea: Decoction of young leaves of “gachuw” is taken (Yap: Okabe, 1943). Wood...the men like to use it when they make copra husking stakes. Also used for braces for canoe outriggers. The small branches are often made into fish hooks (Sonsorol: *Berry 10*). Buds are used in medicine for illness caused by spirit of breadfruit. Used in garlands. Used as “ways” when beaching canoe (Woleai: *Alkire 29*). Roots are used as a hemostatic in menstruation. In former times spears were made from the wood (Ponape: Glassman, 1952). Branches used for rim of flying fish nets, flowers in leis occasionally, sticks used by children in a game called “apis”; sometimes used as a Christmas tree (Namoluk: *Marshall 69*). Flowers used for garlands, put around head when dancing, wood for scoop net

for fish (Yap: *Fosberg 25539*). Flowers used for leis (Ulithi: *Fosberg & Evans 46370*).

VERNACULAR NAMES.—

kantan agaga (Guam: *Evans 1600*)
 atiya (Palau: Hosokawa, 1937)
 kerdeo (Palau, Koror: *Fosberg 32069*)
 kerdeu (Palau: Otobed, 1967; *Canfield 303*)
 kerdew (Palau, Koror: *Hardy 15*; *Salsedo 83*)
 terdeo (Palau, Urukthapel: *Fosberg 32176*)
 hasiyou (Sonsorol: *Berry 10*)
 gachieu (Yap: *Fosberg 25539*)
 gachiou bachichig (Yap: *Cushing 506*)
 gachiou (Yap: *Cushing et al.*, 375, *Cushing 50*)
 gachuw (Yap: Okabe, 1943)
 gagciyon (Yap: *Wong 1129, 429*)
 brachio (Ulithi: *Fosberg & Evans 46370*)
 hachio (Ulithi: Hosokawa, 1937; *Lessa 1*)
 hachio (Fais: *Evans 354*)
 hachiu (Fais: *Fosberg 46658*)
 gashio (Woleai: *Alkire 29*)
 gatrion (Ifaluk: *Abbott & Bates 52*)
 hatio (Ifaluk: *Fosberg 47217*)
 achiue (Nomwin: *Evans 1118*)
 atiu (Truk, Pis: *Fosberg 24624*)
 ajiu (Satawan: *Anderson 934*)
 katio (Nukuoro: *Fosberg 26204*)
 karadiu (Ponape: Kanehira, 1933)
 Kartieu (Ponape: Glassman, 1952)
 Katiu (Ponape: *Riesenberg 20, 21, 23*; *Fosberg 26295*)
 kelesew (Ponape: *Soloman & George 23*)
 kalesu (Pingelap: *St. John 21463*)
 galsua (Kusaie: *Wong 68*)
 kajiru (Ailinglapalap: *Fosberg 26876*)
 gajiru (Majuro: St. John, 1951)
 kajdro (Arno: *Stone 1099*; *Anderson 3704, 3763*)
 kajiru (Jaluit: *St. John 21666*)
 Kajiru (Ebon: *St. John & Cowan 22105*)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Tinian: San Jose Valley, village, cult., *Fosberg 59924* (US, BISH).

Rota: Songsong village, 5–10 m, *Evans 2286* (US).

Guam: Lujuna, 10–50 m, *Evans 1600* (US, BISH, POM, NY).

CAROLINE ISLANDS.—Palau: Babeldoab: Ngerelong, 0.2 mi [0.3 km] W of Pkulrengelong, 10 m, *Canfield 303* (US); Garamiscan colony, upper Garamiscan River, 0–75 m, *Fosberg 25691* (US, BISH, POM, NY, L); Gatulel-to, Ailai-son, *Hosokawa 7315* (BISH, K); cult. *Cheatham 13* (US). Koror: Road to airport, near KB bridge, 8 m, *Shearard and Spence 83* (US). Angaur: *Holt 60* (US).

Sonsorol: *Berry 10* (US).

Yap: Trail from E coast of central Yap W to Mt. Matade, 35

m, *Cushing 440* (US); Tomil Islet, 100 ft [30 m], *Hosaka 3260* (US, BISH, POM, NY).

Ulithi: Fassarai I., 7 ft [2.2 m], *Hosaka 3207* (US, BISH, POM).

Fais: Lochochoy, village on plateau, S end of island, 15 m, *Fosberg 46658* (US); village area, 5 m, *Evans 354* (US).

Ifaluk: Falarik, *Abbott & Bates 52* (BISH, US).

Truk: s. l., *Pelzer 1* (US, BISH). Moen: *Rainey 41* (US). Pis: N side of Truk barrier reef, cult, 1–2 m, *Fosberg 24624* (US, BISH).

Namoluk: Namoluk Islet, *Marshall 69* (US).

Satawan: Moch I., *Anderson 934* (US, BISH, POM, NY, L).

Nukuoro: Nukuro Islet, planted in dooryard, 1–2 m, *Fosberg 26204* (US, BISH, POM).

Ponape: Mt. Tamatamansakir, 600 ft [182 m], *Glassman 2334* (BISH); Parkil-Kolonia, *Hosokawa 5886* (BISH); NW ridge of Mt. Tamatamansakir, 150–250 m, *Fosberg 26295* (US, BISH, POM); *Kanehira 1469* (NY); upper branch of Nanpili River, *Miller 6693* (US, BISH, POM, NY, L); Nanipiru, 200 ft [61 m], *Hosaka 3534* (US, BISH, POM).

Kusaie: Walpers, 1851–52:754; Hooker, 1886: t. 6853; S slopes and ridges of Mt. Tafeyet, S of Lela Harbor, *Fosberg 26680* (US, BISH, POM, NY, L); N ridge of Mt. Matanta, above Tafanshak village, *Fosberg 26598* (US, BISH); Lela I., Lela Harbor, 7 ft [2.2 m], *Wong 68* (US, BISH); “Strong I.” s. l., *Case* (K, probable holotype of *I. casei*); cult. Hort. Kew, s. coll. (K, 2 sheets), *Lele, Takamatsu 344* (BISH); Mt. Matante, *Takamatsu 502a, 542, 580* (all BISH); Kepla Plateau forest, near Palestik River, *Falanruw 3549* (US); s. l., *Kanehira 1311* (NY).

MARSHALL ISLANDS.—Kwajalein: Fosberg, growing in pot, 1956, 1958.

Ailinglaplap: Airik (a part of Ailinglaplap islet), 0–2 m, *Fosberg 26876* (US, BISH, POM, NY).

Arno: Arno I., throughout breadfruit zone, *Stone 1099* (POM); Ine I., *Anderson 3704* (US, BISH, POM); Arno I., *Anderson 3763* (US, BISH, POM); Arno I., *Hathaway 790* (US, BISH, POM).

Ixora casei var. *lanceolata* Kanehira

Ixora casei var. *lanceolata* Kanehira, Fl. Micr., 23:11, 1989.

Ixora pulcherima var. *lanceolata* Kanehira, Fl. Micr., 361, 1933.

Ixora volkensis var. *lanceolata* (Kanehira) Kanehira, Enum. Micr., Pl. 421, 1935.

Ixora carolinensis var. *lanceolata* (Kanehira) Fosberg, Occ. Pap. Bish. Mus., 15:223, 1940.

Ixora confertiflora var. *parvifolia* Hosokawa, Trans. Nat. Hist. Soc. Formosa, 24:204, 1934.

Ixora carolinensis var. *parvifolia* (Hosokawa) Hosokawa, Trans. Nat. Hist. Soc. Formosa, 25:268, 1935.—Kanehira, Enum. Micr. Pl., 420, 1935.—Fosberg, Occ. Pap. Bish. Mus., 15:222, 1940.

Ixora carolinensis var. *parviflora* Hosokawa ex Kanehira, Enum. Micr. Pl., 420, 1935 [sphalm.].

Ixora carolinensis var. *ponapensis* Fosberg, Occ. Pap. Bish. Mus., 15:223, 1940.

Plants with small lanceolate leaves and small flowers, corolla lobes 3–6.5 mm long.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Babeldaob: Kamiyangu, Nekken, *Hosokawa* 9728 (A); Arekalong, *Takamatsu* 1657 (US, UC); Armatin, *Hosokawa* 6972 (A, isotype of *I. confertiflora* var. *parvifolia*). Koror: Ngerkesoal, *Blackburn* 182 (US, BISH).

Yap: Balebat, 10 m, *Cushing, Ryan & children* 375 (US); near Malai village, sea level, *Cushing* 506 (US); Colonia, *Fosberg* 60129 (US, BISH).

Ponape: Mt. Nanaraut, 330 m, *Hosokawa* 9615 (A); Palang, west coast, *Fosberg & Falanruw* 58360 (US, BISH, POM); Wara, *Takamatsu* 1030 (UC); 1031 (UC).

Kusaie: Lela (Lele) I., Lele Harbor, 15 m, *Wong* 68 (US, BISH).

Ixora casei var. *medialoba* Fosberg & Sachet

Ixora casei var. *medialoba* Fosberg & Sachet, *Baileya*, 23:85, 1989.

Leaves broad elliptic or oblong, corolla with lobes less than 8 mm long.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: Barrigada-Mangilao, *Stone* 4049 (US, BISH).

CAROLINE ISLANDS.—Palau: Baldeldaob: *Richardson* 10 (US); Garudokku, *Takamatsu* 1350 (US, K, BISH); SW of Mt. Yekigaroto, 130 m, *Fosberg* 47686 (US); road to water plant, Ngesaol, *Salsedo* 83. Koror: (US); *Blackburn* 205 (US); *Otobed* 54 (US, BISH); Ngesaol, 0 m, *Hardy* 15 (US). Ngerakabesan, W side near old Japanese seaplane base, 1–20 m, *Fosberg* 25621 (US, BISH, POM, NY, L). Malakal: Above MMDC, *Rhinehart LR* 16931 (US). Aulupse'el: Du'ebachel beach, E end of island, 2 m, *Fosberg* 47450 (US, BISH), 47468 (US, BISH, POM).

Yap: Mt. Matade, 160 m, *Fosberg* 25539 (US, BISH, POM, NY, L); ridge above Nimar NNW of Colonia, 130 m, *Fosberg* 46518 (US, BISH, POM, NY, L); near Malai village, 5 m, *Cushing* 507 (US).

Ulithi: Mogmog Islet, 1–2 m, *Fosberg & Evans* 46370 (US?).

Woleai: Sholiap islet, 1 m, *Fosberg* 47043 (US).

Nomwin: Fananu Island, 3–5 m, *Evans* 1118 (US).

Truk: Tol: Amatyan, *Hosokawa* 8309 (US).

Ixora casei not determined to variety

Micronesia.—*s. coll. s. n.* (BISH).

CAROLINE ISLANDS.—Palau: *Wallin & Resson* in 1825 (P). Babeldaob: Arekalong, *Takamatsu* 1657 (K, BISH); Ngatpang,

Takamatsu 1302 (BISH); Arumogui, *Hosokawa* 6952 (BISH); Arumonogui, near Arumatan, *Hosokawa* 6750 (BISH). Koror: Ngerebe'ed, 5–10 m, *Fosberg* 32069 (US, BISH, POM); Ngerkesoal, *Blackburn* 182 (US); road to K-B Bridge, *Shearard & Spence* 83. Malakal: Volcanic slopes, *Stone* 4574 (GUAM). Aulupse'el [as Aurapushekaru]: 321 ft [95 m], *Stone* 4544 (GUAM); landlocked bay at SE corner of island, 0–5 m, *Fosberg* 32356 (US, BISH, POM, NY).

Yap: Kanif, *Takamatsu* 1946 (BISH, 2 sheets); 25 ft [7 m], *Wong* 429 (US, BISH, K); Ururu-Tarago, *Hosokawa* 8740 (K, 2 sheets); near Gaanpan village, Dalipepinau Mun., *Fosberg* 60101 (US).

Ulithi: Mogmog, *Lessa* 1 (BISH).

Woleai: Falalis islet, *Alkire* 29 (US).

Puluwat: Puluwat I., Niering, 1961:76 (seen in 1954).

Namonuito: Ono Island, 0–3 m, *Evans* 1003 (US, BISH, POM).

Murilo: Ruo Island, 3–5 m, *Evans* 1192 (US, BISH, POM).

Truk: Ile Shix, *Hombron* in 1841 (P); Harushima, *Takamatsu* 235 (BISH, 2 sheets, K); bottom of trail to Mt. Winifouere, *Spence* 442 (BISH). Archipel d'Hogoleu ou de Roug (Truk), *Le Guillou* 8 (P).

Etal: Anderson, seen but not collected.

Lukunor: Lukunor I., *Anderson* 2186 (US, BISH, POM, NY, L).

Ponape: *Riesenberg* 21, 22 (BISH); Wone, *Takamatsu* 1031 (BISH, 2 sheets, K); Toleailuka, *Takamatsu* 809 (BISH); Anapeng-pa, *Takamatsu* 746 (US, BISH); Nanalaut, 330 m *Hosokawa* 9615 (BISH); Nanuwe, *Takamatsu* 1008 (BISH); Kolonia, *Kanehira* 636 (BISH, NY); Net village, *Soloman & George* 23 (US); Tean-Parkil Sinrin-titai, *Hosokawa* 5847 (K); "Nach d Schiepstand zu," *Hallier s. n.* 5. X. 03 (HBG), *Bechte* in 1881 (NSW); Palang, W coast, *Fosberg* with *Falanruw* 58360 (US, BISH, POM, NY, L); road to Nan Pohn Mahl, 1/2 mi [0.8 km], past radio tower, *Spence* 446 (BISH).

Pingelap: *St. John* 21463 (BISH).

Likiep: Likiep I., *Fosberg* 27032 (US, BISH).

Majuro: NE side, *Bryan* in 1944 (BISH).

Jaluit: Volkens, 1903:91; *Schnee* in 1902 (NSW); Imrodg, *St. John* 21666 (BISH).

Ebon: Ebon I., *St. John & Cowan* 22105 (BISH).

Ixora chinensis Lamarck

Ixora chinensis Lamarck, *Encycl.*, 3:344, 1789.—*Stone*, *Micronesica*, 6:550, 1971 [pro parte].—*Souder*, *In Guam Gardens*, 54, 1974.—*Fosberg, Sachet, and Oliver*, *Micronesica*, 15:270, 1979.—*Fosberg and Sachet, Baileya*, 23:77, 1989.

This species is probably not in cultivation in Micronesia, but if a plant with orange, salmon, yellow or white flowers with corolla lobes round at apex and not more than 6–7 mm long should be found there, it might probably be this species. Plants that have been referred here are *Ixora coccinea* color forms with unusually wide, obtuse corolla lobes.

Ixora coccinea L.

Ixora coccinea L., Sp. Pl., 110, 1753.—Chamisso, Remarks and Opinions, 3:154, 1821.—Schumann, Bot. Jahrb., 9:221, 1888.—Schumann and Lauterbach, Fl. Süds., 570, 1901.—Glassman, Bish. Mus. Bull., 209:94, 1952.—Catala, Atoll Res. Bull., 59:97, 1957.—Otobed, Guide List Plants Palau Islands, 1967.—Stone, Micronesica, 6:550, 1971.—Souder, In Guam Gardens, 54, 1974.—Fosberg, Sachet, and Oliver, Micronesica, 15:270, 1979.—Fosberg et al., Vascular Pl. Palau, 41, 1980.—Fosberg and Sachet, Bailey, 23:79–82, 1989; Taxon, 336:486–489, 1989.

Ixora fraseri Hort. ex Gentil, Pl. Cult. Jord. Bot. Brux., 103, 1907.—Fosberg and Sachet, Atoll Res. Bull., 92:36, 1962.

Stiff shrub 2 m tall, branching at about 45 degree angle from stem, stems cylindrical, decussate; leaves broadly elliptic-oblong, firm, practically sessile, cordate, slightly acuminate at apex, stipular collar very low, lobes low-triangular with a strong awn-like mucro; cyme condensed, subtended by usually two pairs of cordate leaf-like bracts, upper pair much smaller than lower, if two pairs these separated by an internode 1 cm or less long, if one pair, then cyme usually on a very short peduncle, decussately branched twice, each branchlet ending in a triad of sessile or very shortly pedicellate flowers, the triads and the flowers subtended each by a pair of stipular triangular acuminate bracteoles; flowers 4-merous, calyx lobes dark red, blunt triangular, each with a transverse row of tiny stiffish hairs or glands inside at base, corolla scarlet, tube slender, about 3–4 cm long, falcate, lobes in bud sinistrorsely overlapping, scarcely contorted, at anthesis patent to slightly reflexed, ovate, acute; center buds of triads opening first; anthers lanceolate, mucronate, on contorted filaments in sinuses, early caducous, leaving the curved filaments; style filiform dilated at summit and fusiform the upper $\frac{2}{3}$ separating tardily into 2 flattened stigmatic lobes, the whole enlarged part exerted from corolla throat, dark red, lobes becoming recurved.

Native of India and Ceylon, pantropical in cultivation, several varieties distinguished, three of them cultivated in Micronesia as ornamentals.

**Key to Micronesian Varieties and Forms
of *Ixora coccinea***

1. Corolla lobes acute *I. coccinea* f. *coccinea*
1. Corolla lobes obtuse 2
 2. Leaves acuminate at apex
 - *I. coccinea* var. *intermedia*
 2. Leaves obtuse at apex 3
 3. Corollas scarlet *I. coccinea* var. *bandhuca*
 3. Corolla yellow or yellowish
 - *I. coccinea* var. *coccinea* f. *lutea*

Ixora coccinea* L. var. *coccinea* f. *coccinea

The species as described above.

VERNACULAR NAMES.—

kerdeu ra (Palau: Fosberg et al., 1980)

Ngebard (Palau: Fosberg et al., 1980)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: *Nelson 122* (BISH); Fonte Hill, N of upper Fonte River, 150 m, *Fosberg 35584* (US, BISH, POM).

CAROLINE ISLANDS.—Yap: Colonia, cult., *Fosberg 60129* (US).

Ponape: Kolonia, top of cliff opposite Sokehs (Sokaj), planted, *Fosberg 58451* (US, BISH).

GILBERT ISLANDS.—Tarawa: Bairiki, *Catala 106* (P).

***Ixora coccinea* var. *coccinea* f. *lutea* (Hutchinson)
Fosberg & Sachet**

Ixora coccinea f. *lutea* (Hutchinson) Fosberg & Sachet, Bailey, 23:79, 1989.

Ixora lutea Hutchinson in Curtis, Bot. Mag., 138, t. 8439, 1912.

Leaves obovoid or oblong, apex obtuse, mucronate, base subcordate, sessile, corolla lobes rhombic, said to be 1.3–1.7 cm long, 0.5–0.8 cm wide, ochroleucous.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

CAROLINE ISLANDS.—Ponape: Agriculture station, cult., *Stone 1752* (GUAM).

***Ixora coccinea* var. *bandhuca* (Roxburgh) Corner**

Ixora coccinea var. *bandhuca* (Roxburgh) Corner, Gardn. Bull. Str. Sett., 11:185, 1941.

Ixora bandhuca Roxburgh, Fl. Ind., 1:386, 1820.

Leaves stiff oblong, cordate at base, obtuse at apex; inflorescence subtended by 2 cordate bracts, many flowered; corolla tube 3.5 cm long, lobes broad, 9 × 7 mm, obtusely rhombic; anthers linear, 2.4 mm, reflexed-exserted style exerted, branches soon recurved, broadened, stigmatic within.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Koror: *Cheatham 64* (US).
Ponape: Kolonia, *Fosberg 58353* (US, BISH, POM, K).

***Ixora coccinea* var. *intermedia* Fosberg & Sachet**

Ixora coccinea var. *intermedia* Fosberg & Sachet, Bailey, 23:80, 1989.

Leaves definitely, but shortly, acuminate.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

MARIANAS ISLANDS.—Rota: Songsong village, *Fosberg* with *Moore 58311* (US).

***Ixora finlaysoniana* Wallich ex G. Don**

Ixora finlaysoniana Wallich ex G. Don, Gen. Syst., 3:572, 1834.—Fosberg,

Sachet, and Oliver, *Micronesica*, 15:270, 1979.

Ixora chinensis sensu Stone, pro parte, *Micronesica*, 6:550, 1971 [non Lamarck, *Encycl.*, 3:344, 1789].

Large shrub or small tree, glabrous; leaves narrowly elliptic to oblong, or slightly obovate, apex obtuse or slightly bluntly acuminate, base narrowed to a short petiole; stipules shortly sheathing, lobes slightly developed, with a double carina that runs into a short strong mucro that sometimes appears double, rarely suggestive of additional double carina and subsidiary teeth or mucros; inflorescence a dense terminal trichotomous thyrsoïd cyme with a short peduncle subtended by a pair of reduced leaves or foliaceous bracts or these immediately subtending the 3 branches of the cyme, main rhachis of 2 or 3 (-4) short internodes, ramifications subtended by narrowly linear bracts, one on each side; calyx lobes large, to 5×1.5 mm, somewhat united at base, pale greenish white with 3-5 parallel green nerves, erect; corolla white, tube slender, less than 1 mm thick, 2.5-3.5 cm long, lobes about 5×3 mm, tending to be revolute, apices rounded; anthers linear, about 3.5 mm long, tapering to a point; style well exerted, stigma deeply bifid, lobes strongly recurved; fruit not seen. Cultivated plant probably a self-sterile clone.

Native of Indo-China Peninsula, widely cultivated pantropically. Not common in Micronesia.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: Yona, cult., *Stone 4291* (GUAM, US, BISH); Merizo, 1-5 m, *Fosberg 25371* (US); Lujuno, 10-50 m, *Evans 1599* (US, BISH, POM, A, MO, K).

Ixora siamensis Wallich ex G. Don

Ixora siamensis Wallich ex G. Don, *Gen. Syst.*, 3:575, 1834.—Bremekamp, *Bull. Jard. Bot. Buitenzorg.*, III, 14:211, 1937.

Ixora incarnata (Blume) de Candolle, *Prodr.*, 4:486, 1830 [non Roxburgh ex Smith in Rees, *Cycl.*, 19, no. 4, 1811].

Shrub, glabrous except inflorescence, youngest branchlets somewhat compressed, at least when dry; leaves elliptic, to 10×4 cm at least, apex acutish, base rounded, veins 6-8 on a side, not prominent, petiole thickish, about 5 mm long; stipules triangular, slightly united at base, carinate, gradually or abruptly acuminate into a long subulate apex; inflorescence a terminal condensed thyrsoïd cyme, peduncle short, bearing a pair of small ovate foliaceous bracts half-way up, these sometimes with much reduced cymes in their axils, cymes spreading puberulent, trichotomous, main axis of 2-3 short internodes, a tapering subulate bract on each side of main ramifications, this with or without 1 or 2 teeth at base; flowers crowded, sessile, bracteolate, pink or old-rose; hypanthium and calyx puberulent, calyx lobes triangular to slightly acuminate almost as long as hypanthium, erect; corolla tube slender, about 2 cm long, lobes ovate, 5-6 mm long, acutish, throat glabrous; anthers lanceolate with sagittate bases, about 3.5 mm long;

style exerted about 2.5 mm, stigma about 1.5 mm long, the narrowly lanceolate lobes tardily spreading; fruit not seen.

A cultivated pink-flowered shrub, native of south Asia seen only in and around Agaña, Guam. At first thought to be *I. chinensis* or *I. finlaysoniana* but differing in many small details, especially from *I. chinensis* in the acute corolla lobes, and from *I. finlaysoniana* in the much smaller calyx.

We have no authentic material, or even any specimens purporting to be *I. siamensis* or *I. incarnata* (Blume) de Candolle, but from available descriptions and the fact that Bremekamp (1937:211) considered it a commonly cultivated species, we feel that this is probably the correct disposition. The name *I. siamensis* is not widely known horticulturally, but is the correct name, because *I. incarnata* is unavailable.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: Agaña, cult., *Stone 4382* (GUAM, US); Agaña Vista, 50 m, *Fosberg 31943* (US, BISH, NY, POM).

Ixora triantha Volkens

Ixora triantha Volkens, *Bot. Jahrb.*, 31:476, 1901.—Kanehira, *Enum. Pl.*, 420, 1935.—Fosberg, *Occ. Pap. Bish. Mus.*, 15:220, 1940.—Stone, *Micronesica*, 6:550-551, 1971.—Souder, *In Guam Gardens*, 54, 1974.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:270, 1979.

Slender erect shrub to 3.5 m tall, internodes dull grayish brown, terete, glabrous; leaves broadly elliptic to broadly ovate, up to 10×5 or 11×4 cm, glabrous, slightly acuminate, rounded at base, tending to have a pale patch at base, petiole 4-6 mm long, some upper leaves transitional to the pair of cordate leaf-like bracts subtending the terminal inflorescence; stipules ovate, sharply beaked, beak laterally compressed, bases somewhat connate and sheathing; inflorescence reduced to 3 sessile flowers enclosed between a pair of cordate bracts, these pale or whitish at base, 2 stipular scale-like bractlets alternating with and inside the bracts; hypanthium and whitish cup-like calyx about 2 mm long, glabrous, 5-toothed; corolla white, salverform, tube about 8 mm long, lobes oblong, revolute, 7-9 mm long, slightly mucronate; anthers exerted from sinuses on short curved filaments, hanging point-downward, sagittate-lanceolate, dark brown; stigma of two ovate fleshy papillate somewhat flattened divergent lobes, exerted from the corolla throat, top of filiform style just exerted; fruit globose with a depression in the top, glossy black, white fleshy-spongy within, pyrenes bony, hemispherical, 3.5-4 mm across, slightly unequal, the scar very short sculpturing none.

Description from *Fosberg 59638*, Potts Junction, Guam. Other specimens increase leaf dimensions to 15×7 cm.

This is an outlying representative of the South Pacific *Ixora* sec. *Phylleilema*, which is characterized by extremely reduced inflorescence enclosed between two large bracts. This species

is known only from the Marianas and Yap.

VERNACULAR NAMES.—

gaaguahot (Guam: *Fosberg 35527*)

guaguat (Guam: *Evans 1809*)

gauguaut, gauauaot (Guam: *Costenoble 1184*)

gethemuc (Yap: *Wong 511*)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Agrigan: *Hosokawa 8010* (BISH).

Saipan: *Lange 24* (BISH), sterile det.?

Rota: S of Shinapari (airstrip), 180 m, *Fosberg 31826* (US, BISH, POM, NY, L), *31827* (US, BISH, POM, NY, L); s. l., *Marche 276* (P, POM).

Guam: SW of hospital, *Anderson 179* (US, BISH, POM, NY, L); Ritidian Pt., near light, *Anderson 213* (US, BISH, POM, NY); Oca Pt., opposite Alupat I., *Anderson 185* (US); S ridge of Mt. Alifan, 280 m, *Fosberg 35493* (US, BISH, POM, NY, L); plateau NE of Mt. Santa Rosa, W of Anao, 160 m, *Fosberg 35527* (US, BISH, POM); N end of Agaña Bay, *Rodin 706* (US, UC); N of North West Field, 500 ft [150 m], *Steere 79* (US); E edge of Barrigada, 400–600 ft [120–180 m], *Moore 9* (US, UC); Hilaan, *Costenoble 1184* (US); *GES 99* (US, BISH, K), *33* (US, BISH, K), Tumon Bay, 50 ft [15 m], *Hosaka 3052* (US, BISH, POM); cliff above Uruno Pt., *Moran 4504* (BISH, UC, POM, US); *McGregor 387* (US, BISH), *549* (US, K, BISH); summit of Mt. Alifan, 270 m, *Bryan 1204* (BISH, K, NY, UC); *Fosberg 43437* (US, BISH, POM, NY, L); Dededo Well Field, 110 m, *Evans 1688* (US, BISH, POM, NY, L, UC); terrace below Memorial Hospital, 20 m, *Sachet 1816* (US), *1817A* (US); Haputo Pt., *Sachet & Moore 1838* (US, BISH, POM), *P.H. Moore 420* (US) (sterile, det.?). Asdonlucas, near Yigo, *Stone 4738* (GUAM); just W of Barrigada Hill, 100 m, *Stone 3851* (US, GUAM), *3776* (GUAM); back road to Andersen AFB, Mangilao, *Rinehart LR 17424* (US). Taguac, 110 m, *Evans 1808* (US, BISH, MO, POM); Machanao, 160 m, *Evans 1768* (US, BISH, NY, A, MO, POM), *1768* (US, BISH); S of Ritidian Pt., *Moran 4687* (UC, POM); 1 km N of Yigo, 155 m, *Fosberg 39264* (US, BISH, POM, NY); Mt. Alifan, *Swezey* in 1936 (BISH); Ritidian Pt., 250 ft [45 m], *Cushing-Falanruw 929* (US); Yigo, *Dutton 129* (US, A); SW of Barrigada Hill, 1/5 mi [0.3 km], from Barrigada, *Stone 4011* (GUAM); N.C.S. Beach, *Moore 501* (GUAM); Potts Junction, NW part of island, *Fosberg 59638* (US, BISH, POM, NY, L); Mt. Alifan, *Fosberg & Scully 59724* (US, BISH, POM, NY); *Thompson 33, 99* (NY).

CAROLINE ISLANDS.—Yap: 20 ft [6 m], *Wong 511* (US, BISH); *Volkens 544* (US, isotype); *Kanehira 1167* (US, NY); Kanif, *Takamatsu 1959* (BISH); Mabo, *Hosokawa 8830* (BISH); Tagale, *Hosokawa 8980* (US); Garror I. central plateau, 100 ft [30 m], *Hosaka 3306* (US, BISH, POM, NY); N of Nimar NNW of Colonia, 150 m, *Fosberg 46531* (US, BISH, POM, A, MO); Atelieu, *Tuyama 7214* (GUAM); Mt. Tabiol, *Tuyama* in 1939 (TI); Mt. Tabiwol, Fanif Mun., *Falanruw 3390*

(US); near Gaanpan village, Dalipepinau Mun., *Fosberg 60102* (US, BISH, POM, NY, L); near Makiy, N end of Gagil Mun., *Fosberg 60138* (US, BISH); s. l., *Kanehira 1200* (NY); E end of proposed new airport site, SW Colonia, *Stemmermann 3541* (BISH).

Mitracarpus Zuccarini

Mitracarpus Zuccarini in Schultes, Mantissa, 3:210, in obs. 1827.

Mitracarpum auct. [sphalm.].

Mostly slender herbs with squarish or 4-ribbed stems; leaves simple, linear to ovate, sessile or short-petioled, somewhat sheathing interpetiolar stipules with several to many stiff awns or setae pectinate on margins; dense heads or verticels of small flowers, calyx with unequal white-margined lobes; corolla salverform, 4-lobed; fruit a thin-walled circumscissile capsule; seeds 2, with a cross-shaped ventral groove.

A principally tropical American genus of quite a few ill-distinguished species, one of which is weedy and has become pantropical; common on Guam, recently found in Palau.

Mitracarpus hirtus (L.) de Candolle

Mitracarpus hirtus (L.) de Candolle, Prod., 4:572, 1830 [as *M. hirtum*].—

Schumann and Lauterbach, Fl. D. Schutzgeb. Süds., 589, 1901.—Safford, Contr. U.S. Nat. Herb., 9:325, 1905.—Merrill, Philip. Journ. Sci. Bot., 9:145, 1914.—Stone, Micronesica, 6:551, 1971.—Fosberg, Sachet, and Oliver, Micronesica, 15:271, 1979.

Spermacoce hirta L., Sp. Pl., ed. 2, 1:148, 1762.

Mitracarpus torresianus Chamisso and Schlechtendal, Linnaea, 3:360, T.3, f.2, 1828.—Endlicher, Ann. Wien. Mus. Naturgesch., 1:176, 1835.

Borreria hispida sensu Walker and Rodin, Contr. U.S. Nat. Herb., 30:465, 1949 [non Schumann in Engler and Prantl, Nat. Pflanzenf., 4:144, 1891].

Erect herb, to 40 cm tall, stems nearly square, hirsute; leaves lanceolate to ovate to somewhat obovate, obtuse to acute at apex, sessile to slightly petiolate, rounded at base, scabrous to hirtellous, especially on nerves beneath, nerves 2 or 3 pairs, strongly ascending; stipules very low-sheathing, hirsute, margins pectinate with hirtellous awn-like processes; flowers in crowded head-like verticels in axils of pairs of leaves and terminal, hirsute, calyx lobes unequal, 4, 1 pair much longer than the alternate one, ovate-acuminate, hirsute, other pair much smaller, varied in size, ending in a hair-like tip; corolla salverform, white, scarcely equalling or exceeded by the calyx, lobes 4, ovate, blunt; anthers elliptic or oval, slightly exserted; capsule obovoid, circumscissile, cap crowned by erect persistent calyx lobes; seeds broadly oblong, rather flattish, dull yellowish, with a “hammered” appearing surface, an x-shaped ventral groove.

A very common weed, especially on volcanic soil, probably annual, of tropical American origin, long present in Guam, found in 1818 by Chamisso, who thought it native, and described it as *M. torresianus*. It is easily mistaken for a

Spermacoce, from which it differs in the circumscissile dehiscence and in the very different seed. Known from Guam and Palau, Babeldaob, in Micronesia.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—*Gaudichaud s. n.* (P).

Guam: *Astrolabe 54* in 1828 (P); *Astrolabe s. n.* Herb. Richard (P); *Mertens s. n.* (P, 2 sheets); W slope of Mt. Santa Rosa, *Nelson 27* (NY); Yigo, *Nelson 37* (NY, US); *McGregor 485* (K, BISH); 4 km E of Agat, *Necker 123* (BISH); summit of Mt. Santa Rosa, 270 m, *Bryan* in 1936 (BISH); hills N of Merizo, *Bryan 1234* (BISH); near Mt. Tenjo, *Swezey* in 1936 (BISH, US); Mt. Tenjo, *Rodin 527* (US, UC); Agaña Bay area, 300 ft [90 m], *Moore 127* (US); 1 mi [1.6 km] W of Santa Rosa, *Baker* in 1945 (US); Mt. Tenjo and Mt. Reconnaissance area, 1000 ft [300 m], *Moore 87* (US); Tenjo, *Johnson, Markley, & Necker 78* (US); *Marche 76* (P, POM); *Hombron* in 1841 (P, POM); S to SE of Umatac, *Fosberg 35438* (US, BISH, POM, NY); Mt. Lamlam, *Anderson 141* (US, BISH); Mt. Alutom, E of Sumay, *Fosberg 25278* (US); Mt. Alutom, 700 ft [213 m], *Hosaka 3086* (US, BISH, POM); plateau between Ylig and Talofof Rivers, *Fosberg 25335* (US, BISH, POM, NY, L); Agaña, 5 m, *Fosberg 31249* (US, BISH, POM, NY, L); Mangilao, agriculture station, 60 m, *Evans 1773* (US, BISH, POM, NY, L); above Yona, 100–150 m, *Evans 709* (US, BISH, FO, NY, L); Mangilao, around buildings, *Fosberg 59601* (US, BISH); Dan Dan Radio Tracking Station, 3 mi [4.8 km] SW of Inarajan, *Fosberg & Raulerson 59764* (US, BISH, POM).

CAROLINE ISLANDS.—Palau: Babeldaob: Nekken Forest station, *Aimeliik, Timberlake 3047* (US); Ibobang, 10 m, *Raulerson 5878* (US), *5693* (US).

Morinda L.

Morinda L., Sp. Pl., 176, 1753; Gen. Pl., ed. 5, 81, 1754 [= 1753].
Caespermum Blume, Bijdragen, 994, 1827.

Trees, shrubs and lianes with raphid bundles; leaves entire, pinnately veined; stipules entire, tardily caducous; flowers capitate, heads pedunculate, terminal, axillary or leaf-opposed; hypanthia connate, flowers 4–7 merous, calyx united at base and to various lengths, one lobe enlarged and showy in some species, not constantly so; corolla hypocrateriform, lobes valvate; style 1, bifid; ovaries and fruits connate, ovary cells with one ovule sub-basally attached to septum; fruit a fleshy compound drupe or syncarp, drupaceous, rarely separate drupes, cells 1-seeded.

A pantropical genus of about 80 species, well represented in Micronesia and sparingly in Polynesia. One species, *M. citrifolia*, is pantropical, of ethnobotanical interest, and probably owes its wide distribution to human agency.

Key to Micronesian Taxa of *Morinda*

1. Vine-like plants, heads born in umbels or racemes . . . 2
 2. Slender semi-twining vines, heads in terminal umbels, rarely solitary, flowers 5–6 mm long, corolla tube about 2 mm *M. umbellata* var. *glandulosa*
 2. Stout vines, not at all twining, heads in racemes on smaller branches, peduncles opposite or somewhat congested into loose pseudo-whorls on rhachis, flowers about 1 cm long, corolla tube about 6 (4–6) mm long *M. salomoniensis*
1. Shrubs or small trees, heads on peduncles at upper nodes 3
 3. Stipules foliaceous, rounded, peduncles born leaf-opposed at terminal node, branch continues to grow leaving peduncle lateral on stem, syncarp of many fruits, becoming 5–10 cm long 4
 4. A few calyx-lobes enlarged and bract-like *M. citrifolia* var. *bracteata*
 4. Calyx lobes not enlarged *M. citrifolia* var. *citrifolia*
 3. Stipules ovate to triangular not foliaceous, heads on peduncles in upper leaf axils syncarps less than 5 cm long 5
 5. Some calyx lobes enlarged showy *M. latibractea*
 5. Calyx lobes not at all enlarged *M. pedunculata*

Morinda citrifolia L.

Morinda citrifolia L., Sp. Pl., 1:176, 1753.—Chamisso in Kotzebue, Rem. Op., 3:145–156, 1821.—Gaudichaud, Bot. Voy. Uranie, 76, 77, 1826.—Chamisso and Schlechtendal, Linnaea, 4:149, 1829.—Endlicher, Ann. Wien. Mus. Naturgesch., 1:176, 1835.—Engler, Notizbl., 1:226, 1897.—Hercouet, Bull. Soc. Geogr. Est., 19:267, 1897.—Volkens, Bot. Jahrb., 31:477, 1901.—Schumann and Lauterbach, Fl. D. Süds., 589, 1901.—Yabe, Bot. Mag. Tokyo, 16:258, 1902.—Safford, Contr. U.S. Nat. Herb., 9:326, 1905.—Prowazek, Die Deutschen Marianen, ihre Natur und Geschichte, 125 pages, 1913.—Merrill, Philip. Journ. Sci. Bot., 9:145, 1914.—Koidzumi, Bot. Mag. Tokyo, 29:155, 1915.—de la Corte, Guam Recorder, 160, 1926; Guam Recorder, II, 2(4), 15, 1972.—Valeton, Bot. Jahrb., 63:322, 1930.—Kanehira, Fl. Micr., 365, 1933; Emum, Micr. Pl., 421, 1935; Sanrin, 661:77, 1937.—Kraemer in Thilenius, Engeb. Exp. Suuuds, 11B, 11:1–304, 1937 Tuyama, Journ. Jap. Bot., 14:425, 1938.—Fosberg, Occ. Pap. Bish. Mus., 15:219–220, 1940.—Okabe, Bull. Trop. Indust. Inst., 5:14, 1940; Nankyo, 2:1–49, 1943; St. John, Pac. Sci., 2:112, 1948; Pac. Sci., 5:286, 1951.—Taylor, Plants of Bikini, 200–201, 1950.—Anderson, Atoll Res. Bull., 7:IV, 1951.—Glassman, Bish. Mus. Bull., 209:94–95, 1952; Pac. Sci., 7:308, 1953.—Luomala, Bish. Mus. Bull., 213:20, 26, 38, 43, 47, 49, 103–104, 1953.—St. John and Mason, Pac. Sci., 7:167, 1953.—Niering, Atoll Res. Bull., 49:229, 1956.—Catala, Atoll Res. Bull., 59:99, 1957.—Moul, Atoll Res. Bull., 57:22, 1957.—Stone, Pac. Sci., 13:104, 1959; Micronesica, 6:551–552, 1971.—Fosberg and Sachet, Atoll Res. Bull., 92:36, 1962.—Kiste, Kili Island, 39, 51, 1968.—Randall, Tsuda et al., Univ. Guam Marine Lab. Tech. Rep., 12:(25, 27) 57, 1974.—Kani et al., Univ. Guam Marine Lab. Tech. Rep., 16:12, 1974.—Souder, In Guam Gardens, 58, 1974.—Fosberg, Sachet, and Oliver, Micronesica, 15:271, 1979.—Moore

and McMakin, *Plants of Guam*, 41, 1979.—Fosberg et al., *Vascular Pl. Palau*, 41, 1980.

Morinda indica L. ex Merrill, *Phil. Journ. Sci. Bot.*, 9:149, 1914 [nomen nudum, probably an inadvertance, as the reference given is that for *Morinda citrifolia* L.].

Glabrous tree to 5–7 m tall, with dense crown; dull reddish brown squarish twigs, “terminalioid” or “double terminalioid” branching from 2nd to 4th node back from tip, first internode of twig 10 or more cm long, second 1–2 cm, peduncle leaf-opposed at terminal node, but branch then continues; leaves elliptic to ovate or oval, up to 25 cm long, 20 cm wide, usually narrower, apex obtuse, sharply mucronate, base cuneate to a thick petiole 1–2 cm long, 6 to 8 main veins on a side, alternate to opposite, anastomosing near margin, nerves connected by ladder-like, but not quite straight cross-veins, finer network obscure; stipules prominent, leaf-like in texture, obtuse to rounded, somewhat narrowed to base, barely sheathing or not, caducous below 3 to 6 nodes; peduncle strongly recurved, about 1–1.5 cm long, borne on 1 to 3 terminal nodes of small lateral branches, many ovaries fused into a syncarp, flowering from base toward apex, buds of all sizes present apically; calyx reduced to an almost imperceptible collar; corolla in bud clavate, valvate, rounded apically, white, tube 12–13 mm long, pilose within, scarcely dilated apically, lobes 5, ovate-oblong, about 7 mm × 3 mm, acutish to obtusish with a slight incurved appendage, lobes recurved; anthers 5, attached just below sinuses dorsally at about middle, on short filaments; style bifid into 2 thickened recurved stigmas that are exerted about 2 mm; fruit an irregularly formed white fleshy syncarp up to 10 × 5 cm usually narrower, varying to globose when small (most Gardner specimens seen no more than 4.5 × 6 cm), with prominent spirally arranged disks 5–6 mm across, each in a polygon faintly marked on surface, beneath each of these 4–5 tangentially arranged, cuneate, compressed pyrenes.

USES.—Wood used as building material, root for tan dye; fruit and root used medicinally as an ingredient in backache remedy (Rota: *Fosberg 24952*). Bark of root used in dyeing Guam: Guadichaud, 1826). Root used for dyeing magenta (Guam: *Safford & Seale 1082*). Wood used for construction of huts (Guam: *Safford & Seale 1006*). Leaves applied to forehead to cure headache (Guam: *Fosberg 25402*). Fruit eaten in times of famine (Hall I., Nomwin: *Fosberg 24578*). Root used for blue dye, leaves used medicinally (Jaluit: *Fosberg 26687*). Leaves and fruit used medicinally (Likiep: *Fosberg 27056*). Fruit eaten when ripe and soft (Truk, Udot: *Fosberg 24497*). Fruit eaten when other food short; dye obtained from root (Nauru: *Burges* ms., ca. 1935). Root used in making red dye; terminal leaves in treatment of sprains; fruit eaten but not well-liked (Yap: *Wong 324*). The fruit is reported edible but is hardly attractive (Northern Marshall I.: Taylor, 1950). A tree, the wood of which is used for the framework of a house. The leaf, root, and fruit are strongly medicinal. The seeds are pulverized and the pulp applied to any tooth that is causing pain. The root is scraped, then the scrapings, together with

young coconut husk, are boiled to make a light brown dye for handicraft fibers, such as *Triumfetta*, *Hibiscus*, and young coconut leaf, but not for *Pandanus* (Bikini: St. John and Mason, 1953). The leaves of this species are used in conjunction with other plants as a cure for rheumatism; the stipules are employed in the treatment of wounds caused by scorpion fish; the terminal buds, on abscesses; the inner bark and root, as a hemostatic in menstruation; the young flowers, to relieve pain after childbirth; and young fruit, to alleviate pain in heart attacks. (Ponape: Glassman, 1952). Fruit eaten as a male contraceptive (Mortlock I., local informant in Guam).

Two varieties are distinguished, one widespread, one sporadic, commoner further west.

VERNACULAR NAMES.—

lada (Marianas: Prowazek, 1913. Saipan: Kanehira, 1935. Rota: Kanehira, 1935; Moore and McMakin, 1979. Guam: *Steere 162*; *Safford & Seale 1082, 1006*; Merrill, 1914; *Fosberg 46257, 25402*; *Evans 729, 1615*)

lata (Rota: *Fosberg 24952*)

gada (Guam: *Marche 253*)

ladda (Guam: *Bryan 1129*; de la Corte, 1926; *Stone 4254*; *Safford and Seale 1082*; *Anderson 933*; Moore and McMakin, 1979)

ladda, lada (Guam: *Safford, 1905*)

lahda (Guam: *Whiting 302, R2*)

lodda (Guam: *Gaudichaud, 1826*)

ageru (Palau: Okabe, 1943)

ngel (Palau: Okabe, 1941; Fosberg et al., 1980. Koror: *Hardy 11*; *Blackburn E47*; *Salsedo 79a*; *Emmons 22*. Peleliu: *Fosberg 47644*)

noar (Tobi: *Black 6*)

maalueg (Yap: *Alvis 88*)

magariwek (Yap: Okabe, 1943)

maluegg (Yap: *Volkens 70*; Prowazek, 1913)

maluezg (Yap: *Hosokawa 8996*)

mangalueg, manaliue, maaluwag (Yap: *Cushing & Fanoway 398*)

mangaluwak (Yap: *Wong 324*)

naalueg (Yap: *Alvis 88*)

lol (Ulithi: *Lessa 10*)

lol (Fais: *Evans 358*)

loll (Fais: Kraemer, 1937)

lel (Eauripik: *Fosberg & Evans 47090*. Woleai: *Alkire 3*; *Evans 443*)

nen (Woleai: Kraemer, 1937)

dadi (Faraulap: *Wong 37*)

lel (Faraulap: *Fosberg & Evans 47310*. Ifaluk: *Abbott & Bates 11*, *Burrows s. n.*; *Fosberg 47172*)

ler (Lamotrek: *Fosberg & Evans 46783*)

leen, lan (Satawal: *Fosberg 46855*)

nen (Namonuito: Stone, 1959)

nen (Nomwin: *Fosberg 24578*; *Evans 1062, 1135*)

alin (Truk: Kanehira, 1935)

arin (Truk, Tol: *Pelzer 79*)
 lopur (Truk, Moen: *Evans 793*)
 napur (Truk, Udot: *Fosberg 24497*)
 nobur (Truk, Pis: *Fosberg 24663*)
 nobul (Truk, Dublon: *Hosokawa 1957*)
 noppur (Truk: *Wong 191, 91*)
 nupur (Truk, Moen: *Pelzer 79*)
 nen, nen mefo (Satawan: *Anderson 1125*)
 nen mefo (Satawan, Ta I.: *Anderson 1019*)
 nen, len (Satawan, Afaran I.: *Anderson 933*)
 bugalia (Nukuoro: *Carroll 3, 33, 59*)
 pukaria (Nukuoro: *Fosberg 26173*)
 ti nonu (Kapingamarangi: *Fosberg 26080; Hosaka 3440, 3445*)
 nonu (Kapingamarangi: *Niering 509, 626, 635, 686, 636*)
 nen (Ant: *Glassman, 1953*)
 kirikei (Ponape: *Christian, 1899*)
 pugen malk (Ponape: *Falanruw 3222*)
 weipul (Ponape: *Riesenberg 30*)
 weipwul (Ponape: *Fosberg 26244*)
 wumpul (Ponape: *Riesenberg in Glassman, 1952*)
 wehpul (Mokil: *Glassman, 1953*)
 obul (Pingelap: *St. John, 1948*)
 e (Kusaie: *Kanehira, 1935*)
 hi (Kusaie: *Fosberg 26528*)
 kamim (ninu) (Marshall: *Prowazek, 1913*)
 nin (Eniwetok: *Fosberg 24350*)
 nen (Utirik: *Fosberg 33684*)
 nin (Ujelang: *Fosberg 34177*)
 nin (Ujae: *Fosberg 34315*)
 nin (Lae: *Fosberg 34008*)
 nen, nin, noni (Kwajalein: *Cameron 1*)
 nin (Likiep: *Fosberg 27056*)
 nin (Aur: *St. John 21394*)
 nin (Ailinglapalap: *Fosberg 26792*)
 nen (Arno: *Stone 1125; Anderson 3670; Hatheway, 1952*)
 nen (Kili, Bikini: *St. John and Mason, 1953; Kiste, 1968*)
 nin, nen (Jaluit: *Okabe, 1941*)
 nen (Jaluit: *Schnee in 1901*)
 nin (Jaluit: *Fosberg 26687*)
 donenn (Nauru: *Burges, ms.*)
 te nono (Nauru: *Prowazek, 1913*)
 danini (Gilbert: *Prowazek, 1913*)
 te non (Tarawa: *Catala 6*)
 non (Nonouti: *Koch 8*)
 te non (Tabiteuea: *Lomala 33; Catala 6*)
 te non (Onotoa: *Moul 8227; Cloud 8104*)

Morinda citrifolia L. var. *citrifolia*

The common form of the species as treated above.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Maug: N end of island, below 400 ft

[122 m], *Falanruw 2217* (US).

Asuncion: Lower SW slope, ~150 ft [45 m], *Falanruw 2263* (US).

Agrigan: Trail around S side of island, 10–20 m, *Fosberg 31591* (US); SW coast, below 300 ft [90 m], *Falanruw 2194* (US).

Pagan: In open field near center of isthmus, *Anderson 575* (US, BISH, POM, NY, L); scattered in sunny situations, 150 ft [45 m], *Bonham 13* (US, POM); E coast, *Moore 420* (US); village, *Moore 417* (US); ranch between airport and escarpment, 10 m, *Raulerson 999* (US).

Alamagan: Around Partido village, *Fosberg 31661* (US); SSW coast, 250 ft [75 m], *Falanruw 1880* (US).

Guguan: Slope leading up from W anchorage, 15 m, *Raulerson 981* (US).

Sarigan: Shallow gully above village, 150–250 m, *Evans 2394* (US, BISH, POM, NY); near anchorage NW coast, 325 ft [98 m], *Falanruw 1747* (US).

Anatahan: Vicinity of beach, NW tip of island, 0–10 ft [3 m], *Evans 2461* (US, BISH, POM, NY); behind village, NW corner of island, below 200 ft [60 m], *Falanruw 1604* (US); trail from W anchorage, 15–40 m, *Raulerson 1113* (US).

Saipan: *Stephens 14* (POM); *Hosokawa 6666* (BISH, US); Kagman, roadside, *Courage 40* (US).

Tinian: *Moran 4632* (UC, POM); dry cliff, *Cowan s. n.* (BISH); Mt. Lasso, 175 m, *Fosberg 24777* (US, BISH).

Agiguan: West Pt., *Kondo s. n.* in 1952 (BISH); broad ravine on W coast, below 50 ft [15 m], *Falanruw 1815* (US).

Rota: *Kondo s.n.* in 1952 (BISH); s. l., *Necker R28* (US); Sonson, on open weedy ground of ruined town-site, 1–10 m, *Fosberg 24952* (US, BISH, POM, NY, L); SW side of island, 0–5 m, *Evans 1888* (US, BISH, POM, NY).

Guam: s. l., *Marche 253* (P, POM); *Marche 114* (P, POM); *Glassman 227* (POM), *50* (POM); s. l., *G.E.S. 453* (US); Inarajan, *Whiting R2* (POM); Mogfog, 400 ft [122 m], *Gressitt & Hurlbut 2010* (US); Oca Pt., *Carver in 1945* (US); W of Mt. Santa Rosa, *Anderson 156* (US, BISH, POM); Inarajan, *Whiting R 2* (US); 1 mi [1.6 km] S of Mt. Tenjo, 160 m, *Fosberg 35227* (US, BISH); Pago Pt., *Moran 4606* (UC); Haputo Pt., *Johnson & Necker 23* (US); Ypao Pt., *Necker 112* (US); E shore, E of Barrigada Valley, *Steere 124* (US); N central Guam, *Steere 162* (US); Agaña, *Safford & Seale 1082* (US); Merizo, on moist coastal plain, 1–5 m, *Fosberg 25402* (US, BISH, POM); between Yigo and Mt. Santa Rosa, 200 m, *Bryan 1129* (BISH); *Guerrero 702* (BISH, P); Talofof area, *Pedrus 15* (GUAM, BISH); near entrance to Andersen AFB, *Stone 4254* (GUAM); Mangilao, *Shmull 99* (GUAM); Tarague Beach, Andersen AFB, 0–25 m, *Evans 729* (US, BISH, POM, NY); Lujuna, just off route 15, 0–10 m, *Evans 1615* (US); *Whiting 302* (US); between Campanaya Pt. and Guae, 5–20 m, *Evans 268* (US, BISH, POM, NY, L, P); Mt. Lamlam, 360 m, *Fosberg 46257* (US, BISH, POM, NY, L, P, TI); Atantano River, *Moore 855* (US); Piti Hills, *Swezey in 1936* (BISH).

CAROLINE ISLANDS.—Palau: *Richardson 17* (US). Ba-

beldaob: s. l., *Raulerson 16417* (US); Medorme village, Aimeliik, *Timberlake & Johannes 5035* (US); Arumogui-hukin-sinrin, *Hosokawa 6967* (A). Koror: Ngerebe'ed, 1–2 m, *Fosberg 32508* (US, BISH, POM, NY, L); Pacific War Memorial Grounds, 10 m, *Fosberg 32044* (US, BISH, POM, NY); Ngesaol, *Salsedo 79a* (US, GUAM); *Blackburn E47* (US, BISH); Renrak, *Emmons 22* (US); Ngesaol, *Hardy 11* (US); Ngelobel I., inlet on NW side of island, 1 m, *Canfield 667* (US). Ngeanges: Yoo Passage, 2–25 m, *Fosberg 25849* (US, BISH). 70 Islands: Island 16, *Raulerson 16652* (US). Peleliu: 2–4 m, *Fosberg 47644* (US, BISH, POM, NY). Angaur: Inside depression on hill on NW corner, 25 ft [8 m], *Fosberg 25896* (US, BISH); W side of Lake D, 2 m, *Canfield 159* (US); *Kluding 5* (US). Tobi: N of causeway half way across island, *Black 6* (US); causeway through center of island, *Hardy 141* (US). Pulu Anna: *Koch 1207* (US).

Sorol Atoll: Sorol I., *King 3* (US), *13* (US), *20* (US).

Yap: Rumung, near old Chief's Pabey, 5 m, *Cushing & Giliganganin 577-b* (US); Wora, Rul, *Wong 324* (US, BISH, POM); saddle just N of Mt. Matude, 75 m, *Alvis 88* (US, BISH, POM, NY); low E ridge of Mt. Matade, above Yap Town, 20–40 m, *Fosberg 25567* (US, BISH); Moloai, *Hosokawa 8996* (US); Garim Islet, E of Ngari village, *Cushing 533* (US, GUAM); near Tafagif village, 25 m, *Cushing & Fanoway 398* (US, GUAM); Kanif, *Takamatsu 1912, 1956* (BISH); Tabiwol, near Bulochang abandoned village, *Fosberg 60060* (US).

Ulithi: Mogmog I., on coral soil, 2–4 m, *Fosberg & Wong 25483* (US, BISH); *Lessa 10* (BISH); Asor I., high lagoon beach ridge, *Fosberg 46447* (BISH, POM); Sorlen Island, 5 m, *Evans 393* (POM, BISH).

Fais: Lochochoy village, rampart and top of beach, 1–3 m, *Evans 358* (US); coconut plantation on plateau, 15 m, *Fosberg 46706* (US).

Eauripik: Siding I., scrub around coconut grove, 1–5 m, *Fosberg & Evans 47090* (US); Eauripik I., village, 1–2 m, *Fosberg & Evans 47115* (US).

Woleai: Utagal I., along beach, 1–2 m, *Wong 37* (US, BISH); Falalis I., near beach, *Alkire 3* (US); Falalis I., in village, 1–2 m, *Fosberg 46987* (US); Falalop I., Falalop village, *Evans 443* (US).

Faraulap: Faraulap I., outskirts of village, 1–2 m, *Fosberg & Evans 47310* (US).

Ifaluk: *Burrows s.n.* (BISH); back of camp, *Abbott & Bates 11* (BISH); Ifaluk I., in village, 1–2 m, *Fosberg 47172* (US, BISH, POM, NY, L).

Lamotrek: Lamotrek I., interior coconut-breadfruit forest, 1 m, *Fosberg & Evans 46783* (US).

Satawal: N side of island, 2 m, *Fosberg 46855* (POM).

Puluwat: Puluwat I., Niering, 1961 (sight record).

Murilo: Murilo I., interior of island, 3–5 m, *Evans 1243* (US).

Namonuito: Piseras I., beach and rampart, 0–3 m, *Evans 894* (POM); Magur I., in center of island, 3–5 m, *Evans 938* (POM); Onari I., village and vicinity, 0–3 m, *Evans 978*

(POM); Ono I., village and vicinity, 0–3 m, *Evans 1025* (US).

Nomwin: Nomwin I., on coral sand and rock, 1–2 m, *Fosberg 24578* (US, BISH); Nomwin I., common among trees, *Evans 1062* (US); Fananu I., village and vicinity, *Evans 1135* (US); Ruo I., interior of island, 3–5 m, *Evans 1186* (US).

Truk: *Pelzer 79* (US, BISH); 25 ft [8 m] *Wong 91* (BISH), *191* (US, POM). Moen: *Pelzer 78* (US, BISH); old site of Mechetin village, W side of Bou Bay, 1 m, *Fosberg 24414* (US, BISH); Gov. Hill area, 20 m, *Grimm 46* (US); Nob Hill, 150–250 m, *Evans 1408* (US); road leading from Xavier High School, 100–200 m, *Evans 793* (US). Dublon: Natsushima, *Takamatsu 270* (BISH). Udot: *Fosberg 24497* (US, BISH). Pis: On flat coral sand and rock, 1–2 m, *Fosberg 24663* (US, BISH); center of island, 3–5 m, *Evans 831* (US).

Nama: Center of island, 3–5 m, *Evans 1302* (US).

Losap: Anderson (seen but not collected).

Namoluk: Namoluk I., 1–7 m, *Marshall 96* (US), *9* (US).

Etal: Anderson (seen but not collected).

Lukunor: Lukunor I., *Anderson 2161* (UA, BISH, POM, NY); Oneap I., *Anderson 2105* (US, BISH, POM, NY).

Satawan: Moch I., *Anderson 1125* (US, BISH, POM, NY, L), *1130* (US, BISH, POM, NY, L); Ta I., *Anderson 1019* (US, BISH, POM, NY, L); Afaran I., *Anderson 933* (US, BISH, POM).

Nukuoro: Sinukutae I., 1–2 m, *Fosberg 26173* (US, BISH); Kaujema I., in forest, 7 ft [2.1 m] *Hosaka 3458* (US, BISH); Sungalohu, *Carroll 3* (US); Sabinimadogo, *Carroll 33* (US); Deungaagelegele, *Carroll 59* (US).

Kapingamarangi: Hare I., on flat coral sand, coconut plantation, 1 m, *Fosberg 26080* (US, BISH); in open sand under coconut trees, 7 ft [2.1 m], *Hosaka 3440* (US, BISH); Seetan I., in open sand under coconut trees, 7 ft [2.1 m], *Hosaka 3445* (US, BISH); Taringa I., *Niering 509* (US, POM, BISH); Herekoro I., *Niering 635* (US); Werau I., *Niering 686* (US, POM, BISH), *636* (US), *626* (US, POM, BISH, NY).

Ant: Glassman, 1953:304 (citing "observed along beach"); Wolauna I., *Marshall* in May 1956 (seen but not collected; was in fruit).

Ngatik: Kanehira, Sanrin, 661:77, 1937.

Ponape: Kolonia, Not Distr., beside road on denuded area of mixed volcanic soil and (coral) sand, 10 m, *Wong 55* (US, BISH); Kolonia, *Hosokawa 6045* (A, US); rd. to Auwak from Kolonia, *Stemmermann 3440* (BISH); Narlap I., coral soil, 4 ft [1.2 m], *Hosaka 3555* (US, BISH); Kolonia, Not Distr., cultivated land with thickets, 1–50 m, *Fosberg 26244* (US, BISH); agricultural experiment station, *Glassman 2566* (US, BISH); *Riesenberg 30* (BISH); Sabtic-to, *Hosokawa 6135*; Na Islet (BISH); 0.5 mi [0.8 km] S of agricultural experiment station, along stream, *Glassman 2566* (US); "Pugen Malk" tall volcanic plug in Palikir, *Falanruw 3222* (US); Nanpil River, below reservoir, *Fosberg with Falanruw 58407* (US); Parma, *Takamatsu 630* (BISH).

Mokil: Glassman, 1953:296 ("Observed as a tree along strand").

Pingelap: St. John, 1948:112 ("observed").

Kusaie: Lela Island, Lela Harbor, in village, 1–5 m, *Fosberg* 26528 (US, BISH).

MARCUS ISLAND.—Yabe, 1902:258; Tuyama, 1938:425.

MARSHALL ISLANDS.—Chamisso, 1821:145. Radak: Endlicher, 1835:176 (citing Chamisso); *Eschsholtz s. n.* (LE).

Eniwetok: Japtan I., on coral flat in brushy forest, 1–4 m, *Fosberg* 24335 (US, BISH); Aoman I., on broken coral, toward outer beach, 1–3 m, *Fosberg* 24350 (US, BISH); Igurin I., local on coral flats, 1–3 m, *Fosberg* 24302 (US, BISH); Engebi I., top of beach, 2 m, *St. John* 23780 (BISH); Engebi I., on coral flats, 1–5 m, *Fosberg* 24381 (US, BISH); Biijiri I., *St. John* 23822 (BISH); Eniwetok I., on coral flat, 5 m, *St. John* 23705 (US, BISH); Aniiyaanii I., *St. John* 23723 (US, BISH); Aoman I., *Fosberg* 24305 (US).

Bikini: Chieerete I., *Taylor* 46–1167 (US); Namu I., along shore and in the coconut grove clearing, *Taylor* 46–1116 (US, BM); Bikini I., in village area, *Taylor* 46–1086 (US, BISH); Enyu I., along edges of woodland, *Taylor* 46–1009 (US, BISH); *Mason* 4 (BISH).

Ailinginae: Sifo I., *Fosberg* 36687 (US, BISH, POM, NY).

Rongelap: Eniwetok I., *Taylor* 46–1365 (US, BISH).

Rongerik: Latoback I., *Taylor* 46–1421 (US).

Taka: Take I., *Fosberg* 33734 (US), *Fosberg* 33745 (US).

Utirik: Utirik I., *Fosberg* 33684 (US); *St. John & Cowan* 21953 (BISH).

Ujelang: Ujelang I., *Fosberg* 34177 (US).

Ujae: Bock I., *Fosberg* 34315 (US).

Wotho: Wotho I., *Fosberg* 34231 (US).

Lae: Lae I., *Fosberg* 34008 (US).

Kwajalein: *Fosberg* (seen growing in pot, 1956); Bigej I., one small bush seen on disturbed coral sand and gravel, 1–3 m, *Fosberg* 26507 (US, BISH); Kwajalein I., near shore, 2 m, *Cameron* 1 (BISH); Legan I., *Herbst* 8938 (US).

Ailuk: Ailuk I., *Fosberg* 33955 (US), *St. John & Cowan* 21853 (BISH).

Jemo: *Fosberg* 33878 (US).

Likiep: Aikini (Aekone) I., *Fosberg* 27056 (US, BISH); Likiep I., *St. John & Cowan* 21746 (BISH).

Mejit: *St. John & Cowan* 21953 (BISH).

Wotje: Ormed I., *St. John & Cowan* 22050 (BISH).

Aur: Tabal I., *St. John* 21394 (BISH).

Namu: Leuen I., *St. John* 21630 (BISH).

Ailinglapalap: Bikajle I., generally on flat coral sand and rubble, 1–3 m, *Fosberg* 26792 (US, BISH).

Majuro: St. John, 1948:112 (citing "Majuro Islet: observed"); islet west of Dalap I., on rather dry flat broken coral, 1–2 m, *Fosberg* 26914 (US, BISH); Uliga I., *Stone* 972 (BISH).

Arno: Ine I., *Anderson* 3670 (US, BISH POM); Ine I., *Stone* 1125 (POM); Langar I., *Hatheway* 859 (US).

Jaluit: Engler, 1897:226; Schumann and Lauterbach, 1901:589; Koidzumi, 1915:155; *Schnee* in 1902 (NSW), in 1901 (NSW); Jaluit I., south of Jabor, 1–2 m, *Fosberg* 26687 (US, BISH); Imrodj I., *St. John & Cowan* 21690 (BISH).

Ebon: *St. John & Cowan* 22192 (BISH).

NAURU ISLAND.—Prowazek, *Deut. Marian.*, 120, 1913; *Rhone* 27 (NSW); Nikob, NW coast, *Fosberg* 58754 (US, BISH).

GILBERT ISLANDS.—Butaritari: Hercouet, 1897:267; Butaritari I., *Herbst & Allerton* 2705 (US, BISH).

Tarawa: Bikenibeu, *Catala* 6 (P); Bikenibeu I., *Herbst & Allerton* 2637 (US, BISH); Abaokoro, *Adair* 104 (US, BISH); Tanaea, *Raulerson* 3641 (US).

Nonouti: Tetua, *Koch* 8 (US).

Tabiteuea: Eita village, *Luomala* 33 (BISH).

Onotoa: *Moul* 8140 (POM); 8104, 8227 (US); Tabuasosae I., west of sand flats, *Moul* 8227 (BISH); Abanekeneke I., *Cloud* 8104 (BISH).

Morinda citrifolia var. *bracteata* (Roxburgh) Hooker f.

Morinda citrifolia var. *bracteata* (Roxburgh) Hooker f., *Fl. Br. Ind.*, 3:156, 1880.—*Fosberg*, *Sachet*, and *Oliver*, *Micronesica*, 15:271, 1979.
Morinda bracteata Roxburgh, *Hort. Beng.*, 15, 1814.

Differs from var. *citrifolia* in having one calyx lobe of some of the flowers in a syncarp enlarged and conspicuous, white, obovate, to as much as 1 cm long.

This form is common farther west, as in India, rare in Micronesia. This character, of an enlarged calyx lobe, is found widely in the Rubiaceae, frequent or constant in some genera, rare in others, seldom found in all flowers in an inflorescence. Infrequent in *Morinda citrifolia*, seemingly constant in some of the other species, e.g., *M. latibracteata*. The enlarged calyx lobes are sometimes incorrectly referred to as "bracts."

MEDICAL USES.—The following information was recorded on Sonsorol Island, by Paul Berry, 5 Apr 1968. It is not clear from Berry's account whether or not he distinguished the two varieties of *Morinda citrifolia*, but it seems likely that both were present and that the name "roru" applies to both, though his specimen, no. 32 is var. *bracteata*. The following are the botanical identities of the other plants mentioned as components of the remedies he describes that involve *Morinda citrifolia* L.

fitoa (Berry 25) = *Calophyllum inophyllum* L.

glamahi (Berry 112) = *Scaevola taccado* (Gaertner) Roxburgh

glawira (Berry 69) = *Allophylus timoriensis* (de Candolle)

Blume

gleiwaru (Berry 103) = *Pangium edule* Reinwardt

halifato (Berry 45) = *Eugenia javanica* Lamarck ?

malat (Berry 78) = *Soulamea amara* Lamarck(?)

rifouth (Berry 74) = *Mammea odorata* (Rafinesque) Kostermann

The inner skin of the trunk can be scraped, pounded and put in an *uru*, and the juices can then be squeezed on a cut. For 3 or 4 days *only* the juices will be used, after the fourth day when a scab has formed, the shavings may be applied directly to the cut.

When someone has a pain in the side and cannot breathe

well, three young leaves can be mixed with the small nuts and the shavings from the inner skin of the roots; these are pounded and put in an *uru* and squeezed into a young coconut and drunk 3 times a day, for 3 days only. This medicine will help relieve the pain.

Eye medicine: Four young leaves of *roru* can be mixed with five young leaves of *glawira* (69) these are then pounded and squeezed into the injured eye.

Only two drops of this for very serious injury, *one* drop for less serious. Water cannot be put in the eye before or after the medicine is used or the medicine will be of no value.

Another recommended use: Six drops the first day, 3 or 4 drops the next day, applying 2 drops to the eye not injured. No water can be put in the eye before or after use of the medicine; the medicine can spoil and even blind the patient. If there is *no* bleeding in or around the eye then the medicine is used only *two* days; however, if there is bleeding then the medicine is used longer.

For swelling to the body: By facing the tree and scraping a surface root on the right side, the scrapings can be used as medicine, they are wrapped in the leaves, heated and applied to the swollen area.

Stomach pain: The young leaves can be pounded, then squeezed into a container and drunk for relief of stomach pain.

When someone is suffering from a backache, the leaves can be spread on the sleeping mat to help relieve the pain. For joint pain, the leaves may be tied directly to the ailing joint.

The people speak of a hard lump that may appear on parts of the body, such as the wrist, so to get rid of this they use the following medicine.

The leaves of *malat* (78), the young leaves of *roru*, the young leaves of *gleiwaru* (103), the young leave of *glamahi* (112), the young leaves of *Fitou* (25), are mixed, pounded and squeezed on the hard lump. The area will then open like a cut and drain. While it is healing, the opening will be washed in salt water, then *rifouth* (74), and *halifato* (45) leaves are pounded and squeezed on the cut, to complete the medicine and close the opening.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: *G.E.S. 453* (BISH).

CAROLINE ISLANDS.—Sonsorol: Western side of island, *Berry 32* (US, BISH).

Ponape: Metalanim, near Farm Inst., *Stone 5440* (GUAM).

OCEAN ISLAND (Banaba).—*Rhone 27* (NSW).

Morinda latibractea Valetton

Morinda latibractea Valetton, Bot. Jahrb., 63:321, 1930.

Morinda latibractea Valetton ex Kanehira, Fl. Micr., 366, 1933; Enum. Micr. Pl., 421, 1935.—Fosberg, Sachet, and Oliver, Micronesica, 15:272, 1979.—Fosberg et al., Vascular Pl. Palau, 41, 1980. [Valetton's epithet has been consistently incorrectly read as *latibractea*.]

Tall shrub or small tree, glabrous except for small tufts of

hairs in domatia in axils of leaf veins; leaves broadly, rarely narrowly, elliptic to somewhat obovate, 8–15 × 3–5 mm, apices shortly acuminate, bases contracted, slightly decurrent, blades with 7 sub-opposite pairs of secondary veins, arching, forming an undulate submarginal vein; stipules short-triangular, blunt to mucronate, slightly connate at base; heads on axillary peduncles in upper axils, peduncles about 2.5–3.5 cm long, heads about 5 mm across, excluding “bracts,” flowers 4–12, lower parts of hypanthia connate, calyces subtruncate with one enlarged lobe of which the base is broad, comprising one third or more of the calyx rim, oblanceolate to spatulate or broadly obovate, apex acute to bifid or irregularly shallowly lobed or toothed or subtruncate, base cuneately contracted, about 8 strong veins from base spreading and somewhat anastomosing distally, color white, deciduous from fruit; fruit globose, irregular, about 1 cm across, fleshy.

The “bracts” are really enlarged calyx lobes, as are found in many Rubiaceae.

A very distinct species, apparently endemic to the Palau Islands.

VERNACULAR NAME.—kesengelengel (Palau: Fosberg et al., 1980).

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: *Kanehira 1866* (US, P); on islet cliff, *Herre 46* (BISH). Koror: Arumidu-sangosek-kaiganzan, *Hosokawa 7412* (A, BISH); *Kanehira 214* (BISH); 1/2 mi [0.8 km] from Sansaro intersection, *Salsedo 148* (US). Aulupse'el: Ngerengchol, Lee Marvin Beach, 2 m, *Canfield 459* (US, BISH); *Hosokawa 9103* (A); Dii'ebachel Beach, 2 m, *Evans 579* (US, BISH, POM, NY). Urukthapel: E end, road to lighthouse, 1–5 m, *Fosberg 32038* (US, BISH, POM, NY). Todai-san: *Hosokawa 7496* (BISH, A).

Morinda pedunculata Valetton

Morinda pedunculata Valetton, Bot. Jahrb., 63:322, 1930.—Kanehira, Fl. Micr., 368, 1933; Enum. Micr. Pl., 421, 1935.—Fosberg, Occ. Pap. Bish. Mus., 15:220, 1940.—Fosberg, Sachet, and Oliver, Micronesica, 15:272, 1979.—Fosberg et al., Vascular Pl. Palau, 41, 1980.

Shrub or small glabrous tree, to 7 m tall, nodes prominent, internodes squarish, greatly variable in length; leaves mostly crowded at ends of branches, elliptic to broadly so, or oblong or slightly obovate, somewhat falcate, 9–13 (–18.5) × 5–10 cm, apices slightly acuminate, bases-acute, firm-chartaceous, veins 6–8 (–10) on a side, petiole 1–4 (–5) cm; stipules ovate to triangular, apex obtuse to blunt or usually somewhat acuminate; peduncles axillary, up to 5.5 cm long, heads at anthesis globose, up to 1 cm diameter; calyx truncate or with very minute well-separated teeth, becoming fleshy after corollas have fallen, corolla tube 11–13 mm long, white to purplish or blue-violet, slightly dilated upward, lobes 5, linear-oblong, 5 mm long, reflexed, bearded at base, style well-exserted, bifid,

fruit becoming enlarged, irregular, up to 2–4 × 2–2.5 cm.

VERNACULAR NAME.—kasengel (Palau: Babeldaob: *Falanruw* & *Fosberg 1032*).

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: *Kanehira 1927* (P, US). Babeldaob: Garamiscan Colony, 75 m, *Fosberg 25693* (US, BISH); Airai, 500 ft [150 m], *Hosaka 3417* (US, BISH); Gakilo, 200 ft [60 m], *Hosaka 3363* (US); Nekken, *Cheatham 11* (US, BISH); Ibobang, 10 m, *Raulerson 5696, 6053* (US); Airae, *Hardy 124* (US, BISH); Aimeliik, 500 ft [150 m], *Stone 1330* (US); SW of Mt. Yekigaroto, 130 m, *Fosberg 47691* (US, BISH, POM, NY); *Dutton 66* (US); Lake Ngardok, 25–50 m, *Fosberg 32533* (US, BISH, POM, NY, L); Airai, road to Nekken, *Hardy 124* (US, BISH); Airai, dam site, *Fisher 126* (US); Ngardmau Munic., along Ailong River, 1/2 mi [0.8 km] S of Ngardmau dock, 30 m, *Canfield 384* (US); Aimeliik Munic., along Bakkak River, 5 m, *Canfield 332* (US); Ngiwal Munic., 1.2 mi [1.9 km] SW of Ngiwal village, 20 m, *Canfield 502* (US); Mt. Megiron, Garasumao, *Hosokawa 7106* (BISH); Garasumao, *Takamatsu 1547* (BISH); Garudokku, *Takamatsu 1323, 1417* (BISH); Marukiyoku, *Takamatsu 1719* (BISH); Kaiguru, *Takamatsu 1595* (BISH); Eimeliik, *Tuyama 9357* (GUAM); Nekken, *Falanruw & Fosberg 1032* (GUAM); “near the Dam,” 500 ft [150 m], *Shearard and Spence 400* (US). Koror: Intersection of road to water plant, Ngesaol, *Salsedo 79b* (US). Ngarakabesang: Western peninsula, 10–20 m, *Fosberg 32473* (US, BISH).

Morinda salomoniensis Engler

Morinda salomoniensis Engler, Bot. Jahrb., 7:478, 1887.—Johanson, Blumea, 33:281, 1988.

Morinda volubilis sensu auct. non (Blanco) Merrill, Philip. Journ. Sci. Bot., Suppl., 1:137, 1906.—Glassman, Bish. Mus. Bull., 209:95, 1952.—Fosberg, Sacht, and Oliver, Micronesica, 5:272, 1979.

Woody liana, not twining, to 15 m, glabrous, stems terete or very slightly squarish, internodes to 5 (10–12) cm long; leaves elliptic to broadly so, opposite, to 12–13 × 6–7.5 cm, abruptly sharply acuminate, veins 6–8 on a side, not prominent, with small domatia in axils beneath, petioles 2–3 cm long, flattish; stipules low, 2–4.5 mm high, sheathing, scarcely lobed, obtuse, scarcely cuspidate; inflorescence panicles or corymiform compound cymes, peduncles stout, lower panicle branches opposite, upper ones alternate, branchlets terminating in small heads or capitula, hypanthia partially fused, (2–) 8–20-flowered, calyx shallow cup-shaped, exserted, about 3 mm wide, limb almost truncate, collectors inside at base; corolla tube slender, 4–6 mm long, lobes 5–6 (–9), broadly linear, rather fleshy, 5.6–7.4 mm long, recurved, white; anthers linear, 5.5 mm long, attached about 1/3 from base, base minutely bi-apiculate; heterostylous, style filiform, glabrous bifid at apex into 2 linear recurved stigmas; fleshy fruiting syncarp up

to 2.5 cm across; each ovary “spuriously” 4-loculed, each locule with 1 seed when all are developed (description supplemented from Philippine specimens).

A species known otherwise from Moluccas to Soloman Islands, collected in Ponape twice. The Kanehira collection was distributed to several herbaria under an unpublished manuscript name, but was then identified and reported as *M. volubilis* by Glassman in 1952, but is now placed in *Morinda* (as *Caslospermum salomoniensis* by Johanson).

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Ponape: *Kanehira 1527* (US, BISH, P); trail from Awak Valley to Mt. Toloneshappu, 300–500 m, *Stemmermann & Haun s.n.* (BISH).

Morinda umbellata L.

Morinda umbellata L., Sp. Pl., 176, 1753.

The south Asian typical variety is not known from Micronesia.

Morinda umbellata var. *glandulosa* (Merrill) Fosberg

Morinda umbellata var. *glandulosa* (Merrill) Fosberg, Occ. Pap. Bish. Mus., 15:220, 1940.—Walker and Rodin, Contr. U.S. Nat. Herb., 30:466, 1949.—Stone, Micronesica, 6:552–553, 1971.—Fosberg, Sacht, and Oliver, Micronesica, 15:272, 1979.

Morinda glandulosa Merrill, Philip. Journ. Sci. Bot., 9:146, 1914.—Valeton, Bot. Jahrb., 63:321, 1930.—Kanehira, Fl. Micr., 366, 1933; Enum. Micr. Pl., 421, 1935.

Woody vine, stems glabrous, very soon becoming corky, sparingly branched; leaves elliptic, mostly 5–7 × 2–3 cm, acute to slightly acuminate at apex, acute at base, subcoriaceous, glabrous, main veins visible but not conspicuous, 6 or 7, uniting near margin to form a scalloped submarginal vein, petioles slender, 10–15 mm long, vein axils usually with domatia; peduncles slender, 2–more usually 4, terminal, rarely one in each uppermost axil, 7–16 (–23) mm long, flowering heads 12–22 mm diam., with usually 10–20 (–25) flowers; calyx a short crispate flange; corolla tube about 2 mm long, lobes 4–6, about 3 mm long, ovate oblong, apex hooked, a tuft of hairs within at base; anthers narrowly oblong-sagittate about 2.5 mm long, apex blunt or subtruncate; style glabrous, subequal with corolla tube, stigmas 2, fleshy; fruit a globose syncarp about 12–15 mm diam., red or orange? when ripe.

A rather common liana in forest on limestone, known only from Guam and Saipan, except for the one record from Kusaie, a rather unusual distribution.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Saipan: *Kanehira 10* (BISH); *Kanehira 2223* (P); Tapotyto-santyohukin, *Hosokawa 6689* (BISH),

A); *Hosokawa* 8022 (BISH, A, US); Mt. Tapotchau, N slope, 1000 ft [300 m], *Hosaka* 2940 (US, BISH). (Saipan?) Mikronesien, *Höfer* 45 (BISH); Mt. Tagpochau, 1000 ft [300 m], *Stone* 1379 (BISH); *Herbst & Falanruw* 6924 (US).

Guam: *G.E.S* 37 (BISH, BM, US); E of Yigo, *Moran* 4397 (BISH, POM, UC); *G.E.S.* 376 (US, lectotype, BISH, BM, isotypes); Barrigada and Pagat Pt. area, 400–600 ft [120–180 m], *Moore* 42 (US); Pati Pt., 180 m, *Bryan* 1264 (US, BISH, P); Ritidian Pt., top of cliff, 170 m, *Fosberg* 25311 (US, BISH); Ritidian Pt., 400 ft [120 m], *Hosaka* 3097 (US, BISH); *Fosberg* 43422 (US, BISH, POM); NW Field, *Stone* 5001 (GUAM); cliffs above Pago Bay, *Stone* 3780 (GUAM); N slope of Mt. Almagosa, 280 m, *Fosberg* 35497 (US, BISH); top of Mt. Lamlam, 400 m, *Fosberg* 35365 (US, BISH); Ritidian Pt., *Anderson* 203 (US, BISH, POM, NY, L); Mt. Lamlam, summit, 400 m, *Anderson* 135 (US, BISH, POM); Dededo Well Field, 110 m, *Evans* 1684 (US, BISH, POM, NY, L); Machanao, 150 m, *Evans* 1766 (US, BISH, POM, NY); Sabana Pagat, 150 m, *Fosberg* 35271 (US); Ritidian Pt., 170 m, *Sachet & Moore* 1818 (US, BISH); Navy Magazine, *Moore* 495 (US); S peak of Mt. Lamlam, 380 m, *Fosberg & Evans* 46245 (US, BISH); Mt. Lamlam, 300 m, *Fosberg* 46264 (US, BISH, POM, NY, L); s. l., *Costenoble* in 1906 (US); SW of Barrigada Hill, 1.5 mi [2.4 km] from Barrigada, *Stone* 4010 (GUAM, US); summit of Barrigada Hill, *Stone* 5155 (GUAM); Mt. Alifan, summit, 870 ft [265 m] *Fosberg & Scully* 59723 (US, BISH); Mt. Alifan, E slope, 780 ft [237 m], *Fosberg & Scully* 59732 (US, BISH); NE of main gate to Andersen AFB, *Raulerson & Rinehart* 10582 (US).

CAROLINE ISLANDS.—Kusaie: Mount Matante, *Takamatsu* 518 (BISH).

Mussaenda L.

Mussaenda L., Sp. Pl., 177, 1753; Gen. Pl., ed. 5, 82, 1754 [= 1753].—Safford, Contr. U.S. Nat. Herb., 9:330, 1905.

Shrubs, small trees or lianas; leaves opposite, thin; stipules tardily caducous; inflorescence a terminal cymose panicle with caducous scale-like bracts; calyx lobes separate nearly to base, in central flower of some cymules the outer calyx lobe much enlarged and showy, stipitate, calyx caducous from even young fruit; corolla salverform, tube and throat about equal, buds plicate; fruit fleshy, often with conspicuous white lenticels, locules 2, placentae fleshy, axile, shield shaped, longitudinally attached, the two sides recurved, all surfaces covered by numerous small seeds.

An Old World tropical genus with few highly variable or many ill-defined species.

Mussaenda frondosa L. has been reported a number of times from Micronesia, beginning with Safford (1905:330), who, without specifically saying so, presumably found it on Guam. Subsequent reports are all from the Western Carolines. A.C. Smith (1945) and Jayaweera (1964) referred the Caroline

Islands plants to *Mussaenda philippica*, which seems a satisfactory disposition for them, for the present. The entire complex related to *M. frondosa* seems too closely related, and with further study may turn out to comprise a series of varieties of that species.

The Guam reports remain doubtful, as *Mussaenda* has not been found on Guam by any modern collector, to our knowledge, and no Safford specimen is known. In the absence of a specimen we feel justified in excluding *M. frondosa* from the Guam flora, and from the flora of Micronesia. *Mussaenda frondosa* is regarded by both Smith and Jayaweera as confined to Ceylon and India.

Key to Micronesian Species of *Mussaenda*

Enlarged calyx lobe red, pubescence reddish, abundant, tips of corolla lobes in bud not separate *M. erythrophylla*
Enlarged calyx lobe white, pubescence not reddish, sparse, tips of corolla lobes in bud separate *M. philippica*

Mussaenda erythrophylla Schumacher

Mussaenda erythrophylla Schumacher, Beskr. Guin. Pl., 116, 1827.—Fosberg, Sachet, and Oliver, Micronesica, 15:272, 1979.—Fosberg et al., Vascular Pl. Palau, 41, 1980.

Tall shrub, most parts pubescent with reddish hairs; leaves broadly ovate somewhat acuminate, veins about 8 on a side; stipules very broadly ovate to cordate, patent to reflexed, tips bifid; panicle about 4 times dichotomous or trichotomous, bracts to 1 cm long, deeply trifid, lobes linear; calyx lobes uniformly 5, linear-lanceolate except for enlarged one that is broadly ovate-subcordate, up to 8 cm long, bright red above, pink with red veins below; corolla densely red hairy without, limb very broadly ovoid, almost globose in bud, tips not separate, lobes very broadly ovate, obtuse, red without, cream color within, center deep maroon-bearded, throat densely yellow hirsute within, tube sparsely pilose within; anthers linear-subulate, 4 mm long; style filiform glabrous, stigma narrowly oblong, bluntly bifid about half-way; young fruit clavate, red pubescent.

Planted as an ornamental on Palau: Native of tropical Africa.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Koror: *Blackburn* E 95 (US, BISH); Ngerebe'ed, entomology station, 10 m, *Fosberg* 47418 (US, BISH, POM, NY, L); *Cheatham* 79 (US, BISH); *Falanruw* 1065 (GUAM, 2 sheets).

Mussaenda philippica A. Richard

Mussaenda philippica A. Richard, Mem. Soc. Hist. Nat. Paris, 5:245, 1834.—A.C. Smith, Journ. Arn. Arb., 26:105, 1945.—Jayaweera, Journ. Arn. Arb., 45:128–131, 1964.—Fosberg, Sachet, and Oliver, Micronesica,

15:272, 1979.—Fosberg et al., *Vascular Pl. Palau*, 41, 1980.

Mussaenda frondosa sensu auct. Micr.—Volkens, *Bot. Jahrb.*, 31:474, 1901.—Safford, *Contr. U.S. Nat. Herb.*, 9:330, 1905.—Merrill, *Philipp. Journ. Sci. Bot.*, 9:147, 1914.—Kraemer in Thilenius, *Erg. Süds. Exp.*, 11B, 10(1):1–43, 1937.—Fosberg, *Occ. Pap. Bish. Mus.*, 15:215, 1940.—Stone, *Micronesica*, 6:553, 1971.—Souder, *In Guam Gardens*, 58, 1974.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:272, 1979.—Fosberg et al., *Vascular Pl. Palau*, 41, 1980 [non L. Sp. 177, 1753].

Mussaenda sericea sensu auct. Micr.—Valeton, *Bot. Jahrb.*, 63:300–304, 1930.—Kanehira, *Fl. Micr.*, 369, 1933; *Enum. Micr. Pl.*, 421–422, 1935.—Okabe, *Nankyo*, 2:20, 47, 1943 [non Blume, *Bijdr.*, 986, 1826].

Large shrub or small tree, glabrous to minutely appressed puberulent; leaves ovate-elliptic to elliptic, to 17 × 6 cm, strongly acuminate, base contracted to a slender petiole 1–1.5 cm long, veins 9 to 12 on a side; stipules sericeous, triangular, with a deeply bifid acumen; panicle about 4 times trichotomous, densely sericeous to soft-pubescent, bracts linear, bracteoles irregularly and inequally trifid, segments linear to filiform, flowers apparently dioecious; calyx caducous even from rather young fruits, lobed almost to base, principal lobes 5, outer one greatly enlarged and showy on a few flowers, unmodified lobes somewhat unequal, linear to narrowly lanceolate, tips subulate, much variation even on a single plant, usually somewhat striate or carinate on back (especially on Yap plants), calyx usually somewhat less sericeous than cyme and hypanthium, small extra subulate lobes accompanying the enlarged leaf-like lobe, which is up to 9 cm long, broadly ovate, acuminate, somewhat cordate or rounded or obtuse at base, stipitate (“petiolate”), white, membranous, thinly sericeous, veins prominent; corolla 2–3 cm long, densely but shortly pubescent without, limb ovoid in bud, acuminate, tips of lobes separate, lobes ovate acuminate, bright yellow and densely puberulent within, center of staminate flowers shortly bearded and throat densely yellow hirsute within, 7 mm long, tube glabrous within, 2 cm long, anthers 4–5 mm long, linear or subulate; pistillodes about 5–7 mm long, glabrous, with 2 connivent lobes about 2 mm long; pistillate corollas with tube and throat subequal, about 1 cm long, throat somewhat yellow puberulent within, no beard, tube glabrous within, antherodes subulate, 4 mm long; pistil with glabrous filiform style and subexserted stigma about 7 mm long, linear, bifid almost to base into slender blunt lobes papillate on inner surfaces and margins; fruit (not quite mature) broadly ellipsoid, 2 cm long, 13 mm wide at middle, thickly beset with white lenticels.

Careful study of living specimens, during preparation of the above description, suggest that this species is really dioecious, rather than merely heterostylous, as considered by Jayaweera. The pistil in the staminate plant (*Fosberg 47416*) is reduced to a pistillode 5–7 mm long, with lobes connivent, about 2 mm long. The antherodes in the pistillate plant (*Fosberg 47417*) are subulate, about 4 mm long.

These plants from the western Carolines are probably best referred here, though they are hard to distinguish from those from the South Pacific and westward in Malesia and even India and Ceylon. They have commonly been referred to *M. frondosa*, the original Ceylonese species of the genus.

Discussions by A.C. Smith (1945) and Jayaweera (1964) indicate that the Caroline Island plants are not separable from the widely spread *M. philippica* of the Philippines and Solomon Islands, which is a logical phytogeographic relationship.

This species, interpreted broadly, extends from the Philippines to the Caroline and even the Solomon Islands. In Micronesia it is known from Palau, Yap, and Fais. On Palau the pubescence ranges from close and thinly sericeous to loosely appressed and almost shaggy. On Yap only the sericeous forms are represented (so far as BISH and US specimens go). The Palauan plants are said to tend to erect bushiness while Yap ones tend to be rather sprawling.

USES.—Emetic: New green leaves are crushed together with a cup of water. Lumbago: Fruit and leaves are crushed together and taken with water (Palau: Okabe, 1943). Gonorrhea: Young fruit is pressed and taken with water (Yap: Okabe, 1943). For lungs when chest is hit in a fall. Sap is taken to prevent tuberculosis (Yap: *Cushing 45*).

VERNACULAR NAMES.—

ercherio (Palau: Otobed, 1967; *Blackburn & Bechesrrak E100*)
 erceroi (Palau: Fosberg et al., 1980)
 ereiroi (Palau: Okabe, 1943)
 ereroi (Palau: Kanehira, 1935)
 amerok or bech (Yap: *Cushing 451*)
 bach or wach (Yap: *Fosberg 46315*)
 batsch (Yap: *Alvis 102*)
 petch (Yap: Okabe, 1943)
 djienge (Fais: Kraemer, 1937)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: Safford, 1905:330; Merrill, 1914:147 (citing Safford).

CAROLINE ISLANDS.—Palau: Rocky hillside, *Herre 12* (BISH). Babeldaob: Old Ngatpang village, 25 m, *Bowden-Kerby LR 5138* (US); Katellwell, *Tuyama* s.n. in 1937 (BISH); Garudokku, *Takamatsu 1348* (US); Ngial, 50 ft [15 m], *Hosaka 3404* (US, BISH, POM, NY); E coast, hills between Melekiok and Lake Ngardok, 30–60 m, *Fosberg 32595* (US). Koror: *Ledermann 54217* (B); *Blackburn & Bechesrrak E 100* (US, BISH); *Cheatham 95* (US, BISH, POM); near entomology lab., *Stone 4584* (US); Ngerebe'ed, entomology station, 10 m, *Fosberg 47417* (US, BISH, POM, NY, L), *47416* (US, BISH, POM, NY, L); *St. John 21505* (BISH, US); Coral I., *Kanehira 90* (BISH), *Falanruw 1064* (GUAM); Ngesod, water pumping station, *Marin PV68-11* (GUAM); near entomology station, *P.H. Moore 186* (GUAM); road to airport, 150 ft [45 m], *Shearard & Spence 92* (BISH); Ngarabaket, *Tuyama 7230* (K); Arukodosokkew, *Takamatsu 1151* (K); cult., *Hobdy 1430* (BISH). Ngarakabesang: E slope, near causeway to Koror, *Fosberg 25769* (US, BISH). Angaur: 25 m, *Fosberg 25902* (US, BISH), *25897* (US, BISH); E slope above village, 30 m, *Fosberg 32133* (US, BISH, POM, NY, L).

Yap: $\frac{3}{4}$ mi [1.2 km] W of Gachipar, 20 m, *Fosberg 46315* (US, BISH, POM, NY, L); top slope and summit of Mt.

Matade, 150 m, *Cushing 467* (US, GUAM); summit of Mt. Matade, *Cushing 451* (US, GUAM); Mt. Matade, 160 m, *Fosberg 25555* (US, BISH); *Kanehira 1157* (BISH); Tarago, *Hosokawa 8707* (BISH); Rumonto, *Hosokawa 8945* (BISH); Worwor, 15 m, *Alvis 102* (US, BISH, POM, NY, L); trail to Inuf, S Yap, *Cushing 434* (GUAM); Bahabat, *Takamatsu 1872* (K); s. l., *Stemmermann 3567* (BISH); Tabiwol, near Bulochang abandoned village, *Fosberg 60061* (US, BISH, POM); Tomil L., 100 ft [30 m], *Hosaka 3298* (US, BISH, NY, L).

Fais: S end of island, 15 m, *Fosberg 46688* (US), *46690* (US, BISH, POM, NY).

Mussaenda philippica var. *aurorae* Sulit

Mussaenda philippica var. *aurorae* Sulit, Phil. Journ. Forestry, 2:39, pl. 3: fig. 1, 1939.

Mussaenda philippica cv. Dona Aurora, Hort.

Mussaenda philippica f. *aurorae* (Sulit) Jayaweera, Journ. Arn. Arb., 45:131, 1945.

This differs from *Mussaenda philippica* var. *philippica*, as described above, in having some or all of the calyx lobes enlarged and white.

This highly ornamental shrub was found in the forest in the Philippines by Hugo Curran, and propagated by cuttings, and is now widely planted in the tropics, including Guam. We treat it here as a botanical variety rather than as a cultivar because it did not originate in cultivation. Mr. Souder informs us (pers. comm., 1967) that two hybrid cultivars have been planted in Guam, c.v. Luz and c.v. Dona Trining. They are hybrids involving var. *aurorae*.

Seen cultivated in Guam and Palau-Koror.

Mycetia Reinwardt

Mycetia Reinwardt, Syll. Pl. Nov., 2:1825.—K. Schumman in Engler and Prantl, Nat. Pfl., IV (4):66, 1891.—Backer and Bakhuizen, Fl. Java, 2:305, 1965.

Erect shrubs, branchlets with a soft spongy-swollen corky bark; leaves opposite, penninerved, lacking domatia, membranous; stipules interpetiolar, ovate-triangular often, glandular-dentate; inflorescence various, often corymbiform-paniculate, sometimes involucre, terminal or axillary; calyx lobes 4–6, triangular, glandular-serrate or not, persistent; corolla tubular, hairy within, lobes valvate-induplicate in bud; stamens inserted below throat, rarely at or near base; ovary bilocular, placenta fleshy, on septum, ovules numerous; style filiform, bifid or 4–6 branched, branches linear; fruit fleshy, or coriaceous, indehiscent or tardily loculicidal at apex; seeds many, cuneiform.

A small genus of 4–5 species, distributed from the Himalayas to Malay Archipelago and Palau. One species found once in Palau.

Mycetia lateriflora (Blume) Reinwardt ex Korthals

Mycetia lateriflora (Blume) Reinwardt ex Korth, Nederl. Kreidk. Arch., II,

2:118, 1851.—Valeton, Bot. Jahrb., 63:301, 1930.—Kanehira, Enum. Micr. Pl., 422, 1935.—Fosberg, Sachet, and Oliver, Micronesica, 15:272, 1979.—Fosberg et al., Vascular Pl. Palau, 41, 1980.

Bertiera lateriflora Blume, Bijdr., 987, 1826.

Mycetia cauliflora Reinwardt, Syll. Ratisb., 2:9, 1828.

Shrub; leaves opposite, lanceolate, veins prominent, arching to parallel with margins, strongly acuminate, long-narrowed to base; inflorescences axillary, racemose or somewhat paniculate, with 2 or more whorls of flowers on branchlets, loose, flowers and involucre bracts white; calyx lobes 5, hirtellous subulate; corolla long-subfunneliform, tube swollen at base, hairy within, 10–11 mm; disk elevated, style 11 mm long; fruit pendulous, cylindrical to globose, white, on pedicels 1–3 cm long, seeds many.

Description from Indonesian material and published description, as the plant has not been recollected in Micronesia because *Ledermann's 14360*, from Palau, Babeldaob, in 1914, not seen by us, probably lost in Berlin bombing.

Ophiorrhiza L.

Ophiorrhiza L., Sp. Pl., 150, 1753.—Darwin, Lyonia, 1:47–102, 1976.

Herbs, suffrutescent, or even slender shrubs, erect or decumbent, occasionally procumbent, raphids present but rare; leaves opposite, usually thin, usually petiolate, acute to acuminate; stipules interpetiolar, variously developed, entire to bifid or fimbriate; inflorescence a terminal corymbiform, dichotomously or irregularly branched cyme, branches scorpioid or helicoid, flowers secund, bracts subulate or setiform, usually present, flowers pentamerous, calyx lobes or teeth deltoid to rarely lanceolate; corolla narrowly (rarely broadly) funneliform to salverform, tube often elongate, lobes valvate, usually spreading, tube often variously hairy within; stamens with filaments variously fused to corolla tube, anthers included or rarely exerted; style filiform, stigma capitate to bifid, included or subequal with corolla tube or sometimes exerted; fruit capsular, usually flattened, often obcordate, rarely subglobose, loculicidal, usually broader than long, crowned by persistent calyx teeth; seeds numerous, rhomboid, smooth.

A large Indo-Pacific genus, of controversial affinities, but probably correctly placed in the tribe Hedyotidae; one species in Palau.

Ophiorrhiza palauensis Valeton

Ophiorrhiza palauensis Valeton, Bot. Jahrb., 63:298, 1930.—Kanehira, Enum. Micr. Pl., 423, 1935.—Fosberg, Occ. Pap. Bish. Mus., 15:214, 1940.—Darwin, Lyonia, 1:78–80, 1976.—Fosberg, Sachet, and Oliver, Micronesica, 15:273, 1979.—Fosberg et al., Vascular Pl. Palau, 41, 1980.

Ophiorrhiza palauensis var. *biseta* Fosberg, Occ. Pap. Bish. Mus., 15:214, 1940.—Otobed, Guide List Plants Palau Islands, 1967.

Herb or slightly woody at base, stem subglabrous or slightly puberulent; leaves oblong, 10–12 cm or more long, to 3.8 cm wide, thin, apex acuminate, base acute, slightly decurrent, main veins sparsely pilose above, somewhat more so beneath, about

12 to 14 on a side, arching and anastomosing near margin into a submarginal vein, a weaker vein between each two, not reaching more than half-way to margin, fading into a coarse network, petioles slender, 1.5–3.7 cm long; stipules lanceolate, apex filiform caudate, or forked into two, 5–6 mm long; cyme terminal, peduncle 2.5 cm long, subtended by two foliaceous bracts, these ovate or elliptic, twice dichotomous, the inner sides of the forks densely puberulent, branches and flowers subtended by filiform bracts; hypanthium with 5 rounded glabrous keels running into the 5 subulate calyx lobes, the intervals densely puberulent, corolla sparsely pilosulose, tube 1.5–2 cm long, slender, slightly dilated upward, white, lobes 5, ovate, about 5 mm long; stamens inserted well within corolla tube, filaments short, anthers oblong-linear, 2–2.5 × 0.5 mm, included; stigma fleshy, bifid, about 1.2 mm long, lobes divergent; fruit mitriform, 2.5–4.5 × 4.0–11.2 mm, puberulent, calyx lobes persistent.

VERNACULAR NAMES.—

meldii (Palau: Fosberg et al., 1980; *Fosberg 47564*)
 metsibech (Palau, Koror: Valetton, 1930; *Raymundus 142*)
 odoid (Palau: Fosberg et al., 1980)
 tielar bekai (Palau: Fosberg et al., 1980)

This species, endemic to Palau, is widely distributed on both volcanic and limestone substrata. Plants from limestone areas differ slightly from those on volcanic soils. Their leaves tend to be broader and frequently somewhat obovate or broadly oblanceolate, and the plants to be slightly more slender. The cymes are usually somewhat more slender, and the corolla tube are usually more slender and sometimes shorter. The type from Koror, *Raymundus 124*, which was probably lost in the Berlin bombing, was described as having the leaves narrowly elliptic to lanceolate, suggesting that it may have come from the volcanic part of Koror. Mature fruiting specimens from the volcanic areas are lacking. Darwin, in his revision of the Pacific species (1976) rejects var. *biseta* as the stipule character does not hold up, and mentions the narrower leaf width. He cites material of this species from both volcanic and limestone substrata, but does not suggest any taxonomic separation. Further consideration of this possibly should await collection of more ample flowering specimens from the limestone and mature fruiting ones from the volcanic ones. Darwin, 1976:48, regards *O. palauensis* as related to eastern Asiatic species, rather than to other Pacific species.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Babeldaob: 1.5 mi [2.4 km] due N of airfield, 10 m, *Canfield 265* (US); Airai, old Japanese water reservoir, *Hardy 115* (US, BISH, POM, NY, L); 50 m, *Vann A-12* (US); near waterfall at Ngatpang, *Cheatham 121* (US); Itau, first estuary S of Me'ebe'ubul, 1 m, *Fosberg 32406* (US, BISH, POM, NY); Aimiliiki-son and Ailai Island, *Hosokawa 7274* (A, BISH); Mt. Megilon, *Hosokawa 7118* (A,

US, BISH). Koror: Arumidu-sangoseikaiganzan, *Hosokawa 7405* (US); Ngermid, *Cheatham 61* (US, BISH, POM); Ngarmid, 30 m, *Fosberg 47492* (US, BISH, POM, NY, L); on road to Rendrok, *Salsedo 116* (US, BISH); Ngerbechedesau, 0 m, *Hardy 23* (US); Toirechuil, W of Koror, limestone I., on S side of causeway between Koror and Malakal, 14 m, *Canfield 294* (US); Aurapushokaru I., 321 ft [100 m], *Stone 4550* (US). Aulupse'el: Western part of island, 1–5 m, *Fosberg 31948* (US, BISH, POM); Risong, Matuker Bay, 2 m, *Fosberg 47564* (US, BISH, POM), 30–50 m, *47536* (US, BISH, POM, NY, L). Oropsyakal-to: *Hosokawa 7451* (A). Urukthapel: Ngchus, Ankosu Pt., 50 m, *Canfield 464* (US); SW shore of Malakal Harbor, 1 m, *Fosberg 25864* (US, BISH, POM, NY); SW peninsula of island, 1–10 m, *Fosberg 32187* (US, BISH, POM); Todai-san: *Hosokawa 7528* (A).

Paederia L.

Paederia L., Mant., 1, 7, 52, 1767.

Lianas, unarmed, dextrously twining, often ill-scented when broken; raphides present; leaves simple, entire, opposite or in whorls of 3; stipules entire, triangular or ovate, persistent or tardily caducous; cymes axillary, open, paniculate; flowers pentamerous, bisexual; calyx shortly lobed, toothed, or truncate; corolla infundibuliform to campanulate, pilose within at least in lower part, lobes valvate, margins inrolled; stamens inserted in corolla-tube, anthers narrowly oblong; ovary 2-locular, ovules one in each cell, erect, stigmas filiform, intertwined; fruit a thin-walled dryish drupe, 10-nerved, pyrenes 2.

A pantropical genus, said to include 50 species.

Paederia tomentosa Blume

Paederia tomentosa Blume, Bijdr., 968, 1827.

Vigorous climber, sparsely to densely soft-pubescent, hairs multicellular, erect to curved, or curled, pubescence densest on petioles and under sides of leaf nerves; stems somewhat fistulose, grooved when dry, internodes to at least 10 cm long,, leaves purplish green, opposite, broadly oblong-ovate to suborbicular; apex obtuse, minutely apiculate, base subtruncate to subcordate or cordate, lamina thin, nerves 5–6 on a side, opposite to alternate, petioles slender 2–4 cm long, densely pilose-tomentose; stipules triangular to broadly ovate, acuminate, not or scarcely joined at base, dorsally subglabrous to appressed pilose, strongly and closely hispid-ciliate on margins; cymes 2 at a node very loosely paniculate, peduncles slender, 2–3.5 cm long, trichotomous at first ramification, branches once or twice, rarely three times dichotomous, a sessile or subsessile flower in each forking, branches then elongating with 3–5 secund flowers, 6–12 mm apart, “pink-purple” according to collectors, bractlets small, scale-like, acuminate, strongly ciliate; hypanthium glabrous, calyx di-

vided almost to base, into 5 broadly triangular densely ciliate teeth; corolla about 6 mm long infundibuliform-campanulate, densely purplish tomentose externally, with 5 blunt ovate erect lobes; no fruit seen on Guam specimens.

By some united with *Paederia scandens*, but differing in being soft-pubescent throughout, much broader leaves, different inflorescence branching, and smaller flowers. Native of Java and the Philippines; apparently only recently introduced on Guam. First found 30 Apr 1989, but then already covering a patch about 2 hectares in area.

GEOGRAPHIC RECORD AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: Former Harmon Housing area, inland from Two Lovers Pt., alt. 100 m, *Raulerson & Rinehart 18568* (GUAM, US), *Raulerson 18691* (GUAM, US), *Rinehart & Raulerson 19274* (GUAM).

Pentas **Bentham**

Pentas Bentham, Bot. Mag., 70: t. 4086, 1844.

Herbs or shrubs, with raphide bundles in tissues, 1 or more stems from a rootstock, stems sparingly or much branched, plant usually hairy; leaves ovate to lanceolate, opposite, pseudo-verticillate or in whorls, usually strongly nerved, margins entire; stipules pectinate, rarely bifid, glandular-tipped; inflorescence terminal or rarely also lateral, a corymbiform cyme, often subcapitate or even capitate, more open in fruit; calyx 5-lobed, with stipitate glands between lobes, lobes equal or 1–3 larger, one or more sometimes foliaceous; corolla tubular-funnelform or throat abruptly cylindrical, lobes 5, spreading, ovate or oblong; stamens with filaments adnate to tube to near summit, anthers dorsifixed near base or middle, oblong or linear, opening by longitudinal slits; style filiform, with two branches, these stigmatic almost all around, ovary 2-locular, fleshy placentae attached to middle of septum, ovules numerous; fruit a ribbed, usually turbinate or globose capsule, beaked, usually opening apically into 4 valves, sometimes tardily splitting into 2 cocci; seeds minute, irregularly globose or angular, testa minutely reticulate.

A mostly African genus of between 30 and 40 species, a few of them with cultivated ornamental varieties, two of which are sometimes planted in Micronesia.

Key to Micronesian Species of *Pentas*

- Corolla red, throat cylindrical or at least abruptly dilated at base, pubescence notably velutinous *Pentas bussei*
- Corolla lilac or purplish, or white, throat funnelform, pubescence coarser than velutinous *Pentas lanceolata* var. *carnea*

Pentas bussei **Krause**

Pentas bussei Krause, Bot. Jahrb., 43:134, 1909.—Verdcourt, Bull. Jard. Bot. Bruxelles, 23:297–303, 1953.
Pentas coccinea Stapf, Bot. Mag., t. 9005, 1924.

Shrubs to 2 (or even 4) m, pubescence velvety, yellowish or reddish when dry; leaves ovate to ovate-oblong, to 15 cm long, lateral nerves 5 or 6 on a side, finely hairy especially beneath, acute or acuminate shortly petiolate; stipules pectinate, setae 3–9 on a side; cymes dense to lax, up to 8 cm wide, terminal and axillary, peduncles to 4 cm long; flowers scarlet or crimson, calyx with 1 to 3 larger lanceolate lobes, 2 to 4 shorter subulate to broadly linear ones; flowers heterostylous; longistylous ones with corollas 12 to 20 mm long; anthers included; style well exerted, to as much as 9 mm; brevistylous ones with corolla 10–16 mm long, anthers well exerted, style branches included to slightly exerted; throat in both forms cylindrical; fruit oblong to obovoid, constricted at summit, to 6 mm long, 10-ribbed, splitting into 2 cocci.

An African species rarely cultivated in Micronesia.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED.

NAURU ISLAND.—W side of island, *Fosberg 58675* (US).

Pentas lanceolata (Forsskål) **DeFlers**

Pentas lanceolata (Forsskål) DeFlers, Voyage au Yemen, 142, 1889 [combination often attributed to Schumann, 1891].—Verdcourt, Bull. Jard. Bot. Bruxelles, 23:339–353, 1953.—Catala, Atoll Res. Bull., 59:102, 1957.—Fosberg, Sachet, and Oliver, Micronesica, 15:273, 1979.—Fosberg et al., Vascular Pl. Palau, 41, 1980.
Ophiorrhiza lanceolata Forsskål, Fl. Aegypt.-Arab., 42–43, 1775.

Pentas lanceolata (Forsskål) DeFlers var. *lanceolata* not found in Micronesia.

Pentas lanceolata var. *carnea* (Bentham) **Verdcourt**

Pentas lanceolata var. *carnea* (Bentham) Verdcourt, Bull. Jard. Bot. Bruxelles, 23:345, 1953.
Pentas carnea Bentham, Bot. Mag., 70, t. 4086, 1844.

Pubescent shrub to 1 m or more tall; leaves ovate, to 11 × 5 cm, somewhat acuminate, base contracted and somewhat decurrent, sparsely pilose on both surfaces, densely so on nerves beneath, nerves (6) 8 to 12, rather long; stipules low sheathing densely pilose, with 3 to 5 unequally long pilose processes or setae on each side of the stem between petioles; inflorescence of 3 terminal cymes, often with a cyme in each axil at the next node down, leaves at terminal node reduced, often the entire assemblage condensed, or even subcapitate, individual cymes or their branches subcapitate, peduncles sparsely pilose to densely above, branched portion of cyme densely pilose, branching several times but condensed, flowers crowded; hypanthium turbinate, pilose, calyx lobes strongly

unequal, two usually much longer, all of them flat, linear-lanceolate or lanceolate, within sparsely strigulose, without long-pilose on mid-nerve; corollas tubular funnelform, lilac to pink, sparsely pilose without, tube plus throat 15–19 mm long in longistylous flowers, 20–23 mm in brevistylous, tube slender, throat funnelform-dilated, densely bearded within, lobes ovate, 5–5.5 mm long, acute and minutely mucronulate, pilose without, glabrous within; in longistylous flowers anthers attached at base of throat, narrowly linear, 2 mm long, possibly sterile, style filiform, exserted 2–5 mm, stigma bifid, segments at first connivent, then spreading and becoming recurved, linear; in brevistylous flowers, filaments glabrous, exserted about 3 mm, anthers linear, 2 mm long, erect, style 16 mm long, stigma 5 mm, bifid, lobes linear, included in throat; fruit 3 mm long, turbinate, slightly compressed, pilose, calyx lobes persistent.

Native of Arabia and Africa, this variety only known in cultivation; sparingly planted in Micronesia. Several color variants are known, including a white and a rose-purple form. Some of these may possibly be of hybrid origin.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Tinian: San Jose village, planted, *Fosberg 59917* (US).

Rota: Songsong village, 5–10 m, *Evans 2253* (US, BISH, POM, NY).

CAROLINE ISLANDS.—Palau: Otobed, m.s. 1967:30.

Ponape: Kolonia, planted, *Fosberg 60530* (US); *58441* (US, BISH, POM) (flowers rose-purple).

MARSKALL ISLANDS.—Kwajalein: Fosberg (seen growing in

pot, 1956 and 1958).

GILBERT ISLANDS.—Tarawa, *Catala 116* (P).

Psychotria L.

Psychotria L., Syst. Nat., ed. 10, 929, 1759.—Valeton, Bot. Jahrb., 63:313, 1930.—Stone, Micronesica, 6:553–557, 1971.—Fosberg, Allertonia, 6: 244–247, 1991.

Amaracarpus Blume, Bijdr., 954, 1826.—Valeton, Bot. Jahrb., 63:317, 1930.

Mostly shrubs, rarely small trees or climbers; raphid bundles present; leaves simple, entire, pinnately veined, sometimes with domatia in vein-axils; stipules interpetiolar variously shaped, deciduous or persistent, sometimes forming a calyptra over the terminal bud, this usually with 2 or 4 terminal appendages, a row of trichome-like glands or colletters in stipule axil; inflorescence a terminal or axillary cyme or thyrs, rarely reduced to a fascicle or single flower, variously bracteate or not, branches opposite or whorled; flowers bisexual or unisexual and dioecious; calyx cylindrical or funnel-form, rarely saucer-shaped, usually short, 4 to 5 toothed or lobed or truncate; corolla with cylindrical or dilated tube, often quite short, lobes 4 to 5, valvate, erect to variously spreading or recurved; stamens inserted below sinuses of corolla, anthers attached basally or dorsally; ovary 2-loculed, each cell with one erect ovule, style short to slightly exserted, stigma bifid; fruit a drupe with soft flesh and 2 pyrenes, these with plane inner faces, dorsal side often carinate, tricarinate, or with broken keels, or simply convex, sclerified endocarp rather thin; seed with endosperm simple, grooved or variously ruminant.

An enormous pantropical genus, very difficult taxonomically.

Key to Micronesian Species of *Psychotria*

1. Plant a climber or pseudo-epiphytic *P. diospyrifolia*
1. Plant a shrub or tree, not climbing or pseudo-epiphytic 2
2. Inflorescences clearly axillary or very early pseudoaxillary 3
3. Flowers in dense, axillary verticels; leaves lanceolate; stipules sheathing with lobes lacerate *P. lasianthoides*
3. Flowers either fasciculate or in cymes; leaves usually broader, stipules various 4
4. Stipules sheathing toward base, apically bifid, with 2 vertical ribs or keels; flowers in filiform cymes, or pedicels fasciculate or solitary in leaf-axils *P. hombroniana*
4. Stipules calyptrate with apical appendages or a low collar with a mucro or acumen on each side, very early caducous 5
5. Flowers in irregularly branched loose clusters, these usually terminal but occasionally axillary; stipules low sheathing, mucronate *P. leptothyrsa*
5. Flowers in cymes, sessile or subsessile in triads ending cyme-branches; stipules calyptrate 6
6. Cymes glabrous, once or twice trichotomous; corolla lobes subequal

- with tube *P. malaspinae*
6. Cymes thinly pilose, three or four times trichotomous, corolla lobes much shorter than tube *P. andersonii*
2. Inflorescence terminal, sometimes becoming pseudoaxillary 7
7. Peduncles or pedicels 2 or more at terminal node 8
8. Stipules white, marcescent, subtending inflorescence; corolla funnellform, 9–15 mm. long, lobes 5 mm. long, oblong acutely pointed *P. mycetoides*
8. Stipules not white or marcescent, early caducous, not persistently subtending the inflorescences; corolla much shorter than 14 mm . . . 9
9. Inflorescence a terminal fascicle of long-pedicellate flowers or fruits *P. merrillii*
9. Inflorescences of 2 or more terminal cymes 10
10. Calyx broadly cup- or saucer-shaped, margins obsoletely dentate, not at all crispate, peduncles and pedicels loosely spreading *P. cheathamiana*
10. Calyx reduced to a narrow, thin, crispate ring at top of hypanthium, peduncles and pedicels strongly ascending, rather fastigiate *P. hosokawae*
7. Peduncle one, at terminal node 11
11. Inflorescences usually 2 cm. or less long, terminal but becoming pseudoaxillary; corolla strongly funnellform, 5-lobed, about 7–9 mm. long; stipules calyprate *P. arbuscula*
11. Inflorescence longer than 2 cm., stipules not calyprate; corolla usually tubular or hypocrateriform, usually less than 9 mm long 12
12. Flower clusters irregularly branched or paniculate *P. leptothyrsa*
12. Flower clusters clearly cymose or umbellate 13
13. Inflorescence twice umbellately branched; stipules ovate to deltoid, dried fruit broader than long, bi-sulcate *P. rotensis*
13. Inflorescence trichotomously cymose, thyrsoïd or reduced even to one fruit; stipules tubular or flat, dried fruit as long as or longer than broad, if sulcate then sulci more than two, these between keels of pyrenes 14
14. Cymes trichotomous, stiff, repeatedly branched, corymbiform to hemispheric, stipules flat, ovate; calyx cup-shaped, truncate; dried fruit and pyrenes not at all sulcate or ribbed, endosperm notably ruminant *P. mariana*
14. Cymes thyrsoïd, tending to be elongate; stipules collar-like or tubular; fruit when dried tending to be at least somewhat sulcate pyrenes, ribbed; endosperm not ruminant 15
15. Main branches of thyrse whorled except when thyrse is strongly reduced; distal branching of thyrse tending to be irregular; stipules low, collar-like, lobes triangular early caducous, flowers pedicellate; fruit, not compressed when dry, lacking a strong median keel on each side when dry . . . *P. leptothyrsa*
15. Main branches of thyrse opposite, distal branching decussate; stipules tubular, flowers sessile or subsessile; fruit somewhat compressed at least when dry; pyrenes with a strong median keel on each side 16
16. Fruit broadly ovoid, to 10–13 mm. x 9–10 mm., pyrenes rhombic *P. rhombocarpa*
16. Fruit to 20 mm long x 15 mm. wide, pyrenes hastate, lateral lobes prominent *P. rhombocarpoides*

Psychotria andersonii Fosberg

Psychotria andersonii Fosberg, Allertonia, 6:248, 1991.

Branches tending to be gray to black, glabrous except pilose when very young, squarish; leaves broadly obovate, to 11 × 5–6 cm, shortly but sharply acuminate, base cuneate, 10 to 12 veins on a side, anastomosing close to margin, woolly along midrib beneath when young, petiole 5–10 mm long; stipules narrow calyprate, to 8–9 mm long, glabrous, scarcely bicarinate, with 2 terminal appendages, these notably bifid; cymes axillary, very open, to 9 cm long, peduncles rather heavy, to 3.5 cm long, 3 or rarely 4 times trichotomous, distal forks with a sessile or subsessile flower, branches ending in small glomerules of sessile flowers; calyx deeply cup-shaped, tube 2 mm long, 4 ovate-oblong lobes subequal with tube or shorter, becoming recurved, inflorescence and hypanthium thinly pilose, calyx glabrous, corolla tubular, tube 8 mm long, lobes 2 mm, seen in bud only, glabrous externally; one immature fruit, only, seen, broadly ellipsoid, 5 mm long, scarcely ribbed, crowned by persistent calyx.

A distinctive species characterized by its strong, elongate, very open cymes.

Known only from the type collection.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

MARIANAS ISLANDS.—Guam: West of Mt. Santa Rosa, 5 Sep 1949, *D. Anderson 158* (US, holotype; BISH, MO, BM, isotypes).

Psychotria arbuscula Volkens

Psychotria arbuscula Volkens, Bot. Jahrb., 31:476, 1901.—Valeton, Bot. Jahrb., 63:314, 1930.—Kanehira, Fl. Micr., 369, 1933; Enum. Micr. Pl., 423, 1935.—Fosberg, Sachet, and Oliver, Micronesica, 15:274, 1979.—Fosberg, Allertonia, 6:249, 1991.

Shrub 1–3 m tall, branched, vegetatively glabrous, twigs tending to be blackish, distal internodes very short; leaves narrowly elliptic to narrowly obovate, to 15 cm long, usually much shorter, apex notably acuminate, base acute, blade thin, nerves 6–11 on a side, rather widely spaced, curving upward to near margins, lesser nerves variously developed between them usually straight, spaced irregularly, not reaching near margin, network faint, irregular, petiole 1 cm or less; stipules calyprate, acuminate, minutely 2-lobed at tip, about 1 cm long, early caducous; inflorescences in upper axils, short, 3 cm or usually less long, rather irregularly 2 (–3) times branched, minute ovate-subulate bractlets at ramifications, flowers pedicellate, calyx patelliform, with 5 teeth, these triangular acute to slightly acuminate, a slight constriction between calyx and hypanthium, puberulent to glabrous or glabrate; corolla funnelliform, tube 4–5 mm, lobes ovate, 3–4 mm, blunt, throat bearded; style glabrous, stigma 2 lobed, lobes somewhat divergent, subexserted; drupe ellipsoid to somewhat ovoid, 5–6 × 5–4 mm, crowned by the short persistent calyx, pyrene 4-ribbed dorsally.

Type: Yap I., Volkens 80, 175, 200, 537 (all B, syntypes,

probably destroyed).

A rather uniform species, varying in leaf size and in the degree of development of the inflorescence.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Yap: Volkens, 1901:476–477; *Kanehira 1186* (K, P, NY BISH); *Wong 413* (K); Rogool and Okao I., *Hosokawa 8891* (BISH); Takiol, *Takamatsu 1834* (BISH, 2 sheets); Balabat, *Takamatsu 1885* (BISH); *Kanehira 1168* (NY); Mt. Tabiwol, Fanif Mun., *Falanruw 3388* (US); Mabo (Map), *Hosokawa 8822* (A); Mt. Dabiol, *Hosokawa 8765* (A); Gaanpan village, Delipepinban, *Fosberg 60100* (US, BISH, POM, MO, K, P, TI, BRI, B, A), stipules unusually long with 4 appendages.

Psychotria cheathamiana Fosberg

Psychotria cheathamiana Fosberg, Allertonia, 6:249, 1991.

Shrub or small tree, entirely glabrous except leaf axils and corolla throat, branchlets pale gray, almost white, internodes 1–3 cm long, nodes rather prominent, a fringe of stiff brown trichomes (or colleters?) in axils of leaves and stipules, scars prominent; leaves narrowly elliptic to slightly obovate, ranging greatly in size, from 10 × 2 to 23 × 8 cm on same plant, apices strongly acuminate, bases cuneately contracted, lamina thin chartaceous to almost membranous, primary nerves prominent, 11–17 on a side, secondary ones weak, inconspicuous, few and irregularly somewhat ladder-like, network obscure, petioles 1–3 cm long, stipules of calyprate type but greatly elongate, to 3 cm, lower 1.5 cm narrow, but enclosing bud, ear-like appendages greatly enlarged, leaf-like, apices bifid, early caducous so only one fully developed pair remains on specimen; cymes borne 2–5 at terminal node, but soon becoming pseudo-axillary by development of a leading branch from the same node, cyme twice branched, each branch ending in an umbelloid cluster of up to 5 or 6 pedicellate flowers; calyx broadly cup-shaped, about 1 mm long, margin scarcely toothed; corolla tube narrow, 4 mm long, lobes ovate 2 mm long, somewhat reflexed, throat bearded; anthers erect, partly exserted (only one good flower seen); fruits red, fleshy, rather crowded in a cluster made up of the several cymes at the terminal node, some clusters appearing axillary, drupes ovoid, 10–13 mm long, pyrenes with 3 sharp unequal keels dorsally.

Possibly closest to *P. rhombocarpa* Kanehira, resembling that species vegetatively and in fruit, but with several small terminal inflorescences instead of a large paniculate thyrsus.

An understory or undergrowth species in the thick wet forest on the limestone islands in Palau.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Urukthapel: N coast of SW peninsula, around small lake, on upper slopes and ridges,

17–19 Mar 1950, *Fosberg 32189* (US, holotype, BISH, MO, K, A, P, isotypes); *32194* (US, BISH). Makarakol (Eil Malk); *Hosokawa 9230* (A, BISH).

***Psychotria diospyrifolia* Kanehira**

Psychotria diospyrifolia Kanehira, Bot. Mag. Tokyo, 49:355, 1935; Enum. Micr. Pl., 423, 1935.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:274, 1979.—Fosberg et al., *Vascular Pl. Palau*, 41, 1980.—Fosberg, *Allertonia*, 6:250, 1991.

Scandent shrub, pseudo-epiphytic, branchlets subterete, 4 mm thick; leaves oblong to oblong-ovate, 9–13 × 4–5.5 cm, apex cuspidate-caudate or very shortly acuminate, base obtuse to somewhat cuneate-decurrent, thick coriaceous, primary leaf-veins 9 on a side, spreading at about 60° from midrib, arcuate anastomosing near margin, network obsolete or nearly so, petiole 1.5–2.5 cm long, flattened; inflorescence terminal, to 12 cm long and wide, peduncle to 7 cm, trichotomously branched; fruit densely glomerate, stipitate, globose, 6 mm diam. longitudinally sulcate, pyrenes plano-convex dorsally 3-carinate, endosperm entire. (Adapted from original description.)

After the above description was adapted from the original, it became obvious that a specimen that had long ago been put aside unidentified is either the same or very close. We are regarding it as this species, but because of several discrepancies from the description we are not altering the description but choose to point out the respects in which this specimen, *Cheatham 39*, cited below, differs. If eventual comparison with the type shows that the two are really incompatible this specimen can be made the type of a new species.

Leaves elliptic, to 8 × 4 cm, prominently acuminate, thinly but stiffly coriaceous, inflorescence hemispheric, 5–6 cm wide, on a peduncle 4 cm long, minutely bracteate, fruits somewhat crowded but not glomerate, seeds with a roughened black surface and a very hard deeply ruminant rather than entire endosperm. The leaves resemble closely those of *P. sarmentosa* Blume.

Type: Palau, Babeldaob, Aimirik, *Kanehira 2340* (FU?) not seen by us. Known until now only from the type specimen. We have not seen the type of this climbing species, but presume it is allied to the south Asian and Indonesian *P. sarmentosa* Blume, differing especially in leaf shape and texture. Additional specimen from Babeldaob, “road from Airai to Nekken,” *Cheatham 39* (US).

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

Psychotria hombroniana (Baillon) Fosberg, *Phytologia*, 5(7):291, 1955; *Allertonia*, 251, 1991.—Stone, *Micronesica*, 6:554–555, 1971.—Souder, *In Guam Gardens*, 69, 1974.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:275, 1979.
Uragoga hombroniana Baillon, *Adansonia*, 12:333, 1879.

Shrubs to several m tall, branched, slender, glabrous to thinly woolly-pilose; leaves thin, up to 10 × 3–4 cm, mostly smaller, elliptic to ovate or somewhat obovate, obtuse to somewhat acuminate, base acute to obtuse, veins clearly visible beneath but not prominent; stipules narrow, to 1 cm long, usually much smaller, strongly bifid and only united a short distance to half-way above base, early caducous, glabrous to pilose, in one variety divided distally into many slender threads; inflorescences axillary, varying from a solitary flower to fascicles or almost sessile glomerules, to pedunculate and glomerate, to variously cymosely branched, always slender, often capillary, with small scale-like caducous bracts at ramifications, flowers from pedicellate to subsessile and then in few-flowered glomerules, calyx patelliform to cup-shaped, margin almost entire to denticulate or somewhat deltoid-lobed, persistent on fruit; corolla salverform to funnellform with 4 or 5 lobes, tube in some forms somewhat ampliate above, or sub-campanulate, throat at least usually strongly bearded; drupes red, when dry usually somewhat longitudinally plicate, ovoid to ellipsoid, pyrenes flat on inner face, more or less tricarinate dorsally, also frequently somewhat rugose; seed with endosperm entire.

This species is found in a large number of varieties, on most high islands in Micronesia. It is perplexingly variable, and has been split into many species. These seem to intergrade so thoroughly that they merit at most no more than varietal rank. The stipules and the branching of the inflorescences, as well as the pubescence, provide the principal differences.

VERNACULAR NAMES.—

- demedemegur (Palau: *Ledermann 14099*)
- rtertil (Palau: *Fosberg 25861*)
- kampaniel (Ponape: *Glassman 2873*)
- ke mpenial (Mpen = nearby, ial = path) (Ponape: *Riesenberg 35, 36*)
- chemei (Truk: *Pelzer 37, 36*)

The following key will separate most specimens into the varieties described below, but due to the variability of their characters, may not deal very adequately with some, especially if the specimens are imperfect.

Key to Varieties of *Psychotria hombroniana*

1. Stipules and cymes glabrous or almost so, leaves glabrous or only sparsely pilose along midribs beneath 2
2. Inflorescences reduced to axillary fascicles of pedicellate flowers, or to single axillary flowers, or rarely to small glomerules on short peduncles 1 (–1.5) cm. long var. ***hombroniana***
2. Inflorescences branched cymes 3

3. Flowers pedicellate; corolla tube cylindrical; calyx teeth obtuse or slightly pointed var. *ladronica*
3. Flowers sessile or subsessile; corolla tube funnelform or campanulate; calyx teeth acute 4
4. Corolla 3 mm. long, campanulate, lobes equalling tube, drupe 5 mm. long, sulcate when dry var. *mariannensis*
4. Corolla 2 mm. long, funnelform, drupe 6 mm. long, scarcely sulcate, notably rugulose var. *squarrosa*
1. Stipules usually pubescent, rarely glabrous, cymes glabrous to pilose or hirsute; leaves pubescent, at least beneath 5
5. Apices of stipules with long filaments, especially distally; cymes sparsely branched, 1-4 cm. long, glabrous to sparsely pilose var. *canfieldiae*
5. Apices of stipules not long filamentose but usually hirtellous to hirsute 6
6. Leaves subcoriaceous, petiole and under side of midrib hirsute; stipules and inflorescence hirsute, cymes less than 1 cm. long, scarcely branched, 3-5 flowered var. *peliliuensis*
6. Leaves thin-chartaceous, indument pilose or almost none; stipules hirtellous to woolly-pilose, cymes lax, trichotomous, well over 2 cm. long, sparsely pilose 7
7. Cymes glabrous somewhat thyrsoid; plants subglabrous; drupes strongly ribbed when dry and notably rugose var. *kusaiensis*
7. Cymes pilose, filiform to capillary, once or twice cymosely branched; plant generally hirtellous, drupes weakly or scarcely ribbed when dry
. var. *hirtella*

Psychotria hombroniana var. *canfieldiae* Fosberg

Psychotria hombroniana var. *canfieldiae* Fosberg, Allertonia, 6:253, 1991.

Shrub or small slender tree, branchlets glabrous, brown to blackish; leaves broadly lanceolate to narrowly elliptic, 5-8, rarely 10 cm long, strongly acuminate, rarely acute or even obtusish, base gradually contracted, blade thin, glabrous or, when very young, pilose on under side along midrib, usually soon glabrate, petiole slender, to about 1 cm; stipules sheathing, strongly bifid into very slender points these more or less filamentose, especially distally (filaments often rubbed off; cymes filiform to capillary, 1-4 cm long, sparsely branched once or twice, glabrous to sparsely pilosulous, flowers subsessile, 2 or 3 at ends of branches.

The stipules of this variety are distinctive, in general resembling those of var. *squarrosa*, but clothed, distally by long filament-like hairs; this character seems quite constant, except that the hairs tend to be rubbed off on specimens subject to handling.

Known only from the karstic limestone islands of the Palau Group, where common in undergrowth on steep slopes and ridges.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Aulupse'el: S side, Risong, Matuker Bay, 30-50 m, *Fosberg 47537* (US, BISH, POM, P, MO, S); *47554* (US, BISH, POM, K, MO, NSW, A).

Urukthapel (Ngerukthapel): Ngchus, Ankosu Pt., 50 m, *Canfield 466* (US); N part of island, near entrance to Ascidian Marine Lake, *Hobdy 1527* (BISH); middle of NE coast of Magaiald (N arm of Urukthapel Island), SW shore of Malakal Harbor, *Fosberg 25861* (US, BISH, POM, NY, BM); W side N peninsula near old cultured pearl establishment, 2-10 m, *Fosberg 32148* (US); E end Urukthapel, 200 m, *Fosberg 32493* (US, BISH); SW peninsula Urukthapel, around small lake at base of small peninsula on N coast, 1-10 m, *Fosberg 32184* (US, holotype, US, BISH, K, POM, isotypes), *32182* (US, BISH), *32183* (US, BISH, GUAM, B, MO, POM, TI). Orukuizu or "Seventy Islands Nature Reserve," easternmost large island, 20-25 m, *Fosberg 47662* (US, BISH, POM, MO, K, S, BM, A, CHR, GUAM) (leaves unusually short in proportion to their width, acute to obtusish not acuminate); *Rinehart LR 16542* (US); Bhumekerall I. (no. 13), *Rinehart LR 16619* (US). Mecherchar (Eil Malk): just above marine lake at center of island, 25 m, *Canfield 733* (US). Makarakol: *Hosokawa 9227* (A).

Psychotria hombroniana var. *hirtella* (Valeton) Fosberg

Psychotria hombroniana var. *hirtella* (Valeton) Fosberg, Smith. Contr. Bot., 45:29, 1980.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:275, 1979. *Amaracarpus hirtellus* Valeton, Bot. Jahrb., 63:320, 1930.—Kanehira, Bot. Mag. Tokyo, 49:275, 1935.—Fosberg, Allertonia, 6:253, 1991. *Amaracarpus macrophyllus* Valeton, Bot. Jahrb., 63:317-318, 1930.—Kanehira, Bot. Mag., Tokyo, 49:276, 1935; Enum. Micr. Pl., 415, 1935.—Hosokawa, Tr. Nat. Hist. Soc. Formosa, 26:38, 1935.

Psychotria ponapensis Fosberg, Occ. Pap. Bish. Mus., 15:224, 1940.—Glassman, Bish. Mus. Bull., 209:96, 1952.

Shrub, generally more or less pilose, at least young growth, leaves ovate to elliptic, acute to acuminate, hairy beneath at least along mid-rib, often glabrate when mature; stipules more or less pilose to woolly-pilose, bifid, with 2 ridges in lower part, united, at least lowest part; cymes filiform to capillary, pedunculate, once or twice branched, shorter than to subequal with leaves, at least somewhat pilose, quite variable in density of pubescence and development of cymes, also in size of leaves.

Known from Palau, Truk, Ponape, and Kusaie, including the generally, though often sparsely, pubescent plants with bifid hairy stipules. *Amaracarpus macrophyllus* and *A. kraemeri* Valetton (p. p.) probably belong here, judging by their descriptions, but their types are missing and we cannot be certain.

Regarded by Fosberg, 1940, as a distinct species, but it seems to us now only a pilose variety of *P. hombroniana* sensu lato. Specimens from Kusaie have narrower leaves than most of those from Ponape and the two available from Truk.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Pelew (Palau) Island: *Kanehira* 2475 (P).

Truk: Fefan: Mt. Ibal, *Hosokawa* 3372 (US, A). Uman: *Hosokawa* 8483 (A).

Ponape: Patapat, 2–300 m, *Ledermann* 13413 (B, lectotype); without locality, *Kanehira* 1506 (US), 1619 (US), 1671 (P, BISH); V., am wegnach d. Wasserfall und Schiepstand, *Ledermann* 13708 (B); *Hallier* 100 (US); Kolonia—Palkier, kan Nanpomaru, *Hosokawa* 9548 (BISH, US); Mt. Nanaraut, 330 m, *Hosokawa* 9614 (BISH); U Distr., Mt. Seltenreh, *Stone* 5416 (Guam), 5404 (Guam), 5378 (Guam); Neti, in trail to Lududuhniap falls, *Hobdy* 1609 (BISH); Matalanim, *Stemmermann* 3001 (BISH); between Meitik and Dolokey, *Ishikawa* et al. 443 (US).

Kusaie: s. l., *Kanehira* 1442 (US); Utuwa-kyahon, *Hosokawa* 9363 (US); Mt. Buache, *Hosokawa* 6247 (A); Mwot Wakapp, *Hosokawa* 9450 (A); N ridge of Mt. Matante (Buache), above Tafonshak village, *Fosberg* 26593 (US, BISH).

Psychotria hombroniana (Baillon) Fosberg var. *hombroniana*

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

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

Amaracarpus rotensis Hosokawa, Trans. Nat. Hist. Soc. Formosa, 25:35, 1935 [non *Psychotria rotensis* Kanehira].

Shrub to 4 m tall; leaves broadly lanceolate to narrowly elliptic or narrowly obovate, to 10 × 3 cm, apex acuminate, base acute to cuneate or slightly decurrent, glabrous except sparsely long-pilose along midrib beneath, hairs strongly appressed to

blade, veins 5 to 8 pairs, anastomosing near margin, spreading at right angles from midrib; stipules glabrous, united at base and to middle in some specimens, bifid into two strong acuminate points, dorsally with two ridges or keels part way in from each margin; flowers axillary, solitary or in fascicles or glomerules, some usually in glomerules on short (to 1–1.5 cm) peduncles, these filiform to capillary; corolla white and strongly bearded in throat (except in *Stone* 5134 said by collector to be yellowish green and throat glabrous); fruit ellipsoid, pyrenes weakly or scarcely carinate.

The variation in shape, color, and pubescence of corolla suggest need for further field study. Known only from the Marianas Islands, Guam and Rota, and only from forests on elevated coral limestone.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Rota: Savanna, *Hosokawa* 7614 (A, type of *Amaracarpus rotensis* Hosokawa).

Guam: Ritidian Pt., near lighthouse, 160 m, *Fosberg & Evans* 46231 (US, BISH, K); 46232 (US, BISH, MO, POM, BM, A, PAP); 46227 (US, BISH, NY, TI, NSW); *Anderson* 220 (US, BISH, POM, P, L, MO, GUAM, BRI); Ritidian Pt., trail to Ritidian Beach, 90 m, *Anderson* 223 (US, BISH, B, GUAM); top of cliff above Tarague Beach, 70–80 m, *Fosberg* 35673 (US, BISH, POM, MO, CHR, P, ST, L); Asdonlucas, E of Yigo, *Stone* 5264 4273 (GUAM); Ritidian Pt.—Mt. Machanao plateau, *Stone* 5134 (GUAM, peduncles rather long, corolla yellowish green, glabrous within); Anao Mati Conservation Reserve, 160 m, *Fosberg* 36234 (US, BISH, A, B, K, CHR, TI); Tailalo, *Moran* 4578 (US); S ridge of Mt. Alifan, 280 m, *Fosberg* 35494 (US, BISH, POM, BM); “Guham, Archipel des Mariannes, Voy. Astrolabe et Zelee,” *Hombron* in 1841 (P, 2 sheets, type of *Uragoga hombroniana* Baillon).

Psychotria hombroniana var. *kusaiensis* (Kanehira) Fosberg

Psychotria hombroniana var. *kusaiensis* (Valetton) Fosberg, Smith. Contr. Bot., 45:29, 1980; Allertonia, 6:254, 1991.—Fosberg, Sachet, and Oliver, Micronesica, 275, 1979.

Amaracarpus kusaiensis Kanehira, Bot. Mag. Tokyo, 49:276, f.26, 1935.

Amaracarpus kanehirae Hosokawa, Trans. Nat. Hist. Soc. Formosa, 25:35, 1935.—Hosokawa in Yamamoto et al., Mat. for Study of Fl. Form. and Micr., 38, 1936.

Large shrub, leaves thin, elliptic, lateral nerves 8 to 13 on a side, glabrous, shortly petiolate; stipules “rufo-hirtis” cymes glabrous, lax, capillary, few-flowered, flowers shortly pedicellate, floral bracts subulate, caducous; corolla tube 3 mm long, barbate in throat; fruit ellipsoid, notably rugose when dry, pyrenes strongly rugose and tricarinate.

Probably endemic to Kusaie, though a specimen from Truk, *Hosokawa* 8409 (A), with broader ovate leaves and stipules slightly hairy might belong here, though more probably with var. *squarrosa*.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Kusaie: s. l., *Kanehira 1339* (P, TAI isotypes); Utuwa-kyabon, *Hosokawa 9363* (A); Mt. Fenkol, 1000 ft [300 m], *Hosokawa 6373* (A); N ridge of Mt. Matante, above Tafonshak village, *Fosberg 26596* (US, BISH, POM, BM, MO, A, CHR, BRI); S slope of Mt. Tafeyet, S of Lele Harbor, *Fosberg 26666* (US, BISH, NY, P).

Psychotria hombroniana var. *ladronica*
(Hosokawa) Fosberg

Psychotria hombroniana var. *ladronica* (Hosokawa) Fosberg, *Allertonia*, 6:255, 1991.

Psychotria ladronica Hosokawa, *Journ. Soc. Trop. Agr.*, 6:669, 1934 [nomen nudum]; *Trans. Nat. Hist. Soc. Formosa*, 25:38, 1935.

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

Leaves narrowly elliptic to elliptic, gradually acuminate, base acute, glabrous or slightly pilose along midrib beneath; stipules quite long and narrow, bifid with two ridges, but separate almost to base; cymes slender, filiform, to 7 cm, once or twice trichotomous, flowers pedicellate, calyx 4-dentate, lobes obtuse to somewhat pointed; about 1 mm high; corolla with tube 2.5 mm long, 4 lobes slightly longer, reflexed, throat bearded; drupe ovoid-ellipsoid somewhat 3-ribbed and rugose when dry, 6 mm long.

Apparently endemic to Rota, resembling *P. malaspinae* and at first placed there until close examination showed typical *P. hombroniana* stipules.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Rota: Notyon, *Hosokawa 7675* (A, US, 2 sheets, isotypes of *P. ladronica*); Rota, without locality, *Hosokawa 7585* (A); Necker R 74 (US); S of Dugi, *Stone 5188* (GUAM, US).

Psychotria hombroniana var. *mariannensis*
(Kanehira) Fosberg

Psychotria hombroniana var. *mariannensis* (Kanehira) Fosberg, *Allertonia*, 6:255, 1991.

Amaracarpus kraemeri Valetton, *Bot. Jahrb.*, 63:320, 1930.—Kanehira, *Bot. Mag. Tokyo*, 49:275, 1935.—Hosokawa, *Bull. Biogeogr. Soc. Jap.*, 7:201, 1937; 38, 1936.

Amaracarpus mariannensis Kanehira, *Bot. Mag. Tokyo*, 48:925, 1934; *Enum. Fl. Micr.*, 415, 1935.

Psychotria mariannensis Kanehira ex Fosberg et al., *Smith. Contr. Bot.*, 22:41, 1975 [sphalm.] [= *Amaracarpus mariannensis* Kanehira].

Leaves elliptic to slightly obovate-cuneate, abruptly acuminate, chartaceous; peduncle filiform, 2–3 times trichotomous, flowers sessile or nearly so; calyx funnelform, lobes acute; corolla campanulate, 3 mm long, lobed half way; drupe 5 mm long, longitudinally sulcate. Insufficiently known.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

MARIANAS ISLANDS.—Alamagan: Near crater, *Kanehira 2186* (P, NY, isotypes).

Psychotria hombroniana var. *peliliuensis* Fosberg

Psychotria hombroniana var. *peliliuensis* Fosberg, *Allertonia*, 6:255, 1991.

Apparently a shrub, notably leafy, leaves elliptic, acute, subcoriaceous hirsute beneath along costa and on short petiole; stipules notably hirsute, connate in lower part, shortly bifid with broad sinus; cymes greatly reduced, pedunculate, less than 1 cm long, hirsute, 3 to 5 flowered; flowers with hypanthium hirsute, calyx glabrous, broadly cup-shaped, 4-dentate, teeth acuminate; corolla glabrous, tube 2 mm long, lobes shorter, oblong-ovate, recurved; anthers partly exerted.

Differs from other varieties in thicker leaves, hirsute indument, shortly bifid hirsute stipules with open sinuses; and reduced, scarcely branched hirsute cymes.

Known only from the type, *Hosokawa 9213* (A, holotype) from Peleliu, next to southernmost island of the Palau Archipelago, a somewhat elevated limestone platform.

Psychotria hombroniana var. *squarrosa* (Valeton) Fosberg

Psychotria hombroniana var. *squarrosa* (Valeton) Fosberg, *Smith. Contr. Bot.*, 45:29, 1980; *Allertonia*, 6:256, 1991.—Fosberg, Sachet, and Oliver, *Micronesia*, 15:275, 1979.—Fosberg et al., *Vascular Pl. Palau*, 41, 1980.

Amaracarpus carolinensis Valetton, *Bot. Jahrb.*, 63:318, 1930.—Kanehira, *Bot. Mag. Tokyo*, 49:274, 1936.—Hosokawa in Yamamoto et al., *Mat. for Study of Fl. Form. and Micr.*, 38, 1936.

Amaracarpus carolinensis var. *squarrosa* Valetton, *Bot. Jahrb.*, 63:319, 1930.—Kanehira, *Bot. Mag. Tokyo*, 49:275, 1935.—Hosokawa in Yamamoto et al., *Mat. for Study of Fl. Form. and Micr.*, 38, 1936; *Bull. Biogeogr. Soc. Jap.*, 7:201, 1937.

Psychotria carolinensis (Valeton) Fosberg, *Occ. Pap. Bish. Mus.*, 15:224, 1940.—Riesenberg, *Southw. Journ. Anthro.*, 4:427, 1948.—Glassman, *Bish. Mus. Bull.*, 209:95, 1952.

Amaracarpus heteropoides Valetton, *Bot. Jahrb.*, 63:320, 1930.

Shrub, glabrous or almost so, leaves elliptic, acuminate, thin to "subcoriaceous," venation not conspicuous, glabrous or with rather long hairs along costa beneath, at right angle to costa and appressed to blade; stipules sheathing below, deeply bifid, glabrous or almost so, with 2 longitudinal ridges; cymes filiform or capillary, usually once or twice trichotomous, rarely with also sessile or compact glomerules at base in axils (*A. heteropoides*), flowers sessile or subsessile at tips of branchlets of cyme, solitary or in very few-flowered clusters; fruit ellipsoid, when dry weakly costate and rugulose, crowned by persistent dentate calyx cup. Plants answering this description are known from Palau, Truk, Ponape, and Kusaie, but showing some variation that may be significant. These have been ascribed to 3 species, but the types of all but one are lost. It seems impossible with material available to sort out populations, or to attach the available epithets to actual

specimens. So, tentatively all are grouped under the earliest varietal epithet available, var. *squarrosa*, which I earlier transferred to *P. hombroniana*.

VERNACULAR NAMES.—

kisikitumai (Truk: Hosokawa, 1937)

nide (Truk: Hosokawa, 1937)

ke mpenial (Ponape: *Riesenberg 35, 36, 427*)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Koror: *Ledermann 14099* (B, isotype, lectotype of *Amaracarpus carolinensis* Valetton). Peleliu: *Hosokawa 9213* (BISH). Angaur: *Takamatsu 1801* (BISH).

Truk: Moen (Wono, Harushima, Wara): s. l., *Falanruw 3499* (US); *Takamatsu 192* (BISH); *Pelzer 37* (US, BISH, K); *36* (US, BISH); Mt. Trokken, *Hosokawa 8409* (A, BISH); Melot, *Hosokawa 8348* (US). Trowasi (Dublon): *Hosokawa 8511* (A, BISH). Tol: Mt. Tumutal (Winiboet, Unibopoet, Uriribot), summit, 460 m, *Fosberg 24460* (US, BISH, POM, P, MO, S); *Hosokawa 246* (US, A); *8276* (A).

Ponape: s. l., *Ledermann 13565a* (B); *Kanehira 1506* (BISH); *Riesenberg 35* (BISH), *36* (BISH); dem Weg nach der Wasserfall in Schiepstand, *Hallier 100* (HBG, US); Matalanim, *Stemmermann 3001* (BISH); East-facing wall of Awak Valley, *Stemmermann & Haun 6502* (BISH); Mt. Sankakusan, *Hosokawa 5506* (BISH); Filenkiup River, near Nanpil, *Glassman 2873* (BISH); vicinity of Ronkiti, 200 ft [60 m], *Glassman 2468* (BISH); Arapeng-pa, *Takamatsu 742* (BISH). Param: *Takamatsu 638* (BISH).

Kusaie: Utuwa-kyahon, *Hosokawa 9363* (BISH); Mt. Faming, *Takamatsu 500* (BISH); *Kanehira 1339* (BISH, P); Mwot Wakapp, *Hosokawa 9450* (BISH).

Psychotria hosokawae Fosberg

Psychotria hosokawae Fosberg, Allertonia, 6:257, 1991.

Woody plant, glabrous, terete or slightly squarish when very young, 1–3 cm long, nodes not significantly enlarged; leaf blades oblanceolate, to 19 × 5 cm, sharply acuminate, base cuneate, main veins 12 to 14 on a side, visible but scarcely prominent, arching upward, anastomosing very close to margins, petiole slender 2–3.5 cm long; stipules caducous, a dense row of multicellular hairs in their axils, stipules not available except for an obscure and much reduced pair on a tiny branchlet at the terminal node, apparently calyprate, 8 mm long, with two flat appendages at apex; inflorescence a cluster of 5 once- or twice-branched small cymes about 2 cm long at terminal node, in bud only, pedicels strongly ascending; calyx spreading, rotate, scarcely lobed but margin strongly crispate-undulate; corolla buds about 1 mm long, 1.5 mm thick, limb broadly ovoid, to about 2 mm long and wide, apex obtuse to broadly rounded or subtruncate, lobes not yet started to open,

ovate to oblong; fruit unavailable.

This species known only from its type, from Kusaie, seems related, by the form of its inflorescence and stipules, to *Psychotria cheathamii* from Palau. Its habit, leaf-shape, and size of its parts set it off from that species. The type specimen lacks open flowers and fruits, so its characterization is incomplete.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

CAROLINE ISLANDS.—Kusaie: Inrare, *Hosokawa 8775* (A, holotype).

Psychotria kanehirae Merrill

Psychotria kanehirae Merrill in Kanehira, Dainippon Sanrin Kaiho, 401:56, 58, 15 Apr 1916; Trans. Nat. Hist. Soc. Formosa, 6:43, 1916.—Fosberg, Sachet, and Oliver, Micronesica, 15:276, 1979.—Fosberg et al., Vascular Pl. Palau, 42, 1980.—Fosberg, Allertonia, 6:268, 1991.

GEOGRAPHIC RECORD

CAROLINE ISLANDS.—Palau: *Kanehira 37* (specimen not seen). Published in Japanese. Plant not identified.

Psychotria lasianthoides Valetton

Psychotria lasianthoides Valetton, Bot. Jahrb., 63:314–315, 1930.—Kanehira, Enum. Micr. Pl., 423, 1935.—Fosberg, Occ. Pap. Bish. Mus., 15:225, 1940; Allertonia, 6:257, 1991.—Glassman, Bish. Mus. Bull., 209:95, 1952.—Fosberg, Sachet, and Oliver, Micronesica, 15:276, 1979.

Shrubby tree or shrub (originally described as “Herba”), generally, except upper leaf surface, dark brown woolly-hirsute, internodes 1.5–5 cm; leaves lanceolate, to 16 × 3 cm, prominently acuminate, base acute, somewhat decurrent on petiole, nerves 10 to 14 on a side, strongly ascending, upper surface glabrous, lower hirsute especially on nerves, petiole 10–15 mm; stipules prominently sheathing-cylindric, 1–1.5 cm long lacerate above into a number of lanceolate-caudate segments, these irregularly pectinately-bristly-ciliate, persistent but gradually weathering off; inflorescences axillary capitula or compound capitula, involucre with complicated deeply lacerate bristly-woolly bracts; calyx prominent, deeply cut into lanceolate woolly lobes, corolla; and other flower parts not seen, corolla said to be red; fruit about 6 × 2.5 mm, subcylindric, strongly ribbed when dry, crowned with persistent calyx, described when fresh as red, fuzzy or with white hairs.

A strikingly distinct species not close to any other Micronesian species. Endemic to Ponape, so far as known, mostly inhabiting high wet mountain ridges. Perhaps related to *P. guilloveana* Baillon of New Guinea.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Ponape: Paue, 800 m, Dec 1913,

Ledermann 13798 (B, lectotype, US, isotype); Mt. Asama-san, 500–200 m, *Hosokawa 9607* (A, BISH); *Kanehira 1476* (BISH, P), 1560 (US); U District, Mt. Seltenreh, *Stone 5425* (US, GUAM); Kuporuj, *Takamatsu 672* (BM, BISH); s. l., *Ledermann 13414* (B); near summit of Mt. Nanalaut, 2300 ft [700 m], *Stone 2006*(GUAM).

Psychotria leptothyrsa Miquel

Psychotria leptothyrsa Miquel, Ann. Mus. Bot. Lugd., 4:208, 1868.—Fosberg, Allertonia, 6:258, 1991.

Shrub or small tree to 6 m tall, glabrous; leaves narrowly to, rarely, very broadly elliptic, 5–25 × 1–15 cm, acuminate to rarely acute or rounded at apex, base acute to decurrent-contracted, thin, usually drying light green, secondary veins (5) 8 to 12 on a side, lesser veins and network inconspicuous to obscure, petiole 1.5 or less to 4.0 (–5.0) cm long; stipules forming a low scarious collar with a mucro on each side, very early caducous, scar tending to enlarge and become corky, a row of hairs or colleters in axil; inflorescence thyrsoid, terminal or axillary, from very long and lax to variously reduced, even to a single (surviving) flower or fruit, branches opposite or whorled, distally often irregularly branched, with minute subulate or triangular caducous bracts, flowers pedicellate; calyx broadly cup-shaped to flaring, subtire to obscurely lobed or denticulate, thin; apparently heterostylous but short-styled greatly predominant at least in Micronesian specimens, corolla tubular, tube (2–) 4–8 mm long, not or slightly ampliate upward, visibly veined, pilose within especially in throat, lobes shorter about 2 mm long, ovate, apex of bud rounded to subtruncate; anthers broadly linear, usually exerted from tube, rarely included; style deeply bifid, shorter than corolla tube or, rarely, exceeding it, disk prominent, rounded; drupe ovoid to globose, or obovoid, sulcate when dry, obtuse or rounded to truncate; pyrenes sharply 3-carinate; seed with homogeneous endosperm, not at all ruminant.

One of the most plastic of species, varying in practically every character, even within the varieties, extremes scarcely seeming to belong to the same species. Probably separable into many geographical varieties, but very few non-Micronesian specimens available to us. Three discernible varieties in the central and western Caroline Islands, one in Palau, one in Yap, one in Truk, these overlapping in most characters. The geographic range of the species is Indonesia and Philippines to New Guinea and Caroline Islands, and probably still wider; originally described from the Moluccas.

Key to Micronesian Varieties of *Psychotria leptothyrsa*

1. Fruits 6–7 mm long, slightly obovoid . . . var. *yapensis*
1. Fruits mostly 10–13 mm long, slightly ovate or tapering distally 2
2. Apex of fruit rounded when dry . . var. *leptothyrsoides*

2. Apex of fruit nearly truncate and apical part slightly sulcate var. *longicarpa*

Psychotria leptothyrsa Miquel, Ann. Mus. Bot. Lugd. Bat., 4–200, 1868 var. *leptothyrsa* not known from Micronesia.

Psychotria leptothyrsa var. *leptothyrsoides*
(Kanehira) Fosberg

Psychotria leptothyrsa var. *leptothyrsoides* (Kanehira) Fosberg, Allertonia, 6:259, 1991.

Psychotria leptothyrsoides Kanehira, Bot. Mag. Tokyo, 49:355, 1935; Enum. Micr. Pl., 423, 1935.—Hosokawa, Bull. Biogeogr. Soc. Jap., 7:201, 1937.—Fosberg, Occ. Pap. Bish. Mus., 15:225, 1940.—Fosberg, Sachet, and Oliver, Micronesica, 15:276, 1979.

Shrub or small tree to 5 m tall; leaves elliptic or oblong-elliptic, 10–20 or up to 30 cm long, strongly acuminate, membranous, 8 to 14 veins on a side; stipules triangular, long-acuminate, acumen more or less bifid, inner surface pilose; inflorescence tending to be large, branches whorled, flowers more or less umbellate; fruit ovoid-ellipsoid, distal half tapering somewhat to a rounded or obtuse apex.

Differing notably in its stipules, triangular, not low collar-like, but which as in other varieties, are very early caducous, and in the shape of its fruit, which is not notably truncate. Apparently endemic to Tol Island, Truk, found only on summit and upper slopes of its highest peak.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Truk: Tol: Mt. Tumuital (Uiniboet), top of mountain, 460 m, *Fosberg 24458* (US), 24456, (US, BISH); Mt. Tumuital, upper slopes, 200–460 m, *Fosberg 24466* (US, BISH, MO, NY), 24446, (US, BISH); lower E slope of Mt. Tumuital above Fasan village, 0–250 m, *Fosberg 24471* (US, BISH, K, MO); *Kanehira 1279* (BISH, syntype, lectotype); Ururibot, *Hosokawa 8256* (BISH, A), 8272 (BISH, A, US); Suiyoto (Tol), *Takamatsu 12* (BISH); volcanic soil, 1400 ft [426 m], *Wang 268* (BISH, US), 1340 ft [408 m], 275 (BISH, US); summit, 1400 ft [426 m], *Stone 5356* (US), 5348 (US, GUAM).

Psychotria leptothyrsa var. *longicarpa* Valetton

Psychotria leptothyrsa var. *longicarpa* Valetton, Bot. Jahrb., 63:315, 1930.—Kanehira, Enum. Micr. Pl., 423, 1935.—Fosberg, Occ. Pap. Bish. Mus., 15:225, 1940; Allertonia, 6:259, 1991.—Fosberg, Sachet, and Oliver, Micronesica, 15:276, 1979.—Fosberg et al., Vascular Pl. Palau, 42, 1980.

Psychotria tubiflora Hosokawa, Trans. Nat. Hist. Soc. Formosa, 32:19, 1942.—Fosberg, Sachet, and Oliver, Micronesica, 15:277, 1979.—Fosberg et al., Vascular Pl. Palau, 42, 1980.

Shrub or small tree, entirely glabrous, leaves elliptic to oblong, to 20 × 8 cm, apex acuminate, base acute, 8–10 principal veins on a side, domatia none, petiole rather slender, 2–3 cm long, stipules low-triangular, united into a very low

collar, shortly mucronate; inflorescence a terminal, rarely axillary, very lax slender thyrses, branches in whorls of 2 to 4, each branch ramifying again or ending in a cluster of several flowers, entire thyrses up to 7 cm long in flower, to 10 cm in fruit, possibly dioecious, more likely heterostylous; fruit ovoid, fleshy, red when mature, 12–13 × 7–8 mm, scarcely, if at all compressed, distally somewhat sulcate and slightly tapering when dry, apex notably truncate; pyrenes with inner face flat, ovate, about 12 × 6.5 mm, convex face with 3 ridges, these rugose, apex obtuse to rounded, base broadly acute, slightly mucronate.

Endemic to Palau western Carolines in edges and undergrowth of forest.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: *Kanehira 2313* (K, P); Garusamao (island not indicated), *Takamatsu 1568* (US). Babeldaob: s. l., *Dutton 65* (US, BISH, NY); *Ledermann 14247* (B); s. l., 50–300 m, *Ledermann 14357* (B, US); *14359* (B, US); Ngardok, *Tuyama 9332* (GUAM); S central, E coast, S of Mt. Yekigaroto, 130 m, *Fosberg 47685* (US, BISH, POM, MO, BM, P, CHR, GUAM); *47685a* (US), *47685b* (US), *47688* (US, BISH, MO, K, POM); E coast, hills above Melekiok, 30–60 m, *Fosberg 32522* (US, BISH, POM, NSW, K, P, MO, A); Aimirik, *Kanehira 2329* (US), *1959* (US); 500 m, *Stone 1326-A* (BISH); Arurukouku-Zanfomenshirriu (Mt.), *Hosokawa 7489* (BISH); Mt. Sul near Ngarsul, 100–150 m, *Hosokawa 9809* (BISH, US, 2 sheets, isotypes of *P. tubiflora* Hosokawa). Koror: 10–100 m, *Ledermann 14230* (B, syntype/lectotype); *Kanehira 458* (NY). Aulupse'el (as Aurapushakaru): *Stone & Sabine 4549* (US, GUAM). Ngerenchol: Lee Marvin Beach, 5 m, *Canfield 460* (US). Urukthapel: SW peninsula of Urukthapel Island, around lake at base of small peninsula on N coast, *Fosberg 32189A* (US); *32206* (US, BISH, POM, MO, K, S, NY, NSW, CHR); Ngchus, Ankosu Pt., 100 m, *Canfield 469* (US). Mecherchar (Eil Malk): 25 m, *Canfield 732, 734, 735* (all US).

Psychotria leptothyrsa var. *yapensis* Fosberg

Psychotria leptothyrsa var. *yapensis* Fosberg, Allertonia, 6:260, 1991.

Shrub, leaves small to medium, not or seldom, more than 15 × 5 cm, varying to elliptic lanceolate, 5 to 8 veins on a side, thyrses loose even when small, mostly about 4 or less rarely to 10 cm; flowers with corollas 3–5 mm long; fruits small, 6–7 × 5–6 mm, broadly obovoid—cup-shaped, truncate distally.

So far as known endemic to Yap, probably all Yap plants of *P. leptothyrsa* belong here. In fruit size (and shape) this variety seems closest to var. *leptothyrsa*, but the small flowers and small, few-flowered thyrses, as well as the smaller leaves with fewer veins, seem to justify separation. More collections with special attention to flower size and to whether flowers are heterostylous are very much needed.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Yap: Gaanpan village, Dalipepinbau, in understory in wooded ravine, 8 Aug 1980, *Fosberg 60099* (US, holotype, BISH, POM, MO, BM, P, BRI, TI, A, NSW, isotypes); Balabat, *Takamatsu 1862* (US, BISH); Takiol *Takamatsu 1848* (BISH), *1848a* (BISH); near Garguei, 70 m, *Cushing 404* (US) (flowers very short); Mt. Dabiol, *Hosokawa 877* (A) (flowers very short).

Psychotria lineolata Merrill

Psychotria lineolata Merrill, Craib, Kew Bull, 480, 1932.—Fosberg, Sachet, and Oliver, Micronesica, 15:276, 1979.—Fosberg et al., Vascular Pl. Palau, 42, 1980.

Misidentification on a sheet of *Psychotria palauensis* Hosokawa.

Psychotria malaspinae Merrill

Psychotria malaspinae Merrill, Phil. J. Sci., Bot., 14B:149, 1914.—Kanehira, Enum. Micr. Pl., 423, 1935.—Fosberg, Allertonia, 6:260, 1991. *Amaracarpus malaspinae* (Merrill) Kanehira, Bot. Mag. Tokyo, 50:607, 1936. *Psychotria hombroniana* var. *malaspinae* (Merrill) Fosberg, Smith. Cont. Bot., 45:29, 1980.—Fosberg, Sachet, and Oliver, Micronesica, 15:275, 1979. *Psychotria hombroniana* sensu Fosberg, Falanruw, and Sachet, Smith. Contr. Bot., 22:41, 1975 [non (Baillon) Fosberg].

Shrub or small tree, glabrous or almost so, branches cylindrical dark gray or gray-brown to light gray, branchlets slender, lowest internode of branchlet to as much as 8 cm long, distally progressively much shorter; leaves tending to be crowded at ends of branchlets, chartaceous to subcoriaceous, obovate to elliptic, shortly acuminate, 6–10 (–12) × (2–) 3–4 (–5) cm, usually narrower, base cuneate or acutely contracted, nerves 6 to 12 on a side, not prominent, petiole rather slender, 1–2.5 cm long, stipules connate, forming a fusiform calyptra enclosing terminal bud and primordia, opening down one side and caducous, apex with 2 or 4 short aristate appendages (lost from most specimens), not carinate or plicate, glabrous; cymes in upper axils, trichotomous or rarely twice trichotomous, slender or almost filiform, flowers subsessile, in triads ending cyme-branches; calyx rather turbinate minutely 4-denticulate; corolla with 4 lobes almost as long as or longer than tube, throat bearded; drupe red, to 6–8 mm long, pyrenes more or less tricarinate, rugose.

A member of the widespread Pacific group of *Psychotria*, characterized by the terminal buds and inflorescence primordia enclosed by calyptrate caducous stipules. It seems indeed related to *P. arbuscula* Volkens of Yap, as stated by Merrill, but not so close to *P. viridiflora*, or *P. insularis*. However, it is closer to *P. hombroniana* (Baillon) Fosberg, where we had placed it as a variety, until we had studied closely the stipular arrangement. The calyptrate stipules, as contrasted with the sheathing, strongly bifid ones of *P. hombroniana*, seem ample reason for maintaining *P. malaspinae* as a separate species.

Known only from Guam.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: Lepi Road, *McGregor 559*, (US, isotype, designated lectotype, as holotype was destroyed in the burning of the Manila Herbarium); W of Mt. Santa Rosa, *Anderson* (US, BISH, POM, BM, MO); hills near Sagua River, due west of Mt. Lamlam, 100 m, *Stone 4191* (US, BISH, GUAM), *4389* (GUAM, US); Upi, 175 m, *Bryan 1266* (US, BISH, K); Asinan, *Costenoble 1181* (US).

Psychotria mariana Bartling ex de Candolle

Psychotria mariana Bartling ex de Candolle, Prod., 4:522, 1830.—Safford, Contr. U.S. Nat. Herb., 9:362, 1905.—Prowazek, Die deutschen Marianen, ihre Natur und Geschichte, 120, 1913.—Merrill, Philip. Journ. Sci. Bot., 9:148, 1914.—Valeton, Bot. Jahrb., 63:315, 1930.—Kanehira, Fl. Micr., 371, 1933; Enum. Micr. Pl., 423–424, 1935.—Stone, Micronesica, 6:555–557, 1971.—Fosberg, Falanruw, and Sachet, Smith. Contr. Bot., 22:41, 1975.—Moore and McMakin, Plants of Guam, 42, 1979.—Fosberg, Sachet, and Oliver, Micronesica, 15:276, 1979.—Fosberg, Allertonia, 6:261, 1991.

Psychotria rotundifolia Valeton, Bot. Jahrb., 63:316, 1930.—Kanehira, Enum. Micr. Pl., 424, 1935.

Psychotria gaudichaudii Kanehira, Bot. Mag. Tokyo, 48:926, 1934; Enum. Micr. Pl., 423, 1935.

Shrub or small tree, glabrous, internodes on flowering branchlets very short; leaves 8–10 (–14) × 4–6 (–7) cm, thinly coriaceous, usually showing a rose or purplish tinge when dried, obovate to elliptic, obtuse to bluntly acute or broadly short acuminate, main veins 7 or 8 on a side, blade narrowed to a short petiole; stipules ovate, flat in middle of dorsal side, slightly carinate distally, connate in lower third or half, early caducous, axils stiffly hirsute; cymes terminal, pedunculate, trichotomous, subthyrsoid, widely branching about 5 times or less, stiff, hemispherical to corymbiform when well developed, a pair of scale-like bracts at each articulation; hypanthium glabrous, calyx limb prominent funnelform or slightly campanulate, from essentially truncate to shallowly crenate or obtusely lobed, splitting tardily into irregularly ovate lobes, persistent on fruit; corolla hypocrateriform, tube cylindric, up to 6 mm long, lobes 5, oblong, reflexed, throat densely barbate; anthers exerted, at least partially, erect; style well exerted, glabrous, stigma fusiform, tip bifid; fruit subglobose, red, fleshy, crowned with prominent cup-like calyx, pyrenes 2, inner face flat, outer strongly convex, with no trace of ribs; seed with endosperm deeply ruminant.

This species is perplexingly variable in a number of characters, e.g., leaf size, outline, and apex. length of petiole, size, shape and degree of branching of the inflorescence, lobing of calyx, etc., but there is no correlation between these variations or in their geographic localization. Until quantitative field studies are done there seems no basis for separation into infraspecific taxa. *Psychotria gaudichaudii* Kanehira was based on material from Sarigan and Rota. It does not seem to

differ significantly, though there seems to be a tendency toward narrower, more acute leaves northward in the Marianas, but this is too vague to merit any nomenclatural recognition. *Psychotria rotundifolia* Valeton was likewise based on Sarigan material, but this is described as having leaves very broad, almost suborbicular. It seems to represent the opposite extreme in the variation in this species. If these were recognized as taxa, the results would be that in some cases two taxa would be found on the same plant.

The form of the stipules, the nature of the inflorescences, and especially the notably ruminant endosperm place this species in the subgenus *Grumilea*, well developed farther west.

USES.—The wood is durable and is used in construction of houses (Guam: Safford, 1905).

VERNACULAR NAMES.—

aphiloghating (Marianas: Prowazek)
 aplikating (Alamagan: *Anderson 403*)
 aplikaking (Pagan: *Anderson 505*)
 aplocating (Rota: *Stone 5192*)
 ajagao (Guam: *Whiting 325*)
 ajgao (Guam: *Marche 184*)
 aploc-hating (Guam: *Nelson 158*)
 aploc-jatin, aploghating (Guam: *Safford and Seale 1023*)
 aploghating, aplokhating (Guam: *Whiting 32*, *Costenoble 1178*, Safford, 1905)
 aplokhating (Guam: *Whiting 325*)
 sumac (Guam: *Seale* in 1900; this name applies to *Aidia* also?)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—s. l., *Haenke* (G, type); *Gaudichaud s. n.*, Herb. Poirer (P).

Agrigan: *Marche 292* (P); canyon on E side of island, *Fosberg 31632* (US, BISH, POM); trail around S side of island, 10–20 m, *Fosberg 31615* (US, 2 sheets, BISH, POM, NY, L); midwest coast, 200 ft [60 m], *Falanruw 2333* (US, BISH).

Pagan: *Kanehira 2205* (NY); Fresh Water Lake, 2–50 m, *Fosberg 31370* (US, BISH, POM), *31377* (US); *Anderson 505* (US, BISH, POM, NY); 150 ft [45 m], *Bonham 9* (US, BISH); Caldera Wall, *Moore 327* (US, GUAM); Tulagi beach, *Moore 337* (US, GUAM); road to Inae Dikiki or Togari Rock area, below 100 ft [30 m], *Falanruw 1856* (US); trail to Talague beach, below 150 ft [45 m], *Falanruw 1871a* (US); base of old caldera wall, SW of village, below 100 m, *Falanruw 3000* (US), *3001* (US); W side of Fresh Water Lake, *Falanruw 3254* (US).

Alamagan: Asongsong, 100 ft [30 m], *Kondo 11b* (BISH); 200 m, *Anderson 403* (US, BISH, POM), *420* (US, BISH, POM, NY); SSW coast, 350 ft [110 m], *Falanruw 1891* (US); 250 ft [75 m], *Falanruw 1875* (US); around Partido village, *Fosberg 31664* (US, BISH, POM, NY, L); *Kanehira 2194* (NY).

Sarigan: NW coast, near anchorage, 325 ft [100 m], *Falanruw 1744* (US, BISH); above village, 150–250 m, *Evans*

2391 (US, 2 sheets, BISH, POM, NY); near village, 10–100 m, *Evans 2340* (US, 2 sheets, BISH, POM, NY); *Kanehira 2159* (NY).

Anatahan: Trail from W anchorage, toward cliff edge, *Raulerson 1480* (US).

Saipan: Mt. Tapotchau, 900 ft [275 m], *Hosaka 2896* (US, BISH, POM, NY, L, P); Laderan i Agaga, 200 m, *Stone 5222* (GUAM); *Kanehira 2226* (P); *Lange 3* (BISH), *26* (BISH); *Kanehira 884* (BISH); *Hosokawa 6592* (BISH), *9322* (BISH); around Partido village, *Fosberg 31632* (US, BISH, POM); Kannat Laulau, above Magicienne Bay, 75 m, *Fosberg 31269* (US, BISH, POM, L, NY); base of cliff, N of Mt. Marpi, N end of island, *Fosberg 25225* (US, BISH, POM); ridge just S of Mt. Tapotchau, 220 m, *Fosberg 25176* (US, BISH, POM, A, MO, BM, B).

Tinian: Dry cliff, *Cowan s. n.* in 1945 (BISH); *Hosokawa 7698* (BISH, A); *Kondo 56* (BISH); S end, S plateau, *Kondo 47* (BISH), *Kondo 48a* (BISH); Mt. Lasso, 500 ft [150 m], *Hosaka 2800* (US), *2826* (US, BISH, POM, NY); N end, 15 ft [3.5 m], *Hosaka 2842* (US, BISH, POM); *Kanehira 2271* (NY), *2270* (US), *2263* (US); W of As Mahalang, 5 mi [8 km] N of San Jose village, *Fosberg 59894* (US, BISH, POM, NY, L); W part of Caroline area, 100 m, *Herbst & Falanruw 6832* (US); edge of Hagoi, 10 m, *Herbst & Falanruw 6848* (US); W coast of N half of island, "Palm Beach" 1 mi [1.6 km] S of Faibres (San Hilo) Pt., top of cliff, *Fosberg 24871* (US, BISH, POM, NY); Tinian (former town), SW coast of I., 3–30 m, *Fosberg 24757* (US, BISH, POM, MO, UC, L, BRI); S end of Masalog Ridge, E side of island, 100 m, *Fosberg 24747* (US, BISH, POM, BM, P, PAP, MO, NSW); above Carolinas (Lalo) Pt., S end of island, 80 m, *Fosberg 24721* (US, BISH, POM, P, NY, CHR); W of As Malialong, 5 mi [8 km] N of San Jose village, *Fosberg 59894* (US, BISH, POM, NY, L).

Agiguan: SW part, 100 ft [30 m], *Kondo VIII* (BISH); *Kondo* in 1952 (BISH, 3 sheets); W Pt., 200 ft [60 m], *Kondo s. n.* in 1952 (BISH).

Rota: *Hosokawa 7575* (A, BISH); Sabana, *Hosokawa 7551* (A, BISH); *Kondo s. n.* in 1952 (BISH); Beach Rd., *Kondo s. n.* in 1952 (BISH, 2 sheets); *Kanehira 1752* (P, NY, K); S of Dugi, *Stone 5192* (GUAM, US); road to Haofna, S side of island, 50–150 m, *Sachet 1745* (US, BISH, POM, NY, L); base of Taipingot, Isthmus, 20–30 m, *Sachet 1789* (US, BISH); road SE of Songsong, around Sasan Bay, 10–30 m, *Sachet 1767* (US, BISH); *Kanehira 1755* (US); *Necker R107* (US), *R79* (US), *R67* (US); Sabana, old Japanese phosphate washings, 400 m, *Evans 2230* (US, BISH, POM, NY); Rota (Sonson) and vicinity, ruined town site, 1–10 m, *Fosberg 24661* (US, BISH); road along S side, between Songsong village and Atatsu Bay, 5–100 m, *Evans 1946* (US, BISH, POM, F, IC, MO, BM), *1938* (US, BISH, POM, NY); track from Mackay Beach along shore to Mochom Beach, 5–10 m, *Evans 2153* (US, POM, BISH, MO, K, CHR, STD, A, P); track between airstrip and N most part of I., *Evans 2170* (US, BISH, POM, BRI).

Guam: Merrill, 1914:148; Pagat Pt., E side of island,

100–150 m, *Sachet 1697* (US, BISH, POM); Alupat I., *Anderson 189* (US, BISH, POM); Ritidian Pt., *Anderson 198* (US, BISH, POM, NY, L); Lafac Pt., *Anderson 105* (US, BISH, POM, NY, L); vicinity of Agaña, *Anderson 175* (US, BISH, POM); Asan Pt., 20 m, *Anderson 31* (US, BISH, POM, L); Tarague Beach, 12 m, *Anderson 241* (US, BISH, POM, NY, L); Ritidian Pt., 400 ft [120 m], *Hosaka 3110* (US); Pago Bay, 50 m, *Fosberg 35646* (US, BISH, POM, NY); Uruno Pt., *Moran 4506* (US, UC, POM); S of Tarague Bay, *Moran 4573* (UC, US, POM); s. l., *Marche 184* (P, POM); s. l., *Whiting 325* (US, BISH, POM); Orote Pt., 60 m, *Bryan 1092* (US, BISH); Talofoto, 160 m, *Bryan 1278* (US, BISH); s. l., *s. coll.* (BISH); s. l., *Nelson 561* (BISH), Pega River, *Nelson 254* (BISH, US, P); s. l., *McGregor 526* (US, BISH); s. l., *Nelson 158* (BISH), *152* (BISH); s. l., *G.E.S. 36* (US, BISH); Agaña, *Seale s. n.* in 1900 (BISH); Barrigada Hill, *Stone 3809* (US, GUAM); Asdonlucas, near Yigo, *Stone 4737* (BISH, GUAM); Inarajan Distr., falls of the N branch of the Inarajan River, *Stone 5051* (GUAM); Manengon, Cotal Conservation area, Tarzan River area, *Stone 5136* (US, GUAM); Ritidian Pt., 160 m, *Fosberg & Evans 46233* (US, BISH, POM, NY); Pati Pt., Andersen AFB, *Fosberg 59954* (US, BISH, POM, NY, L); Andersen AFB, cliff edge, *P.H. Moore 582* (GUAM); Oca Pt., *Glassman 67* (US); Cabras I., N end, 15 m, *Evans 1774* (US, BISH, POM, F, L); between Tarague Beach and Pajon Pt., 0–50 m, *Evans 1628* (US, BISH, POM, MO, K, N) W of Barrigada Hill, *Stone 4039* (GUAM); Pagat, *Cushing 165* (GUAM); *Cushing-Falanruw 875* (US); *P.H. Moore 57* (GUAM), *144* (GUAM); Haputo Pt., *P.H. Moore 465* (GUAM, US); edge of savannah, near Sigua River, *Rodin 670* (US); 5 mi [8 km] S of Yona, *G.C. Moore 290* (US); Asanite Bay, Talofoto, on cliff, 25 m, *Evans 1875* (US, BISH, POM, MO, SYD, L, K, CHR, A); Lates Pt conservation area, 60–90 m, *Evans 1826* (US, BISH, POM, F, B, MO, CHR, A, L, BRI, UC, TI); between Canpanaya Pt. and Guae, 5–20 m, *Evans 271* (US, BISH, POM, BRI, CHR, NY, BM, P, MO); cliff N of Agaña Bay, *Rodin 712* (US); N end of Tumon Bay, *G.C. Moore 386* (US); Pati Pt., near cliff, 160 m, *Necker 355* (US); Agaña, *Safford & Seale 1023* (US).

CAROLINE ISLANDS.—Fais: Plateau, 15 m, *Fosberg 46704* (US), sterile, identification doubtful.

Psychotria merrillii Kanehira

Psychotria merrillii Kanehira, Bot. Mag. Tokyo, 46:674, 1932; Fl. Micr., 371, 1933.—Glassman, Bish. Mus. Bull., 209:95–96, 1952.—Fosberg, Sachet, and Oliver, Micronesica, 15:276, 1976.—Fosberg, Allertonia, 6:262, 1991. *Electronia obovata* Valetton, Bot. Jahrb., 63:311, 1930 [non *Psychotria obovata* Ruiz and Pavon, Fl. Per., 2:58, 1799, nor Hemsley, Biol. Centr. Amer. Bot., 2:50, 1881]. *Canthium valettonii* Kanehira, Bot. Mag. Tokyo, 46:761, 1932; Enum. Micr. Pl., 416, 1935.

Shrubs 4–5 m tall, also suffruticose or herbaceous, glabrous or thinly appressed puberulent; leaves obovate, bluntly short acuminate, base cuneate, varying from 5 or less to 15 (17) cm

long, up to 7.5 cm wide, material with larger leaves seen, including that described as *Plectronia polyneura*, and at least part of syntype material of *Psychotria merrillii*, glabrous or sparsely puberulent or hirtellous, especially along the nerves beneath, nerves prominent, 8 to 10 (16) on a side, petioles 1–2.5 (–3.0) cm; stipules calyptrate, to at least 13 mm long, early caducous with expansion of inflorescence, with 2 free mucronate terminal appendages; flowers in 6- to 12-flowered fascicles terminal becoming pseudoaxillary, pedicels (very rarely branched?) slender, glabrous or puberulent, up to 10 (rarely 18) mm, long hypanthium glabrous or hirtellous, calyx widely spreading saucer-shaped, even in bud, with 5 very short subulate teeth; corolla white, in bud with rounded apex, at anthesis tube 1.5–3.5 mm long, bearded in throat, 5 lobes ovate, 2.5–4.5 mm, with a thick hook-like appendage inside apex; disk prominent, entire, flat-topped; style glabrous, apparently subequal with corolla-tube; drupe red when mature, narrowly ovoid, about 5–6 (–10) mm long, pyrenes apparently tricarinate dorsally, glabrous or pubescent.

This is a typical member of the widespread Pacific group of *Psychotria*, characterized by calyptrate stipules usually appended at summit, and early caducous. Apparently endemic to Ponape.

This species seems quite uniform in leaf shape, stipules, inflorescence, flowers and fruit, except for variation in leaf size. The distribution of puberulence, however, is variable. Some specimens (nos. 9521, 5592, 8203, 5973, 13790, 13274, 2352, 13790) are quite glabrous. Others (nos. 2010, 13829) have puberulence along the midrib on the under sides of leaves. Still others (nos. 13689, 1618, 2501, 26425) have the leaves puberulent beneath, especially along midrib, and the hypanthium, sometimes the pedicels, and the fruit notably hirtellous. These variations all seem to occur together on the mountain tops and ridges. The one designated here as lectotype of *Plectronia obovata* Valetton, *Ledermann 13790* (B) is glabrous. The specimen described by Valetton as *Plectronia polyneura*, *Ledermann 13814*, we have not seen, but from a photo, appears to represent a separate taxon. It is maintained here as a variety and is discussed below.

VERNACULAR NAME.—kampaniel (Ponape: *Stone 2010*).

Key to Micronesian Varieties of *Psychotria merrillii*

Leaf-veins 8 to 10 (12) on a side var. *merrillii*
 Leaf-veins about 16 on a side var. *polyneura*

Psychotria merrillii Kanehira var. *merrillii*

Lateral nerves on leaves 8 to 10 (12) on a side.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Ponape: Tolun Nanket, mountain above Nanpil, drainage of Tawenjokola River, Not Distr. above

power plant, 600 m, *Fosberg 26425* (US, BISH, POM); Mt. Poaipoai, 2100 ft [640 m], *Glassman 2501* (US, BISH); Mt. Niinioanii, 700 m, *Hosokawa 9521* (BISH, A), 5592 (A); Mt. Nanaraut, *Hosokawa 8203* (BISH, A, GUAM), 5943 (BISH); Mt. Nanaraut, Nampil, *Hosokawa 6017* (BISH), 5945 (BISH); *Stone 2010* (GUAM, BISH); *Kanehira 1618* (BISH, P, US, isosyntypes); *Glassman 2352* (US); Patapat am Tol, 100–200 m, *Ledermann 13274* (B syntype of *Plectronia obovata*); Station Paue, 600–800 m, *Ledermann 13790* (B, lectotype of *Plectronia obovata* Val.), 13689 (B), 13829 (B, syntypes of *Plectronia obovata*).

Psychotria merrillii var. *polyneura* (Valeton) Fosberg & Sachet

Psychotria merrillii var. *polyneura* (Valeton) Fosberg & Sachet, *Allertonia*, 6:264, 1991.

Plectronia polyneura Valetton, *Bot. Jahrb.*, 63:309, 1930 [non *Psychotria polyneura* Kurz, *Journ. Bot.*, 8:327, 1875].

Canthium polyneurum Kanehira, *Bot. Mag. Tokyo*, 46:672, 1932; 49:274–275, photo 3, 1935; *Enum. Micr. Pl.*, 416, 1935 [non *Psychotria polyneurum* Kurz, *Journ. Bot.*, 8:327, 1875].

Leaves elliptic to somewhat obovate, 15–17 × 7–7.5 cm, petioles 20–30 cm, pedicels many in fascicles in uppermost axils, rufo-villosulous, 5–10 mm, hypanthia villosulous; calyx glabrous, teeth acute, corolla about 4 mm long, velutinous within at base.

This has been considered synonymous with *Psychotria merrillii* by Kanehira and by Fosberg, neither of whom had seen the type, *Ledermann 13814*, which was probably destroyed in the bombing of the Berlin herbarium. However, a photo of this specimen was published by Kanehira in 1935 (photo 3). This, while not too well reproduced, shows a plant that has larger leaves with more veins than the plant described as *Plectronia obovata* Valetton. Valetton gives ±16 for *Plectronia polyneura*. Valetton's description of *P. obovata* gives the number of veins as 10 to 12 on a side, and Kanehira, for *Psychotria merrillii*, gives 8 to 10, to 11 in his fig. 197, 1933. Material available to us has, with two exceptions, 8 to 10 veins on a side. The exceptions are *Stone 2010*, with 8 to 12, and *Kanehira 1618* with 11 or 12 so far as can be seen without damaging the specimen. We choose to maintain *Plectronia polyneura* as a distinct taxon in *Psychotria* but at the rank of variety. This may direct attention to it and future collections may settle whether or not it represents a population, or if the variation is continuous. The two collections mentioned above, *Stone 2010* and *Kanehira 1618*, we treat as intermediates closer to var. *merrillii*.

GEOGRAPHIC RECORD AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Ponape: Paue (or Pane?), *Ledermann 13814* (B, now probably represented only by a published photo); s. l., *Ledermann 13790* (B, lectotype).

Psychotria mycetoides Valetton

Psychotria mycetoides Valetton, Bot. Jahrb., 63:315, 1930.—Kanehira, Enum. Micr. Pl., 424, 1935.—Fosberg, Occ. Pap. Bish. Mus., 15:225, 1940; Allertonia, 6:264, 1991.—Fosberg, Sachet, and Oliver, Micronesica, 15:276, 1979.—Fosberg et al., Vascular Pl. Palau, 42, 1980.

Slender shrub, branches terete, thick, herbaceous, internodes short, marked by large oval scars, not at all thickened at nodes, 1.5–4 cm long, separated by stipule scars; leaves 10–20 × 3.5–6 cm, obovate-lanceolate acutely acuminate, base gradually attenuate, membranous, paler beneath, lateral nerves 10 to 12 on a side, parallel, lightly curved, oblique, veins loosely delicate; stipules crowded at base of inflorescence, persistent acute, bifid; inflorescence terminal sessile cymosely-branching, moderately dense, foliaceous bracts subtending the inflorescence, to 20 × 7 mm, white; flowers long pedicellate, calyx broadly saucer-shaped, minutely dentate; corolla notably tubular-funnelform, lobes oblong-acute, suberect, much shorter than tube, corolla 14–20 mm long of which 5 mm are the pointed lobes, throat broad, densely bearded; anthers subsessile, exserted; style longer than corolla, minutely puberulent. (From Valetton's description).

Known with certainty only from the description based on two *Ledermann* collections nos. 14360 and 14152, which are now apparently lost. Specimens referred to this species by Kanehira (1935) and by Fosberg (1940) are probably *P. leptothyrsa* var. *longicarpa* Valetton.

Endemic in Palau: Babeldaob and Koror.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Babeldaob: Mt. Ngarsul, *Hosokawa 9809* (BISH); Garasumao, *Takamatsu 1573* (BISH).

Psychotria rhombocarpa Kanehira

Psychotria rhombocarpa Kanehira, Bot. Mag. Tokyo, 46:493, 1932; Fl. Micr., 373, 1933; Enum. Micr. Pl., 424, 1935.—Fosberg, Occ. Pap. Bish. Mus., 15:225, 1940; Allertonia, 6:265, 1991.—Fosberg, Sachet, and Oliver, Micronesica, 15:276, 1979.

Shrub or small tree, to 10 m tall, vegetatively glabrous, young branches to 5 mm thick, internodes 2–6 cm long, nodes not conspicuously enlarged; leaves narrowly elliptic to broadly ovate-lanceolate, apex caudate-acuminate, base acute, blade thin, to 25 × 9 cm, main veins 12 to 18 on a side, spreading and arching upward, anastomosing near margin, prominent beneath, much less so above, petiole 1–3.5 cm long; stipules to 10 mm long, sheathing, distal 2–5 mm free, ovate, very acute; inflorescence terminal, (rarely axillary probably on a reduced branch), a decussate thyrsoid panicle, long pedunculate, peduncle to 9 cm, branches repeatedly branched, ultimate branchlets ending in 1–several sessile, subsessile or very shortly pedicellate flowers; panicle, hypanthium and calyx finely puberulent; calyx saucer-shaped to spreading funnelform, less than 1 mm long, obscurely lobed, margins ciliolate; corolla

narrowly campanulate-funnelform, tube 2–2.5 mm, minutely puberulent without, lobes 3–4 mm, ovate to lanceolate, glabrous without, notably pubescent within, throat bearded, tube glabrous within; anthers broadly linear, inserted in throat, included; style glabrous, strongly bifid, stigma-lobes exserted; drupe red when ripe, broadly ovoid, 10–13 mm long, pyrenes broadly rhombic in outline, lobes thin, one keel in middle of each side.

Kanehira's drawing, Fl. Micr., fig. 198, is a good representation, except for over-simplification of panicle and pubescence of corolla.

This species is not close to others in Micronesia except *P. rhombocarpoides*. Its stipules are very unusual in the genus. Its fruits closely resemble those of *P. cheathamii*.

Endemic to Kusaie, in primary to secondary forests from low to high elevations.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Kusaie: Without locality, *Hosokawa 6354* (A, BISH); *Kanehira 1333* (US), *1321* (BISH); Mt. Iyawoe, *Hosokawa 7440* (A); Mt. Tefayaht, 500 ft [150 m], *Glassman 2689* (US); Mt. Matanta (Buache), *Townes 3* (US); north ridge, Mt. Matanta, above Tafonshak village, *Fosberg 26597* (US, BISH); S side Mt. Matanta, 1–50 m, *Fosberg 26562* (US, BISH, MO, POM, BM); Mt. Wakapp, *Takamatsu 405* (BISH); Mot, *Takamatsu 466* (BISH); Mt. Matante, *Takamatsu 511* (BISH); W of Innem River, near boundry of Tafunsak and Lelu, *Falanruw 5441* (US).

Psychotria rhombocarpoides Hosokawa

Psychotria rhombocarpoides Hosokawa, Trans. Nat. His. Soc. Formosa, 31:287–88, 1941.—Glassman, Bish. Mus. Bull., 209:96, 1952.—Fosberg, Sachet, and Oliver, Micronesica, 15:277, 1979.—Fosberg, Allertonia, 6:266, 1991.

Shrub to 2 m, resembling *P. rhombocarpa* but branchlets slightly 4-angled, leaves more cuneate at base, petiole somewhat longer; fruit larger, 2 cm long, 1.5 cm wide, pyrenes with terminal lobe longer and narrower, lateral lobes much longer, general shape hastate.

A poorly known species, collected only once, isotype studied sterile, possibly too close to *P. rhombocarpa*, but maintained tentatively on the basis of the much larger, differently shaped fruit as described.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

CAROLINE ISLANDS.—Ponape: Mt. Nanaraut nototy ("on the way to Mt. Nanaraut"), 330 m, *Hosokawa 9617* (A, BISH, isotypes).

Psychotria rotensis Kanehira

Psychotria rotensis Kanehira, Fl. Micr., 373, f. 199, 1933; Bot. Mag. Tokyo, 47:679, 1933; Enum. Micr. Pl., 424, 1935.—Stone, Micronesica, 6:555,

1971.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:277, 1979.—Fosberg et al., *Vascular Pl. Palau*, 42, 1980.—Fosberg, *Allertonia*, 6:267, 1991 [non *Amaracarpus rotensis* Hosokawa].

Psychotria palauensis Hosokawa, *Trans. Nat. Hist. Soc. Formosa*, 25:38, 1935.—Kanehira, *Enum. Micr. Pl.*, 424, 1935.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:276, 1979.—Fosberg et al., *Vascular Pl. Palau*, 42, 1980.

Shrub 1–2 m tall, glabrous, stems cylindric, raphid bundles short linear, abundant, internodes 1–3 cm long drying light green; leaves elliptic or oblong-elliptic, rarely slightly obovate, to 10 × 3.5 (–4) cm, apices obtusish to usually acute, or slightly acuminate, base acute, blade thin, nerves 6 to 8 on a side, not prominent, network obscure, petioles slender about 1 cm long; stipules triangular, obtuse to acute, not sheathing nor calyptrate, sub-persistent; cymes slender, terminal, 1 to 3 at terminal node, 2–3 times umbellately or subumbellately few-branched, with caducous minute ovate or lanceolate bracts at lower ramifications; calyx short, limb somewhat spreading, teeth 5, low triangular somewhat pointed; corolla small, tube 1.5–2 mm long, lobes 5, oblong-ovate, 1.5–2 mm long, spreading or somewhat reflexed, hooked, densely woolly-bearded in throat, anthers lanceolate, basifixed in throat just below sinuses, somewhat exerted; style and stigma exerted, stigma bifid; fruit depressed globose, 2–3 mm high, 4 mm wide, subgminate especially when dry (bisulcate), purplish red, flesh soft, pyrenes very convex only slightly 3-ribbed or carinate, calyx persistent on fruit but very inconspicuous.

A very distinct species not much resembling any other, at least in Micronesia. Apparently endemic to Rota and Palau. Guam specimens reported or named as this were misidentified. We have seen an excellent sheet of *Hosokawa 7476*, reported as this from Palau, but he later described this as *P. palauensis* Hosokawa, which we have reduced to varietal rank under *P. rotensis* Kanehira. The above description refers to var. *rotensis*.

Key to Varieties of *Psychotria rotensis*

Leaf-bases acute, main nerves 6 to 8 on a side, petioles 1 cm long var. *rotensis*
 Leaf-bases cuneate-decurrent, main nerves 4 to 6, petioles 2–2.5 cm long var. *palauensis*

Psychotria rotensis Kanehira var. *rotensis*

This variety is, so far as known, endemic to the island of Rota, where it grows in undergrowth in forests on elevated limestone. Records from Guam have proven, on study of the specimens on which they were based, to be misidentified members of the *P. hombroniana* relationship.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Rota: *Hosokawa 7569* (A, BISH, US); savanna, *Hosokawa 7617* (BISH, US); *Kanehira 1740*

(US, lectotype, P, K, isolectotypes); Titgua District, 70 m, *Herbst & Falanruw 6688* (US); airstrip, N of Shemaparee, 180 m, *Fosberg 25162* (US, BISH, A, BM, P, GUAM).

Psychotria rotensis var. *palauensis* (Hosokawa) Fosberg

Psychotria rotensis var. *palauensis* (Hosokawa) Fosberg, *Allertonia*, 6:267, 1991.

Psychotria palauensis Hosokawa, *Trans. Nat. Hist. Soc. Formosa*, 25:38–39, 1935.—Kanehira, *Enum. Micr. Pl.*, 424, 1935.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:276, 1979.—Fosberg et al., *Vascular Pl. Palau*, 42, 1980.

Psychotria rotensis sensu Hosokawa, *Trans. Nat. Hist. Soc. Formosa*, 24:204, 1934 [pro parte; non Kanehira, 1933].

Differs from var. *rotensis* in more obovate leaves, less acute, only 4 to 6 less prominent main veins on a side, base cuneate-decurrent, petiole to 2–2.5 cm, slender.

This is a weak variety, but usually recognizable, found in forests on limestone islands. The type *Hosokawa 7476* (TAI holotype, BISH, isotype) is from Oropushakal (= Aulupse'el) Island S of Koror. Endemic on limestone islands in Palau Archipelago.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Rock islands near Koror, *Hobdy 1524* (BISH); Ngermeyaus (Garameyaosu) I., S Koror Municipality, 7 m, *Canfield 654* (US); W side of SW peninsula of Urukthapel I. near old cultural pearl establishment, 1–2 m, *Fosberg 32160* (US, BISH, K, MO). Peleliu: North end of strip of land on E side of island, 2 m, *Fosberg 25986* (US, BISH, NY, BM, BRI); s. l., *Herre* in 1933 (BISH).

Scyphiphora Gaertner

Scyphiphora Gaertner, *Fruct. et Sem.*, 3:91, 1806.

Shrubs, branching slightly to notably supra-axillary, branches widely spreading, then arching upward; leaves simple, opposite, coriaceous; stipules forming a subtruncate sheath secreting a transparent gum; flowers in compact short supra-axillary cymes, 4-merous, calyx thin, cup-like; corolla salverform; anthers and style exerted; ovary 2-celled, ovules 2 in a cell, attached near middle of septum, one erect, the other pendent; fruit a drupe with thin flesh, pyrene corky, cylindric, 2-celled, 2 seeds in a cell.

A genus of one species, found on muddy shores and around mangrove swamps from Indo-Malaysia to Australia, Melanesia north to Palau and Yap.

Scyphiphora hydrophyllacea Gaertner f.

Scyphiphora hydrophyllacea Gaertner f., *Fruct. et Sem.*, 3:91, t. 196, 1806.—Volkens, *Bot. Jahrb.*, 31, 475, 1901.—Valeton, *Bot. Jahrb.*, 63, 303, 1930.—Kanehira, *Fl. Micr.*, 378, 1933; *Enum. Micr. Pl.*, 425, 1935.—Fosberg, *Occ. Pap. Bish. Mus.*, 15:214, 1940.—Fosberg, Sachet, and Oliver,

Micronesica, 15:277, 1979.—Fosberg et al., Vascular Pl. Palau, 42, 1980.—Stemmermann, Wetland Plants, 99, 1981.

Shrub about 1.5 m tall, glabrous, branchlets very slightly supra-axillary; leaves broadly obovate, coriaceous, to about 5 × 3 cm, apices rounded, bases acute, veins about 8 on a side, obscure, petiole 1–1.5 cm long, thickish; stipules reduced to a low subtruncate collar, to 2 (–3) mm high, pectinate-ciliate; cymes axillary, small, dichotomous several times with a pedicellate flower in each fork, each ultimate branch 3–5-flowered; calyx pink or whitish, very short tubular or cup-shaped, truncate, about 1 mm long and wide; corolla tube 2.5–3 mm long, 5 lobes narrowly ovate, pinkish white, firm, reflexed, throat bearded; 5 anthers narrowly sagittate, dorsifixed, about 2.5 mm long, well exerted on curved filaments, pointing outward and downward; style strongly exerted, dilated at top into a 4 ribbed stigma about 2 mm long, that collects pollen on its sides, apex with 2 slightly divergent lobes, at length separating all the way down and reflexed, apically; fruit cylindrical-turbinate strongly 5-fluted, apex truncate with small, not at all accrescent calyx on top.

Common in edge of mangrove swamps on Palau and Yap at about high tide level.

VERNACULAR NAMES.—

- gaut, quat (Palau: Kanehira, 1935)
- kaut (Palau: Fosberg et al., 1980)
- kuat (Palau, Babeldaob: *Otobed P-10005*)
- kaut (Palau, Koror: *Emmons 24*; *Stone 4590*)
- gause (Yap: Kanehira, 1935)
- gawath (Yap: *Wong 497*)
- gualt (Yap: *Alvis 103*)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: *Kanehira 2078* (P, US). Babeldaob: *Otobed P-10005* (US, BISH, POM). Koror: In mangrove swamp, *Hosaka 3383A* (US, BISH); *Kanehira 147* (BISH); *Stone 4590* (GUAM, US); *Garikiae, Takamatsu 1738* (US); *Renrak, Emmons 24* (US); below hills of limestone rock just before causeway leading to ferry, *Falanruw, Fosberg, & Woodrich 1073* (US); *Rendrok, Salsedo 281* (US); *Ngetmeduch, between town and KB bridge, Sheard & Spence 70* (BISH).

Yap: *Koronia-Gofu, Hosokawa 8850* (BISH, POM); mangrove swamp, *Wong 497* (BISH, US, POM); Balabat, 0 m, *Alvis 103* (US); just N of Maa, Tomil Dist., 0 m, *Fosberg 25616* (US, BISH); near Rang, *Falanruw 3377* (US); Kanday village, W coast, *Fosberg 59965* (US, BISH); Ngagil, near Tagaren Channel, *Cushing 600* (US); S of Loran Station, Tomil, *Stemmermann 3151* (BISH).

Spermacoce L.

Spermacoce L., Sp. Pl., 102, 1753.—Stone, *Micronesica*, 6:559, 1971.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:277, 1979.—Fosberg and

Sachet, *Smith, Contr. Bot.*, 45:29, 1980.
Borreria G.F.W. Meyer, *Pl. Esseq.*, 79, t. 1, 1818 [nom. cons.].—Volvens, *Bot. Jahrb.*, 31:477, 1902.—Valeton, *Bot. Jahrb.*, 31:631–632, 1930.

Herbs and small dwarf shrubs, stems tending to be square, often with cord-like angles, most parts of plants with few or many raphid-bundles showing through the epidermis, roots often wiry or somewhat woody, forming stiff root-crowns; leaves simple, entire, opposite, decussate, usually not more than 5–7 cm long, in some species appearing fasciculate because of reduced leafy branches in leaf axils; stipules interpetiolar, usually somewhat united below or adnate to leaf bases, margins often pectinate with linear or setiform processes, or dentate; inflorescences usually of strongly condensed axillary cymes forming few-flowered or usually many-flowered verticels, the terminal ones often larger and appearing older, capitate; flowers usually sessile or subsessile; hypanthium cylindrical, prismatic or turbinate, crowned by a calyx with 4 lobes or teeth, one pair often reduced or vestigial, united base of calyx usually very short; corolla white, lavender or bluish, tubular or campanulate, subequal with calyx to strongly exerted, 4-lobed; stamens 4, inserted below sinuses, anthers included or exerted; style filiform, bifid and stigmatic at apex, ovary bilocular with one ovule in a locule; fruit a capsule, dehiscing variously, basically septicial, one cell may not open, or both cells open septicially, leaving an erect hyaline septum (this in one species separating into 2 thin layers and loosening), or splitting first down one side and opening out to shed seed, or after separating into cocci the cells opening by splitting ventrally; seed one to a cell, cylindrical to ovoid or ellipsoid, with a deep, wide or narrow ventral groove, this either open or closed at ends, testa smooth or variously reticulate, rugose or sulcate.

In the sense accepted here, a pantropical and subtropical genus of many species, not well known, some of them very weedy and widespread, resembling in habit some species of *Hedyotis*. Six species are known from Micronesia, all of them introduced. The most reliable characters to separate them are in the seeds. The key presented here is based partly on vegetative features, used because seeds and flowers are not always present.

Key to Micronesian Species of *Spermacoce*

1. Corolla short, not or scarcely exceeding calyx, stamens and pistil included 2
2. Plant prostrate or weakly ascending, branches not conspicuously more slender than the main stem, seeds oblong, transversely reticulate, ventral groove nearly closed *S. mauritiana*
2. Plant erect, branches more slender than main stem, seeds elliptic, glossy, castaneous, weakly alveolate-reticulate, ventral groove open *S. ernstii*
1. Corolla notably exceeding calyx lobes, stamens and pistil exerted 3

3. Veins of leaves conspicuous 4
 4. Leaves essentially glabrous, setae of stipules glabrous or nearly so *S. assurgens*
 4. Leaves notably appressed hirsute above, stems spreading-hirsute, setae of stipules pilose, especially toward apex *S. bartlingiana*
 3. Veins of leaves obscure 5
 5. Leaves strongly revolute, appearing linear . *S. pusilla*
 5. Leaves flat, ovate to obovate, acute to mostly obtuse *S. hispida*

Spermacoce assurgens Ruiz & Pavon

Spermacoce assurgens Ruiz & Pavon, Fl. Per., 1:60–61 t. 92, 1798.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:277, 1979.—Fosberg et al., *Vascular Pl. Palau*, 42, 1980.—Fosberg and Canfield, *Micronesica*, 16:199, 1980.

Spermacoce suffrutescens Jacquin, Pl. Rar. Hort. Schoenbr., 3:40, t. 322, 1798. *Borreria laevis* sensu auct. plur. [non (Lamarck) Grisebach, Goett. Abh., 7:231, 1857].

Erect to reclining herb, tending to branch at base, usually 2–3 (–5) dm tall, internodes with 4 sharp keels and 2 deep grooves, keels usually notably retrorsely appressed hispidulous or hirsutulous, stems and sometimes leaves tending to be reddish; leaves broadly lanceolate, lance-ovate, or lance-elliptic to broadly ovate or elliptic, up to 6 × 2 cm, apex acute to acuminate, base acute, shortly petiolate to sessile, strongly nerved, 4 or 5 nerves on a side, essentially glabrous on both surfaces, becoming reflexed where subtending inflorescences; stipules forming a sheath, to 3 mm long, dilated upward, pectinate with 5 to 7 setiform appendages on a side, these well separated at base, this sheath densely or sparsely appressed pubescent, often in lines, greatly swollen and stretched by development of dense head-like inflorescences at nodes, these subtended by two leaves at a node and usually additionally by 2 smaller bracteal leaves, all becoming reflexed; heads packed with setae, presumably stipular in nature, equalling hypanthia; flowers with hypanthium pubescent, calyx lobes 4, triangular-acute to linear-oblong, subulate, blunt, or expanded and rounded and varying greatly in length and width; corolla white or pinkish, strongly exserted, with a very narrow tube, a very short campanulate or funnelliform throat, and 4 oblong lobes, hispidulous without near tips, pilose within, the whole about 4–6 mm long, buds oblong-ellipsoidal; anthers oblong to oval, strongly exserted on filiform filaments; filiform style and capitate stigma greatly exceeding corolla, to about 6 mm, fruit obovate or turbinate, 4–5 mm long, strongly pubescent above, septicidally, then slightly loculicidally, dehiscent, leaving an ovate, acute, stiff, white septum erect between valves; seed dark dull brown, plumply ellipsoid with usually blunt ends, deeply and conspicuously transversely sulcate, and minutely reticulate especially at ends.

Pantropical species, probably of American origin, now on many Pacific Islands, including Marianas, western Carolines, and Gilberts; weedy, found in disturbed places, along paths and roadsides. Has traditionally, but incorrectly, been called

Borreria laevis.

VERNACULAR NAMES.—

okulabeluu (Palau: Fosberg et al., 1980)
 opusal (Woleai: *Emmons* 427)
 shiumwit (Satawan: *Anderson* 1093)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Saipan: Puerto Rico, *Herbst & Falanruw* 6912 (US).

Rota: Trail to Sabana region, 500 m, *Evans* 2111 (US).

Guam: Tamuning, 35 m, *Falanruw* 1281 (US); Mt. Alutom, E of Sumay, 350 m, *Fosberg* 25278 (US); Agaña, 2 m, *Fosberg & Evans* 46204 (US); NAS, Trust Territory Compound, *Fosberg* 46294 (US); road from Guam Memorial Hospital to Tumon Heights, 5–25 m, *Evans* 230 (US); Dan Dan Radio Tracking Station, 3 mi [4.8 km] SW of Inarajan, *Fosberg & Raulerson* 59761 (US, BISH, POM, NY, L).

CAROLINE ISLANDS.—Palau: s. l., *Richardson* 21 (US). Babeldaob: Irrai Airfield, *Woodrich* 104 (US); Ngardmau village, *Raulerson* 5923 (US). Koror: Ngerebe'ed, 10 m, *Fosberg* 32490 (US), 47423 (US), 47576 (US); NE corner of island, along road to Airai dock, *Fosberg* 50628 (US). Malakal: Skilang's garden, *Blackburn* 117 (US); Fisheries Wharf, 2 m, *Fosberg* 47612 (US). Ngerchong: NW end of island, 3 m, *Canfield* 539 (US). Peleliu: N landing, 1–2 m, *Fosberg* 31954 (US); Ngalkol village, 2 m, *Fosberg* 47633 (US); ½ mi [0.8 km] SW of Mt. Amiangal, 2 m, *Canfield* 425 (US); near small cemetery, *Raulerson* 17077 (US). Angaur: Just N of phosphate drying plant, 8 m, *Canfield* 181 (US); N end of island, 3–4 m, *Fosberg* 25971 (US); E side of island, 4 m, *Fosberg* 25979 (US); S end of island, 2–5 m, *Fosberg* 31966 (US).

Mapia: Eiland Pegun, *Vink* 12087 (L).

Yap: Hill 0.5–0.7 mi [0.8–1.1 km] SW of Gitam, S of Yap High School, 40 m, *Fosberg* 46572 (US); along approach road to airfield, S Yap, 20 m, *Cushing & Cushing* 344 (US); Colonia, *Fosberg* 60005 (US, BISH, POM).

Ulithi: Mogmog I., 1–2 m, *Fosberg & Evans* 46358 (US); Asor I., 2 m, *Fosberg* 46954 (US).

Woleai: Falalop I., 0–5 m, *Evans* 427 (US).

Truk: Moen: Moen village, *Fosberg* 60174 (US).

Satawan: Satawan I., *Anderson* 1093 (US).

MARSHALL ISLANDS.—Kwajalein Atoll: Kwajalein I., *Herbst* 9049 (US). Ennylabegan: *Herbst* 8904 (US); Illinginni I., *Herbst* 8981 (US).

GILBERT ISLANDS.—Butaritari: Butaritari I., *Herbst & Allerton* 2697 (US).

Tarawa: Bairiki, 1–2 m, *Sachet* 1417 (US); Betio, lagoon side, *Adair* 150 (US); in garden, *Adair* 52 (US); Bairiki, *Raulerson* 3664 (US); Betio, *Raulerson* 3800 (US).

Spermacoce bartlingiana (de Candolle) Hemsley

Spermacoce bartlingiana (de Candolle) Hemsley, *Biol. Centr. Am. Bot.*, 2:58, 1881.

Borreria bartlingiana de Candolle, Prodr., 4:544, 1830.

Borreria fockeana Miquel, Linnaea, 18:299, 1844.

Spermacoce latifolia sensu auct.—Fosberg, Sachet, and Oliver, Micronesica, 15:278, 1979.—Fosberg et al., Vascular Pl. Palau, 42, 1980.—Fosberg and Canfield, Micronesica, 16:199, 1980 [non Aublet, Hist. Pl. Guiane Fr., 1:55, t. 19, 1775].

Slender herb, sprawling, decumbent to erect, rooting at lower nodes, yellow-green in appearance, even when dried, stems sharply quadrangular to sub-alate, thinly to notably retorse- or spreading-hirsute; leaves to 5–6 × 3–3.5 cm, broadly elliptic to slightly ovate, thin, apex acute, base acute, somewhat decurrent on the short petiole, up to 1 cm, mostly shorter, blades sparsely to notably appressed hirsute on both sides, veins about 5 or 6, slightly arched forward; stipules membranous, low-sheathing, hirsute-pilose, pectinate with setiform processes, these sparsely long-hirsute-pilose, especially near apex; inflorescences very dense, crowded but usually rather few-flowered, crowded with linear or lanceolate bracts, and hypanthia, calyx lobes triangular ovate to oblong ovate, or almost lanceolate, persistent; corolla about 3–5 mm long, very thin, ephemeral, shed easily, tube very slender, about equalling or exceeding the campanulate throat and ovate lobes; stamens and style about subequal with corolla, or style slightly longer, glabrous; capsule broadly ovoid to subglobose, 2.5–3 × 2 mm, hirsute, crowned by persistent calyx lobes, thin-walled, dehiscing septicidally into 2 cocci that then split ventrally the length of the thin half of the septum, then somewhat loculicidally, opening widely to release the seeds, superficially resembling a circumscissile-dehiscent capsule (frequently under pressure during drying the capsules may fracture transversely, again simulating a circumscissile dehiscence); seed somewhat ovoid broadly oblong-elliptic, ends rounded, 2.5–3 × 1.6–2 mm, light drab brown to black, dorsally convex, surface minutely reticulate-rugulose, ventrally flattened, groove wide, deeply excavate, the ends closed, margins appearing inrolled, a large elongate white scar in bottom of excavation, narrower than groove.

This plant has generally been called *Spermacoce* or *Borreria latifolia*, which it resembles. The delicate, fugacious corolla with a slender tube seems wrong for that species, or for the similar *S. alata* Aublet. It is also more hirsute than either of these.

Widespread in the Indo-Pacific, from India and Ceylon to Fiji, Palau, and Ponape, but probably introduced from tropical America.

VERNACULAR NAME.—Ulechouch (Palau: *Otobed* PW-10084).

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Koror: Ngerebodel, *Otobed* PW-10084 (US). Babeldaob: Airai Mun. Ngerkiil, 40 m, *Canfield* 774 (US).

Ponape: Kolonia: *Sachet* 1833 (US, BISH, POM); *Fosberg* 26258 (US, BISH, MO, K, NY, L, GUAM); *Fosberg* 58437 (US, BISH, POM); 2.5 mi [4 km] S of Kolonia, *Fosberg* 58541

(US, BISH, MO, BM, CHR, NSW, G); *Falanruw* 3239 (US); Metalanim, *Stemmermann* 2945 (BISH).

Spermacoce ernstii Fosberg & Powell

Spermacoce ernstii Fosberg & Powell, Smith. Contr. Bot., 45:29, 1980.—

Fosberg, Sachet, and Oliver, Micronesica, 15:278, 1979.—Fosberg et al., Vascular Pl. Palau, 42, 1980.

Spermacoce stricta auct. Micr. pro parte [non L. f., Suppl. Pl., 120, 1781].

Low, diffuse to erect, to 60 cm tall, freely branched, stems glabrous or slightly scaberulous or puberulent around nodes, 4-angled, with strong costae at angles, the branches tending to be much more slender than main stems; leaves elliptic or elliptic-lanceolate, rarely somewhat ovate, acute to usually acuminate, attenuate at base to a short petiole, subglabrous to sparsely scabrous or hispidulous, blades thin, up to 4 × 1.5 cm, usually much smaller, up to 5 main veins on a side, strongly ascending, petioles usually 5 mm or less, occasionally longer, usually one or more pairs of more or less reduced leaves subtending inflorescences in addition to main pair; stipular sheath very short, 1 mm or less, much exceeded by the setiform pectinately arranged segments, these scarcely puberulent, not or scarcely gland-tipped, 8 or more on a side, sheath puberulent; inflorescences capitate, axillary few to many-flowered, flowers subtended by filiform stipular bracts but these not conspicuous; hypanthium almost glabrous to hispidulous, calyx-lobes 4, linear or lance-linear, equal to somewhat unequal, hispidulous-ciliate near base, subacuminate; corolla shorter than or subequal to calyx, tube very short, lobes triangular-ovate, minutely puberulent without, subglabrous or puberulent within but base of lobes and throat pilose-bearded; anthers subsessile, attached in tube, broadly oval, bluish or blackish; style exceedingly short, stigma bilobed; fruit broadly obovoid to broadly cylindrical, very slightly compressed, more or less hispidulous, about 1.5 mm long, dehiscing septicidally, one side more tardily than the other, so that capsule valves tend to spread from one side, septum membranous, ephemerally thin; seed broadly, to rarely narrowly, elliptic, about 1–1.5 (–1.7) mm long, groove very wide, extending full length of seed, with a prominent row of raphide bundles along each side, dorsal surface, when mature, glossy, castaneous, shallowly alveolate-reticulate.

A widespread tropical American species, introduced in the Pacific probably during or shortly after World War II, which since then has become fairly widespread at least in the central and western archipelagoes; known in Micronesia from the Marianas (Saipan, Rota, and Guam), from the Carolines (Palau), and from the Gilberts (Tarawa). It has become common on roadsides and in disturbed places, frequently in semi-shade. It is usually known in tropical America as *Borreria ocymoides*, which it only resembles in its small corolla, not exceeding the calyx.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Saipan: E of Ogso Tapotchau, just N

of Kannat Tadung Laulau, 170–190 m, *Fosberg 50545* (US); Puerto Rico, *Herbst & Falanruw 6911* (US).

Rota: Road to Sabana area, 200–400 m, *Sachet 1808* (US); 150–250 m, *Evans 2123* (US); Tatgua District, 70 m, *Herbst & Falanruw 6687* (US).

Guam: Dededo, 100 m, *Fosberg 35309* (US); Campanaya Bay, 20 m, *Fosberg 43413* (US); Trust Territory Compound, NAS, Agaña, 70 m, *Fosberg 46215* (US); Andersen AFB, *Moran 4463* (US); Mangilao, University of Guam Campus, *Fosberg 59627* (US, BISH, POM, NY, L); Chaot River Ravine, E of Afami, 10 m, *Fosberg 59657* (US, BISH); Pipeline Road in Chaot River Ravine, *Fosberg 59673* (US, BISH, POM); Puguia Pt., 40 m, *Fosberg 59778* (US, BISH, POM, NY).

CAROLINE ISLANDS.—Palau: Kayangel: Along trail in middle of main islet, *Cheatham 86* (US); Kayangel I., 2 m, *Canfield 720* (US). Koror: NE corner of island, along road to Airai Ferry dock, *Fosberg 50629* (US). Ngerchong: NW end of island, 3 m, *Canfield 540* (US). Peleliu: Around the N landing, 1–2 m, *Fosberg 31958* (US); N end, Akalokul at boat landing, 2 m, *Fosberg 47616* (US); 0.3 mi [0.5 km] SSE of Mt. Amiungal, 2 m, *Canfield 422* (US). Angaur: West of Lake D, 0.3 mi [0.5 km] NE of village, 2 m, *Canfield 150* (US).

Truk: Moen; Gov. Hill area, *Grimm 15* (US).

GILBERT ISLANDS.—Tarawa: Betio, *Raulerson 3801* (US).

Spermacoce hispida L.

Spermacoce hispida L., Sp. Pl., 102, 1753.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:278, 1979.—Fosberg and Sachet, *Smith. Contr. Bot.*, 45:30, 1980.

Borreria hispida (L.) Schumann in Engler and Prantl, *Nat. Pfl.*, 4(4):144, 1891.—Kanehira, *Enum. Micr. Pl.*, 417, 1935.

Borreria rotundifolia Valetton, *Bot. Jahrb.*, 63:323, 1930 [nom. illegit., superfl.].—Kanehira, *Enum. Micr. Pl.*, 417, 1935.—Glassman, *Bish. Mus. Bull.*, 209:91, 1952 [non *B. rotundifolia* Andersson, *Kongl. Svensk. Vet.-Akad. Handb.*, 1861].

Wiry herb, branched, ascending to prostrate and mat-forming, stems square, almost glabrous to usually hirsute or hispid to pilose, especially on prominent angles; leaves ovate-lanceolate to elliptic; oblong or obovate, obtuse to acute, moderately to sparsely hirsute on both surfaces, narrowed to a subsessile or sessile base; stipules membranous, 2 mm high, hirsute, with ciliate margins pectinate with about 5 to 7 filiform, glabrous or slightly hirsute, gland-tipped setae with triangular widening at base; verticels rather few-flowered, younger ones distal; hypanthium and calyx densely hirsute, hairs flattened, calyx lobes 4, linear-lanceolate, unequal, 2 tending to be longer, hirsute, fruit densely hirsute, or almost glabrous toward base, dehiscing apically toward base, leaving a scarious septum; seed elliptic to elliptic-oblong, 2.5–3.5 mm long, minutely rugose, rather convex, ends rounded, groove ends open but sometimes appearing semi-closed.

This species, common in south and central Asia, was collected twice in 1913 on Ponape, but has not been found there

since. One of these collections was described as a separate species, *Borreria rotundifolia* Valetton, but seems, at best, varietally distinct from *Spermacoce hispida* L. The Yap record of this species based on *Volkens 215*, is now referred with some doubt to *Spermacoce mauritiana* Gideon. That from Guam, by Walker and Rodin (1949), based on *Rodin 527*, is *Mitracarpus hirtus* (L.) de Candolle.

GEOGRAPHIC RECORD AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Ponape: Pailapalap, *Ledermann 13899* (B, holotype of *Borreria rotundifolia* Valetton); s. l., *Ledermann 13962* (B).

Spermacoce mauritiana Gideon

Spermacoce mauritiana Gideon in Verdcourt, *Kew Bull.*, 37:547, 1983.

Borreria repens de Candolle, *Prodr.*, 4:542, 1830.

Spermacoce repens (de Candolle) Fosberg and Powell, *Smith. Contr. Bot.*, 45:30, 1980.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:278, 1979.—Fosberg et al., *Vascular Pl. Palau*, 42, 1980 [non Willdenow ex Chamisso and Schlechtendal, *Linnaea*, 3343, 1828].

Borreria ocymoides sensu auct.—Valetton, *Bot. Jahrb.*, 63:323, 1930.—Kanehira, *Enum. Micr. Pl.*, 417, 1935.—Glassman, *Bish. Mus. Bull.*, 209:91, 1952 [non (Burman f.) de Candolle, *Prodr.*, 4:544, 1830].

Borreria hispida sensu auct.—Volkens, *Bot. Jahrb.*, 31:477, 1901.—Valetton, *Bot. Jahrb.*, 63:323, 1930 [non (L.) K. Schumann in Engler and Prantl, *Nat. Pfl.*, IV, 4:144, 1891].

Weak, slender, erect to usually reclining or prostrate herb, stems sharply quadrangular, the angles notably ciliate, the intervals glabrous; leaves broadly ovate, or elliptic, apex acutish or acute to obtuse, base gradually to usually abruptly contracted to a short petiole, blade 1–1.5 (–2) × 0.4–1.0 (–1.5) cm, glabrous to sparsely scabrous or puberulent, especially margins; stipules very low, 1 mm or less high, pectinate with usually about 6 to 8 setae about 1.0–1.5 mm long, these scarcely or rarely glandular at tip; inflorescences capitate, densely rather few-flowered, flowers subtended by setiform bracts; hypanthium papillose-puberulent, together with calyx scarcely 1.5 mm long, calyx lobes 2, lance-subulate, scarcely ciliolate (rarely traces of another reduced pair), persistent in fruit; corolla white or rarely pinkish, urceolate, 0.6–0.8 mm long including the erect spreading ovate-triangular lobes, these about half the length of the corolla, pilosulous within; anthers minute, sessile; style and stigma included; fruit puberulent, slightly obovoid to globose, septicidal into two deeply concave valves; seeds oblong about 1 mm long, dull medium somewhat yellowish or reddish brown, transversely reticulate, cells or areolae notably broader than high.

This pan-tropical weedy plant is probably of New World origin and an early introduction into the Asiatic tropics. The closest relative of *S. mauritiana* seems to be *S. prostrata* Aublet, a widely distributed New World plant that has also usually been called *Borreria ocymoides*. The two are very similar, but may be distinguished by the shape, color, and

sculpturing of the seeds, those of *S. mauritiana* being dull yellowish or reddish brown, often somewhat flatter and more oblong, and finely transversely reticulate, while those of *S. prostrata* are usually mahogany brown, somewhat glossy, more cylindrical and prominently more coarsely alveolate-reticulate. The leaves of *S. mauritiana* are usually broadly ovate or broadly elliptic, and its corolla lobes are pilose, while *S. prostrata* usually, but not always, has narrower elliptic leaves, narrowed gradually to base, and its corolla lobes only papillose or minutely puberulent within.

African specimens of this species, including the type, Sieber in 1835 (G-DC) from Mauritius, and possibly a few American ones, such as Buchtein 1414 (US), from Bolivia, Mapiri region, San Carlos, have the sharp angles of the internodes notably ciliate. They seem to be varietally distinct from the common American plant. Micronesian specimens agree with the type.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Babeldaob: Central Ngerem-lengui Munic., savanna above upper Ngaramiskan River, 55 m, Canfield 602 (US); Me'ebe'ubul village, Ngatapang, Fosberg 32403 (US); Garamiscan Colony, Fosberg 25711 (US).

Yap: Leuj (Luis) village, 10–15 m, Fosberg 46604 (US, BISH); Abhänge des Bennigsenberg, Volkens 215 [not seen].

Ponape: Vicinity Kolonia, 50 ft [15 m], Glassman 2583 (US, BISH); Ronkiti, Fosberg 26400 (US); Matalanim, Hosaka 3541 (US); Retau-nopilichi, Hosokawa 5572 (US, BISH).

Kusaie: Falanruw 3571 (US).

Spermacoce pusilla Wallich

Spermacoce pusilla Wallich in Roxburgh, Fl. Ind., ed. Cary, 1:379, 1820.

Spermacoce stricta sensu auct. plur.—Fosberg, Sachet, and Oliver, Micronesica, 15:278, 1979 [non L. f., Suppl. Pl., 120, 1781].

Slender, simple to branched herb, to 30 cm tall, stems sharply 4-angled, smooth to scabrous, hirsute at and below nodes; leaves narrowly lanceolate to linear-lanceolate, but usually revolute so as to appear linear, scabrous on upper surface, usually very sparsely or more densely hirsute on midrib beneath, veins obscure, blade narrowed to base or subpetiolate, apex bluntly narrowly acute, whole leaf often reflexed, frequently several more or less reduced leaves in axils of principal leaves, making plant look very leafy; stipules sheathing but narrow, united with leaf bases, openly pectinate with 5 to 7 smooth setiform processes, these usually longer, often much longer, than united portion, sheathing part becoming distended by development of inflorescences; flowers small, crowded in tight more or less globose verticils containing also numerous setiform bracts equalling or shorter than flowers; hypanthium hairy above, calyx lobes somewhat unequal, linear-lanceolate, hispid; corolla with limb clavate in bud, slightly pointed, apex shortly hispid, open corolla 2–2.5 mm long, white, tube slender, flaring to funnellform throat,

lobes narrowly ovate-oblong, about as long as throat, glabrous, blunt; stamens with very slender filaments, longer than corolla lobes, anthers pale, broadly ovate or elliptic, twisted when mature; style filiform, glabrous below slightly puberulent above, stigma capitate, somewhat bilobed, puberulent, exserted; capsule ellipsoid, pale straw-colored, often pencilled with dark red, densely to sparsely pilose distally, glabrous toward base, dehiscing from apex septicidally and loculicidally part way, leaving 4 valves flaring, shedding seeds apically; seeds narrowly cylindrical or ellipsoid, 1–1.5 mm long, rounded to somewhat pointed at ends, surface light to medium dark brown, slightly irregular but very glossy, groove narrow, open at both ends.

A widespread weedy species found in Asia and the Pacific; in Micronesia known from Ponape and doubtfully known from Guam, collected once on Ponape.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

CAROLINE ISLANDS.—Ponape: Ledermann 13962 (B).

Tarenna Gaertner

Tarenna Gaertner, Fruct., 1:139, 1788.—Fosberg and Sachet, Allertonia, 6:269, 1991.

Shrubs rarely trees; leaves simple, opposite, usually petio- late; stipules ovate, caducous; inflorescence terminal or becoming lateral, cymose; flowers usually 5–6-merous; calyx usually lobed; corolla hypocrateriform to somewhat funnel- form with spreading lobes imbricate in bud; stamens inserted in corolla throat below sinuses, filaments short, anthers linear; style elongating, stigma becoming strongly exserted, clavate to linear, ovary 2-loculed, placentae fleshy, bearing 1-several or more ovules; fruit fleshy, with thin endocarp; seeds tending to be subglobose or peltate with a cavity on one side, often angular by compression.

An Afro-Indo-Pacific genus of several hundred species, one widespread in the south and west Pacific.

Tarenna sambucina (Forster f.) Durand ex Drake

Tarenna sambucina (Forster f.) Durand ex Drake, III. Fl. Ins. Mar. Pac., 6:190, 1890.—Stone, Micronesica, 6:559, 1971.—Souder, In Guam Gardens, 70, 1974.—Fosberg, Sachet, and Oliver, Micronesica, 15:278, 1979.—Fosberg et al., Vascular Pl. Palau, 42, 1980.—Fosberg and Sachet, Allertonia, 6:271, 1991.

Coffea sambucina Forster f., Prodr., 16, 1786.

Stylocoryne sambucina (Forster f.) A. Gray, Proc. Am. Acad., 4:309, 1859.

Tarenna glabra Merrill, Philip. Journ. Sci. Bot., 9:145–50, 1914.—Valeton, Bot. Jahrb., 63:303, 1930.—Kanehira, Fl. Micr., 381, 1933; Enum. Micr. Pl., 425, 1935.

Shrub or tree, to 10–15 m tall, vegetative parts glabrous; leaves elliptic to oblong or broadly lanceolate, up to 20 × 10 cm, apex acute to somewhat acuminate, veins about 7 or 8 on a side, petiole rather slender, 1–3 cm long; inflorescence

thyrsoid, puberulent to nearly glabrous, 1–3 at a terminal node, 2–4 times ramified, flat to rounded on top, small linear bracts at main nodes, tiny ones at ramifications, flowers pedicellate, pedicel with 1 or more scale-like bractlets; calyx cup-shaped, shallowly 5-lobed, lobes ciliolate; corolla hypocrateriform, tube 5–8 mm long, densely to sparsely puberulent outside, or glabrous, pilose within, lobes 5, oblong, $\frac{1}{3}$ – $\frac{1}{2}$ length of tube, apex rounded or obtuse, puberulent without, glabrous to pubescent within; anthers linear; style glabrous or rarely villous in middle part, strongly exerted, stigma lobes linear-lanceolate, coherent; fruit pea-like, 2-celled, seeds many, angular.

This species occurs throughout the tropical Pacific as far east as the Tuamotus, excepting Hawaii and the Marquesas. It is separated geographically into at least six varieties, mainly differing in minor characters. Two of these occur in Micronesia, but var. *sambucina* is not known to be in Micronesia.

Key to Micronesian Varieties of *Tarenna sambucina*

- Corolla tube glabrous within except for slight pilosity in throat, style hairy in middle part
 *T. sambucina* var. *oweniana*
 Corolla tube pilosulous within, style completely glabrous
 *T. sambucina* var. *glabra*

Tarenna sambucina var. *glabra* (Merrill) Fosberg & Sachet

Tarenna sambucina var. *glabra* (Merrill) Fosberg & Sachet, *Allertonia*, 6:272, 1991.

Tarenna glabra Merrill, *Phil. Journ. Sci. Bot.*, 9:149–150, 1914.

Corolla tube 4–4.5 mm long, somewhat ampliate upward, glabrous or minutely subappressed-puberulent externally, pilosulous within, lobes oblong, 3 × 1 mm, apex rounded, both surfaces glabrous or outer very sparsely hirtellous, style entirely glabrous.

Endemic to Marianas, generally distributed.

VERNACULAR NAMES.—

lumaclada, sumaclada (Guam: *Marche 139*)

smagdara (Saipan: *Kanehira*, 1935)

sumak (Saipan: *Hosaka 2948*, Guam: *Whiting S6a*)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Saipan: Lange (US); *Kanehira 889* (BISH); Mt. Tapotchau, N slope, 1100 ft [300 m], *Hosaka 2948* (US, BISH, POM, NY, L).

Tinian: *Hosokawa 7814* (BISH, A); W coast in forest near beach, 100 ft [30 m], *Hosaka 2871* (US, BISH, POM, NY); “Palm Beach” 1 mi [1.6 km] S of Faibus Pt., W coast, *Fosberg 24858* (US, BISH, POM, NY, L); Bañaderon Lemmai, 100 m, *Fosberg 64507* (US, BISH).

Rota: *Hosokawa 7578st* (BISH, POM, A); Sabana, 1500 ft

[460 m], *Kondo s. n.* in 1952 (BISH); *Kanehira 1786* (US); *Kanehira 1801* (P, K); trail up to the Sabana region, 150–250 m, *Evans 2079* (US, BISH, POM, NY); top of cliff on W end of island above Songsong village, 200–300 m, *Sachet 1776* (US, BISH, POM); track between airstrip and northernmost part of island, 150–250 m, *Evans 2165* (US, BISH, POM, NY, L); Sabana, old Japanese phosphate workings, 400 m, *Evans 2234* (US, BISH, POM, NY); second main terrace from top, 320 m, *Fosberg 31857* (US, BISH, NY, L).

Guam: Mt. Lamlam, *Moran 4711* (UC, BISH, POM); s. l., *Marche 139* (P, POM); s. l., *G.E.S. 26* (BISH, BM, K, isotypes); Mt. Santa Rosa, 500 ft [150 m], *Hosaka 3147* (US, BISH, POM, NY); *Guerrero 758* (P); Manengon, volcanic savanna, *Stone 5150* (GUAM); Mt. Almagosa near Almagosa Springs, 900 ft [275 m], *Pedrus (Stone's) 4116-a* (GUAM); Mt. Lamlam, 370 m, *Fosberg 46254* (US, BISH, POM, NY, L); Yigo, *Whiting s6a* (US, POM); Mt. Lamlam, *Anderson 329* (US, BISH, POM, NY); Kotod, headwaters of Maemong River, 100 m, *Fosberg 39187* (US, BISH); 1 mi [1.6 km] S of Taguae, on N plateau, 110 m, *Fosberg 35477* (US); ridge S of Mt. Lamlam, *Fosberg 35330* (US, BISH, POM, NY); Oca Pt. opposite Alupat I., *Anderson 187* (US, BISH, POM, NY, L); Manchanao, *Swezey* in 1936 (BISH); Tarzan Falls, near Cross Island Road, near observation tower, Cotal, *Fosberg 59790* (US, BISH, POM, NY, L); road down to Tweeds Cave area, NCS, *Krizman* in 1983 (US).

Tarenna sambucina var. *oweniana* Fosberg

Tarenna sambucina var. *oweniana* Fosberg, *Allertonia*, 6:272, 1991.

Medium sized tree, 15 m tall, vegetative parts almost glabrous except domatia, wood hard, leaves elliptic, sub-acuminate, veins alternate to subopposite, domatia hairy, stipules sheathing, lobes oblong-ovate, obtusish, 5–7 mm long, thyrses 3–4 times trichotomous, low rounded distally, traces of sericeous pubescence near nodes, bracts at ramifications scale-like, ovate acuminate rather than linear, ciliate, several scattered tiny ovate scale-like, strongly ciliate bractlets on pedicels, calyx 1 mm or less long; corolla notably glabrous except at base of lobes within where the throat is more or less hirsute, tube glabrous within, style hairy near middle, stigma clavate-pointed, fruit pea-sized, globose, fleshy, drying wrinkled, endocarp hard, 2-locular; seeds blackish brown, irregular cuneate with convex top, surface notably ruminant-rugose, 6–13 seeds, observed in several fruits, probably more or less, number presumably depending on number of ovules fertilized.

Endemic to western Carolines, found on limestone islands in Palau, and on Rumung Island, Yap, Found in dense forest.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: s. l., *Kanehira 2469* (P); “Mt. Kororu” (Koror), *Hosokawa 9797* (A). Aulupse’el: Risong, Matuker Bay, 30–50 m, *Fosberg 47533* (US, holotype, Bish,

K, POM, MO, NY, etc. isotypes).

Yap: Rumon-to (Rumung), *Hosokawa 8954* (A, BISH, US);
Kanehira 1169 (BISH).

Timonius de Candolle

Timonius de Candolle, Prodr., 4:461, 1830.—Fosberg and Sachet, *Micronesica*, 20:157–164, 1987.

Trees and shrubs, dioecious; leaves ovate to elliptic, often strongly veined, usually (or always?) petiolate; stipules thin to firm, usually acuminate, connate and sheathing at base; flowers axillary, the pistillate solitary or in few-flowered cymes, the staminate in several-to many-flowered cymes; cymes with central flower sessile or subsessile, lateral pedicellate; calyx cup-like, 2- to 6-lobed or subtruncate; corolla hypocrateriform,

4–6 lobed, valvate, lobes patent to recurved; anthers or antherodes attached in summit of tube; style with (2) 4-many branches, ovary with few to many locules, one anatropous ovule in a locule; pistillode short, somewhat bifid; fruit globose, usually black at maturity, fleshy, pyrenes usually free, varied in number, few to many, tending to be in vertical rows, one seed in a pyrene.

An Indo-Pacific genus with many species, a few in Micronesia.

Some of the Micronesian species are difficult to distinguish, especially without material of both sexes collected at the same time and place. The morphology of the gynoeceum of some species is very aberrant in the Rubiaceae and needs comparative study of many species, preferably with ample material for dissection.

Key to Micronesian Taxa of *Timonius*

1. Pistillate flowers usually solitary on axillary peduncles, bracteolate at summit 2
2. Plants vegetatively essentially glabrous or subglabrous at maturity (often slightly strigose on very young parts and on stipules) 3
3. Flowers glabrous without, stipules elongate sheathing terminal bud, glabrous *T. ledermannii*
3. Flowers strigose or sericeous externally, stipules triangular, short, if elongate and sheathing, then sericeous 4
4. Calyx lobes rounded, stipules sheathing, elongate *T. timon*
4. Calyx lobes pointed, stipules triangular 5
5. Calyx only slightly lobed, pistillate corolla lobes 5 *T. nitidus*
5. Calyx normally sharply dentate, pistillate corolla lobes 6–7 *T. subauritus*
2. Plants vegetatively persistently hairy at maturity 6
6. Calyx lobes rounded at apex, stipules sheathing, reaching several cm *T. timon*
6. Calyx lobes acute, lanceolate, ovate or dentiform, stipules triangular, acute or acuminate, to 1.2 cm 7
7. Calyx lobes dentiform, triangular or ovate, leaf bases not cordate, at most slightly subcordate, pubescence appressed to subspreading 8
8. Leaves firm, peduncles strong, thinly strigose, pistillate calyx lobes 4–5, triangular, slightly acuminate, equal *T. subauritus* var. *strigosus*
8. Leaves thin, peduncles slender, notably strigose, pistillate calyx lobes 5–6, ovate, unequal *T. salsedoi*
7. Calyx lobes lanceolate, leaf-bases mostly cordate, leaves usually thin, pubescence spreading to (in var. *submollis*) sub-spreading or appressed (*T. mollis*) 9
9. Leaves somewhat firm, base obtuse to subcordate, pubescence thin, tending to be appressed, pistillate peduncle 1.5–4 cm long *T. mollis* var. *submollis*
9. Leaves thin, base cordate, pubescence notably spreading, pistillate peduncle 1 cm or less 10
10. Leaves moderately hirsute beneath, but green, not conspicuously paler than upper surface, upper surface sparsely hirsute or pilose *T. mollis* var. *mollis*

10. Leaves prominently hirsute beneath, appearing paler because of pubescence, upper surface moderately hirsute *T. mollis* var. *villosissimus*
1. Pistillate flowers in cymes of three or more flowers (very rarely also in 3s in *T. nitidus* and *T. timon*) 11
11. Young stems glabrous, calyx subtruncate or only slightly and obtusely toothed, leaves glabrous except for domatia in vein axils *T. albus*
11. Young stems and under-side of young leaves at least slightly appressed hirtellous, sericeous or strigose, calyces distinctly toothed, teeth acute or acutish 12
12. Pistillate cymes once-branched, corolla tube 11–12 mm long, mature leaves subglabrous or slightly strigose beneath *T. korrensis*
12. Pistillate cymes usually twice or more branched, corolla tube 10 mm or less long, leaves usually strigose or puberulent at least beneath 13
13. Staminate cymes 2–3 cm long, twice branched, staminate calyx 5 toothed, pistillate corolla 6-lobed *T. ponapensis*
13. Staminate cymes 5–11 cm long, usually 5–7 times branched, staminate calyx 4-toothed, pistillate corolla 4–5 lobed (*T. corymbosus*) 14
14. Petioles densely hairy, lower surface of leaves strigose, leaf apex acuminate, staminate cymes 9–11 cm long *T. corymbosus* var. *corymbosus*
14. Petioles subglabrous, lower surface of leaves thinly appressed puberulent, leaf-apex scarcely acuminate, staminate cymes 5–8 cm long *T. corymbosus* var. *takamatsui*

Timonius albus Volkens

Timonius albus Volkens, Bot. Jahrb., 31:475–476, 1901.—Valeton, Bot. Jahrb., 63:305–306, 1930.—Kanehira, Fl. Micr., 382, 1933.—Fosberg, Occ. Pap. Bish. Mus., 15:217, 1940.—Fosberg, Sachet, and Oliver, Micronesica, 15:278, 1979.—Fosberg and Sachet, Micronesica, 20:157, 1987.

Shrub or small tree, vegetative parts glabrous except domatia in axils of principal leaf-veins and inner surface of stipules; leaves chartaceous or rarely subcoriaceous, ovate to elliptic, usually broadly so up to 20 × 9.5 cm usually much smaller, acuminate at apex, acute or attenuate to obtuse at base, veins 5 to 7, rarely 8, on a side, rather prominent; stipules ovate-acuminate, usually less than 1 cm long, glabrous without, densely sericeous hirsute within; pistillate flowers rarely solitary on short peduncles, bracteolate at summit, usually in 3-flowered, or 7-flowered short glabrous cymes, central flower sessile; hypanthium and calyx urceolate, the calyx sparingly puberulent, margin subtruncate to very shortly lobed, lobes broadly triangular-obtuse, corolla in bud tomentose, at anthesis thinly strigulose, tube about 5 mm long, lobes 4–5 about 2 mm long, reflexed; staminate cymes compact rounded, to 4 cm long, up to 6 times dichotomously ramified, variously reduced pairs of bracts united by stipules at ramifications, glabrous; calyx funnel form, slightly toothed, glabrous, ciliate and sericeous within; corolla in bud clavate, sericeous, about 7 mm long, stylode several mm long, slightly stigmatic distally; fruits globose, 1 cm or less in diam., pyrenes many.

Endemic to Yap.

VERNACULAR NAMES.—

gathomotsch (Yap: *Alvis 104*)
 mongaluwak nuteth (Yap: *Wong 532*)
 pelang (Yap: *Evans 304*)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Yap: Volkens, 1901:475–476. *Hal-lier 101* (HBG, US); Kanif, *Takamatsu 1960* (P); *Kanehira 1176* (P); Tora, 5 m, *Alvis 104* (US, BISH, POM, NY, L); Ururu-son, Tarago, *Hosokawa 8728* (BISH); Mt. Dabriol, *Hosokawa 8758* (BISH); *Kanehira 1145* (BISH); 100 ft [30 m] *Wong 532* (US, BISH); Koronia-Gofu, *Hosokawa 8852* (BISH); Rull district, near Yap High School, 30 m, *Evans 304* (US, BISH, POM); Gorrer I., central plateau, 100 ft [30 m], *Hosaka 3318* (US, BISH, POM, NY, L), *3316* (US, BUSH, POM); near Garguei, N Yap, 70 m, *Cushing 416* (US); near Dinay, *Cushing 327* (US), *328-b* (US); hill 0.5–0.7 mi [0.8–1.1 km] SW of Gitam, 40 m, *Fosberg 46561* (US, BISH, POM, NY, L), *46560* (US, BISH); plateau W of Gatschapar, and N of Maa, Tomil District, *Fosberg 25615* (US, BISH); N end of Gagil District, high ground SW of Maki, 30–50 m, *Fosberg 25610* (US, BISH, POM, NY); N end of Gagil District, Maki, 2–5 m, *Fosberg 25590* (US, BISH, POM); Dinay, S Yap, 25 m, *Cushing 325* (US, GUAM); S of Loran Sta., Gagil-Tomil, *Stemmermann 3154* (BISH); near old Japanese airplane parking area, NW of airport, *Falanruw 3314* (US), *3340* (US); savanna N of airport, *Falanruw 3201* (US); Adebue, *Falanruw 3380*

(US); Tabiwol, near Bulochang abandoned village, *Fosberg 60054* (US, BISH, POM, NY, L); near Fanaalily, on road to airport, *Fosberg 60070* (US, BISH, POM, NY, L); W end of proposed new airport site, *Stemmermann 3512* (BISH), *3488* (BISH).

Timonius corymbosus Valetton

Timonius corymbosus Valetton, Bot. Jahrb., 63:307, 1930.—Kanehira, Fl. Micr., 382, 1933; Enum. Micr. Pl., 425, 1935.—Fosberg, Occ. Pap. Bish. Mus., 15:217, 1940.—Fosberg, Sachet, and Oliver, Micronesica, 15:279, 1979.—Fosberg et al., Vascular Pl. Palau, 42, 1980.—Fosberg and Sachet, Micronesica, 20:158, 1987.

Shrub or small tree to 5 m tall, young growth thinly and very minutely sericeous-puberulent, internodes variably quite long, on flowering branchlets rarely as short as 1 cm.; leaves up to 14 × 8 cm, usually smaller, broadly ovate to elliptic or oval or slightly obovate, apex obtuse to acutish, or acuminate, usually very slightly and shortly so, base obtuse to acute, sometimes slightly decurrent, appressed pubescent, or glabrous except when very young, main veins 5–7 (–8), petiole 1–1.5 cm long; stipules triangular acuminate, up to 7 mm long, sericeous, especially on midrib, ciliate, densely appressed villous within; cymes axillary, tending to be sericeous, slender, tending to be flat-topped, branches tending to be scorpioid, staminate usually 4–7 times dichotomous, ultimate branchlets either somewhat scorpioid or with one or more scale-like bractlets part way up and a pair at the summit subtending the flower, pistillate inflorescence, flowers and fruit of only var. *takamatsui* known, described under that variety.

Apparently endemic to Palau, occurring in two varieties, one from Koror, substratum not recorded, the other mainly from the limestone islands.

Timonius corymbosus Valetton var. *corymbosus*

Leaves thin-chartaceous or membranous, elliptic to slightly obovate; acuminate, appressed pubescent beneath, midrib slightly so above, densely beneath, petiole densely appressed-hirsute, cymes 9–11 cm long, 5–7 times branched; staminate flowers with calyx cup-shaped, 1 mm long, shortly 4-toothed, sparsely appressed-hirtellous and ciliolate; corolla 10 mm long, strongly sericeous without, tube 8 mm, lobes 5, ovate, 2 mm long.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

CAROLINE ISLANDS.—Palau: Koror: 20–30 m, Feb 1914, *Ledermann 14051* (B, lectotype).

Timonius corymbosus var. *takamatsui* Fosberg & Sachet

Timonius corymbosus var. *takamatsui* Fosberg & Sachet, Micronesica, 20:159, 1987.

Differing from var. *corymbosus* especially in its broader much less hairy leaves, petiole glabrous, shorter, staminate cymes as in var. *corymbosus*, but 5–8 cm long; pistillate cymes slender, to 4 cm long, long-pedunculate, 1–2 (–3) times branched, very small bracts subtending branches, connected by a stipular line, central flowers sessile at each ramification, lateral flower closely subtended by 2 to 4 minute bractlets; pistillate flowers with hypanthium about 2 mm long, calyx urceolate, the 4 triangular teeth spreading somewhat, persisting on fruit; corolla tube 5–6 mm long, somewhat dilated upward or not, glabrous within, densely sericeous without, lobes also, these 4 (–5), ovate 2–2.5 mm long, spreading or reflexed, 2 bands of papillae within, antherodes linear, sessile in throat; style with 2 or more flattened branches, these irregularly tridentate or slightly trifid, then again dentate, apical parts of branches somewhat exserted; fruit globose, 5–7 mm diameter when dry, irregularly mammillate, pyrenes 16 or more, radiating-ascending in vertical rows, fusiform and slightly curved, free.

Found on Olophacal (= Aulupse'el) Island, northernmost of the large limestone islands of Palau, Arimasuku, Kaiguru, Peleliu, and Angaur. In leaf characters this variety resembles *T. korrense*, but the staminate inflorescences are much more slender, more times ramified, and the flowers much smaller; pistillate cymes more slender, more branched, placing it in *T. corymbosus*.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Aulupse'el (Olophacal): *Takamatsu 1478* (P, isotype, BISH, holotype), *1458* (BISH, US), *1452* (BISH); Kaiguuru, *Takamatsu 1580* (BISH); S side, Risong, Matuker Bay, 2 m, *Fosberg 47569* (US, BISH, POM CHR, TI, BM, QLD, MO, A); 10 m, *Canfield 254* (US). Ngemelis Group: Arimasuku, *Hobdy 1445* (BISH). Peleliu: *Blackburn 283* (US, BISH, POM); 15 ft [4.5 m], *Hosaka 3423* (US, BISH, POM).

Timonius korrensis Kanehira

Timonius korrensis Kanehira, Bot. Mag. Tokyo, 45:351, 1931; Fl. Micr., 384, 1933; Bot. Mag. Tokyo, 49:277–278, 1935; Enum. Micr. Pl., 428, 1935.—Fosberg and Sachet, Micronesica, 20:159–160, 1987.
Timonius corymbosus sensu Fosberg, Sachet, and Oliver, Micronesica, 15:279, 1979 [pro parte; non Valetton, Bot. Jahrb. 63:307, 1930].

Shrub or small tree, young parts very slightly to somewhat appressed-puberulent; leaves, to 6 × 9 cm, usually smaller, chartaceous to subcoriaceous, broadly elliptic or oval to slightly ovate or obovate, shortly but sharply acuminate at apex, base acute to obtuse or subtruncate, glabrous to sparsely appressed hirtellous beneath, the 5–7 veins on a side with small domatia with tufts of hair in axils, petiole 5–15 mm long; stipules triangular acuminate, 10–14 mm long, thinly sericeous on outside, densely so within; cymes axillary, less slender than

in *T. corymbosus*, rather open, branches scorpioid, flowers sessile, secund, one sessile in each dichotomy; staminate cymes once or twice dichotomous, or rarely sub-thyrsoid, peduncle 1–3.5 cm long, branches elongate to as much as 10 cm, with 6–10 sessile flowers; pistillate cymes shorter, once dichotomous, peduncle 2–2.5 cm long, branches to 3.5 cm, with 5–6 flowers on a branch; staminate flowers with hypanthium turbinate 1.5 mm high, subglabrous, calyx campanulate 1.5 mm long, sharply 5-toothed, corolla tube 12 mm long, densely sericeous outside, slightly dilated near top, lobes (4-) 5, oblong 5 mm long, sericeous outside, slightly papillose within, spreading, anthers partly exerted; pistillate flowers with hypanthium and calyx urceolate, about 5 mm long, 5 toothed, sericeous inside and out, corolla tube 11 mm long, densely sericeous without, slightly ampliate upward, lobes 5, oblong, recurved, glabrous within; fruit globose, 5–6 mm in diam., 1–3 maturing on a cyme.

Koror and southern Babeldaob, and an uninhabited coral island near Koror. Syntypes, *Kanehira* 105, 460, from Koror. Only one mature flower present on each sheet studied, inner parts and fruit not seen. Neither type or other *Kanehira* material seen by us, except no. 2462.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Koror: Arumizu (Ngarmid), *Hosokawa* 9090 (A); $\frac{1}{4}$ mi [0.4 km] from Rendrok dock, at base of limestone cliff, *Salsedo* 437 (US); s. l., *Kanehira* 2462 (P, US); Ngelmeduch, $\frac{1}{8}$ mi [0.2 km] from KB bridge, 8 m, *Shearard* and *Spence* 75 (US). Malakal: s. l., *Tuyama* 9329 (K).

Timonius ledermannii Valetton

Timonius ledermannii Valetton, Bot. Jahrb., 63:305, 1930.—*Kanehira*, Fl. Micr., 386, 1933; Enum. Micr. Pl., 426, 1935.—*Hosokawa*, Journ. Jap. Bot., 13:66, 13:284, 1937; Bull. Biogeogr. Soc. Jap., 7:201, 1937.—*Fosberg*, Occ. Pap. Bish. Mus., 15:217, 1940.—*Glassman*, Bish. Mus. Bull., 209:96, 1952.—*Fosberg*, *Sachet*, and *Oliver*, Micronesica, 15:279, 1979.—*Fosberg* and *Sachet*, Micronesica, 20:157, 1987.

Tree to 20 m tall, glabrous, branchlets with short internodes distally, longer below; leaves subcoriaceous, rather broadly elliptic to slightly obovate or ovate, mostly 10–15, (–20) \times 4–7 cm, base acutely contracted, apex shortly but sharply narrow acuminate, 8–12 rather inconspicuous nerves on a side, anastomosing into a faint scalloped submarginal nerve, network close and conspicuous beneath, much less so on upper surface, areolae mostly 2–3 times as long as wide, groups conspicuously at angle to each other, petiole stout, (1-) 2–3 (–4) cm long; stipules thin, to 10 cm long rolled around terminal bud; inflorescences short, a little longer or shorter than petioles, staminate cymes stiff, tending to be recurved, 3–5 flowered, peduncle compressed, dorsiventrally, flower sessile or subsessile, articulate to cyme branches subtended by a tiny point or bracteole, pistillate reduced to single-flowered pedun-

cles 1–2 cm long, stout, compressed while in flower, notably articulate at summit but almost ebracteolate; flowers white or pinkish white; staminate flowers 4 merous, calyx cup-shaped, truncate, almost 2 mm long, on a rudimentary ovary, corolla tube about 6–8 (–10) mm long, lobes 4 (–5), acuminate, bud notably 4-sided, anthers linear, 7.5 mm long, 1 mm bifid at base, pistillode about 4 mm long, finely tapered and minutely bifid at apex; pistillate flowers with ovary globose, about 6 mm diam. at anthesis, calyx ring erect, truncate, larger in diameter than corolla tube, corolla in bud acuminate, at anthesis tube cylindrical to funnellform, about 8 mm long, 2 mm thick, lobes 8–13, lanceolate, acuminate with subulate tips, central zone thick, margins wide, membranous, 7 mm long, 2 mm wide at base, recurved; united portion of style columnar, 4.5 mm long, 1 mm thick, branches (10-) 14, fleshy, bluntly pointed, 4–5 mm long; fruit black, 9–11 mm high, 12–13 mm wide, depressed globose, apex subtruncate, crowned with 6 mm calyx ring, style-scar round, with a cavity within, pyrenes in 24–26 vertical series of about 15–16, radiating from a cylindrical-hemispheric placenta or circle of placentae arranged around 2 hollow cells, pyrenes 3 mm long, compressed, rounded on one edge, acute on other, about 1 \times 0.5 mm transversally.

Endemic to the wet forest of Ponape and Truk, above 400 m elevation. Very distinct from and not related to the other Micronesian species of the genus.

VERNACULAR NAMES.—

shouri (Truk: *Hosokawa*, 1937)
syauri (Truk, Tol: *Hosokawa*, 1937)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Truk: Tol: 1400 ft [420 m], *Stone* 5338 (US, GUAM); Uriribot, *Hosokawa* 8260 (BISH, A, US).

Ponape: Niinioanil (Niinani), *Hosokawa* 5673 (BISH, A, US); Niinoani-zon, *Kanehira* 833 (BISH); Mt. Nanalaut, Top, 700 m, *Takamatsu* 1080 (BISH); Mt. Tromail, top, 600 m, *Takamatsu* 977 (BISH); Mt. Poaipoi, 2100 ft [640 m], *Glassman* 2500 (BISH, US); Mt. Troton (Tolotom), *Hosokawa* 5705 (A, BISH), 5769 (BISH); top of Mt. Sonkakayama (Toleailuka), *Takamatsu* 817 (BISH); near summit of Mt. Nanalaut, 2000 ft [600 m], *Stone* 2003 (GUAM); Mt. Nanalaut and Mt. Nginani, near summit, 2550 ft [775 m], *Stone* 5472 (US, GUAM); Tolun Nanket, mountain above Nanipil, Not District, 500 m, *Fosberg* 26460 (US, BISH, POM, CHR, L); s. l., *Kanehira* 1564 (P, US), 1565 (US); Kupsorujō, top of mountain, *Takamatsu* 691 (BISH), 692 (BISH); Mt. Seletenreh, U Distr. NW face, *Stone* 5431 (GUAM); Paul, Hange des Tol, 7–800 m, *Ledermann* 1384 (B, lectotype), 13418 (B), 600 m, 13690 (B); s. l., *Ledermann* 13360 (B); trail from Awak Valley to Mt. Tolonashapper, 560 m, *Stemmermann* 6570 (BISH).

Timonius mollis Valetton

Timonius mollis Valetton, Bot. Jahrb., 63:305, 1930.—*Kanehira*, Fl. Micr. Pl.,

1935.—Fosberg, Occ. Pap. Bish. Mus., 15:217, 1940.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:279, 1979.—Fosberg et al., *Vascular Pl. Palau*, 42, 1980.—Fosberg and Sachet, *Micronesica*, 20:160, 1987.

Timonius tomentosus Valetton, Bot. Jahrb., 63:305, 1930.

Timonius villosissimus Kanehira, Bot. Mag. Tokyo, 48:923, f. 9, 1934; Enum. Micr. Pl., 426, 1935.

Small tree, generally sparsely to densely villous-hirsute, only sparsely so on upper leaf surfaces (more densely on principal veins), internodes mostly short; leaves broadly elliptic to usually broadly obovate, up to at least 27 × 15 cm, thin, apex acuminate, base cordate-auriculate, usually unequally so, nerves 9 to 11 on a side, prominent, anastomosing distally in a weak submarginal vein, network between nerves inconspicuous, petiole thick, 1 (–1.5) cm or usually less long, densely hirsute; stipules straight, ovate, strongly acuminate, up to 15 mm long, soon caducous; staminate cymes dense, subcapitate, at most 2 cm long, shortly pedunculate, at least twice ramified, about 11-flowered, densely short-hirsute, flowers in bud only, buds ellipsoid, hirsute, calyx lobes lanceolate unequal; pistillate flowers on short peduncles (to 10 mm) or sessile, hypanthium subglobose, calyx deeply parted into 6 linear lobes 3–12 mm long, corolla up to 15 (–17) mm long, cut about 1/3 into 6 lance-ovate lobes; fruit globose to depressed globose, up to 15–18 mm wide, 12 mm high, pubescent.

The type of *T. mollis*, *Ledermann 14342*, from Palau, Babeldaob, Ngarsul, consisting of 2 pieces mounted on the same sheet, adequately described by Valetton, was probably lost in the destruction of the Berlin Herbarium. A duplicate could conceivably exist in another herbarium.

Timonius tomentosus was published by Valetton in his key to the Micronesian species, but in the text *T. mollis* was used. *T. tomentosus* was probably a lapsus on Valetton's part, but was published with descriptive material in the key. Since he did not accept it, apparently, it is invalidly published (Art. 34, ICBN).

Apparently endemic to Palau, except that a sterile specimen collected by Otto Swezey on Guam may be a seedling of *T. mollis*.

Three varieties should be recognized, a small-leaved, small-flowered one corresponding to Valetton's species, and a larger leaved, larger flowered one corresponding to Kanehira's *T. villosissimus* represented, at least, by *Takamatsu 1623*, and an intermediate one approaching *T. subauritus*.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

CAROLINE ISLANDS.—Palau: Malakal: *Tuyama 9331* (GUAM). Variety not determined.

Timonius mollis Valetton var. *mollis*

Timonius mollis Valetton var. *mollis*.

Pubescence rather prominent, spreading, leaves thin, elliptic, acuminate, cordate at base, blade, especially the veins, somewhat hirsute, more so beneath, petioles densely hirsute, fruit densely strigose.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Babeldaob: Garmiscan, *Hosokawa 9138* (BISH, A); Arekalong, *Takamatsu 1660* (BISH); Kaiguru, *Takamatsu 1623* (BISH); Mt. Elsum, *Hosokawa 9255* (A). Aulupse'el: Matuker Bay, 30–50 m, *Fosberg 47540* (US). (This is a seedling with similarly reflexed stipules to the Swezey Guam collection mentioned above, but with obtuse rather than subcordate leaf bases).

Timonius mollis var. *submollis* Fosberg & Sachet

Timonius mollis Val. var. *submollis* Fosberg & Sachet, *Micronesica*, 20:161, 1987.

Leaves tending to be firm, pubescence thin, subspreading to appressed, leaf bases obtuse to subcordate, calyx lobes, especially of staminate flowers, lanceolate, fruit minutely strigulose, fruiting peduncle 1.5–4 cm.

This variety seems almost intermediate with *T. subauritus* but its lanceolate calyx lobes suggest that it belongs with *T. mollis*.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Ngarakabesang: W side near old Japanese seaplane base, *Fosberg 25630* (US, holotype, BISH, POM, CHR, L, A, isotypes); W peninsula, 10–20 m, *Fosberg 32474* (US, BISH, POM). Babeldaob: Dam site, Airai, *Fisher 118* (US).

Timonius mollis var. *villosissimus* (Kanehira) Fosberg & Sachet

Timonius mollis var. *villosissimus* (Kanehira) Fosberg & Sachet, *Micronesica*, 20:161, 1987.

Timonius villosissimus Kanehira, Bot. Mag., Tokyo, 48:923, 1934.

Whole plant much more conspicuously hirsute than in var. *mollis*, hairs generally spreading, tending to be somewhat matted on stems, petioles and main veins, and to be appressed on flowers and fruits, fruit densely silky-strigose.

The characters used by Kanehira to distinguish his species from *T. mollis*, larger leaves and fruits and longer pedicels, do not hold up with more specimens than were available to Kanehira. We do not find these characters at all reliable, but the much denser and more conspicuous pubescence seems to justify at least varietal separation, contrary to the opinion expressed earlier (Fosberg, 1940). A specimen of the lectotype collection at K bears an apparently unpublished name by Kanehira, based on the name of the type locality.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Babeldaob: Aimeliik, *Kanehira 2305* (US, lectotype, K, NY, isolectotypes); Lake Ngardok, 50 m, *Fosberg 32586* (US, BISH, POM); SW of Mt.

Yekigaroto, 130 m, *Fosberg 47690* (US, BISH, POM, NY, L); Kaiguru, *Takamatsu 1623* (BISH).

***Timonius nitidus* (Bartling ex de Candolle) F.-Villars**

Timonius nitidus (Bartling ex de Candolle) F.-Villars, Nov. App. Fl. Filip., 109, 1880.—Merrill, Philip. Journ. Sci. Bot., 15:544, 1919.—Kanehira, Enum. Micr. Pl., 426, 1935.—Stone, Micronesica, 6:560, 1971.—Kani et al., Univ. Guam Mar. Lab. Tech. Rept., 16:12, 1974.—Souder, In Guam Gardens, 61, 1974.—Falanruw and Payne, Life on Guam, 18:44, 68, 1976.—Fosberg, Sachtel, and Oliver, Micronesica, 15:279, 1979.—Moore and McMakin, Plants of Guam, 76, 1979.—Fosberg and Sachtel, Micronesica, 20:157, 1987.

Petesia nitida Bartling ex de Candolle, Prod., 4:395, 1830.

Timonius albus sensu Walker and Rodin, Contr. U.S. Nat. Herb., 30:466, 1949 [non Volkens, Bot. Jahrb., 31:475, 1901].

Shrub (or small tree?), internodes subterete to slightly sub-appressed hirsute when very young, 4-angled, glabrate, dark brown with fine white lines, nodes with a fringe of straight hairs in axils of stipules; leaves elliptic to slightly obovate, to 7 × 3, or 9 × 4 (rarely to 11 × 5) cm, acute, veins 5 or 6 on a side, not prominent, with fine network, somewhat strigose beneath when very young, especially on midrib, soon glabrate, firm to subcoriaceous, petiole 0.5–1.5 cm long; stipules triangular, somewhat acuminate, sparsely strigose dorsally, densely so within, caducous; staminate cymes 2–3 cm long, slender, dichotomous, 3–5 flowered glabrous or nearly so; staminate flowers with rudimentary inferior ovary, cup-shaped-campanulate slightly 5-dentate calyx; corolla white, tube slender, thinly sericeous, about 8 mm long, slightly ampliate upward, lobes 5, linear-oblong, blunt, recurved sericeous without, glabrous within; anthers in sinuses, partly exserted, pistillode about 2 mm long; pistillate inflorescence one-flowered (rarely triflorous cymes, *Stone 3858*; *Fosberg 43459*), peduncles slender, 20–22 mm long, with a pair of acuminate scale-like bracts at summit; flower with hypanthium plus calyx urceolate, slightly 5-dentate, about 4 mm long; corolla tube thick, 4 mm long, densely sericeous, lobes 5, oblong, about 4 mm long, blunt, sericeous without, glabrous within, reflexed; stigmatic branches about 6, exserted, tapering; fruit globose or somewhat depressed-globose, black, 7–10 mm across, with many sub-angular narrowly turbinate pyrenes about 3 × 1.5 mm.

Marianas, apparently endemic to Guam, known only from savanna vegetation on volcanic soil (except for *Moore 466*, 558).

VERNACULAR NAMES.—

maholok layu, sumak ladda (Guam: Falanruw and Payne, 1976)

sumac lada, maholoc layer (Guam: Merrill, 1919)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

MARIANAS ISLANDS.—Guam: s. l., *Guerrero 762* (BISH); *Nelson 16* (K); gully near Mt. Chachao, *Swezey* in 1936 (BISH, US); Manengon, dry savannas, *Stone 4850* (GUAM);

Manengon, volcanic savanna, hills near falls of the upper Ylig R., *Stone 3857* (GUAM), 3828 (GUAM), 3812 (GUAM); Umatac Dist., hills between La Sua Fua R. and Cetti R., 80 m, *Stone 3899* (GUAM); N of mouth of Laguas River, Sasa Bay, *Ecology class LR 2910* (US); mouth of Sasa River, edge of mangrove swamp, *Moore 558* (US, GUAM); S of Asan Pt. and Piti, 90 m, *Anderson 74* (US, BISH, POM, NY, L), 72 (US, BISH, POM, NY, L), 61 (US, BISH, POM, NY), 69 (US, BISH, POM, NY), 71 (US, BISH, POM, NY, L); Manengon, 150 m, *Evans 1784* (US, BISH, POM, NY, L); Umatac, ridge crest SE of town, 60–70 m, *Anderson 287* (US, BISH, POM, NY); Cotal conservation area on Cross Island Road, 100–300 m, *Sachtel 1706* (US, BISH), 1707 (US, BISH, GUAM), 1708 (US, BISH); Cotal conservation area, E of Apra Heights, 160 m, *Fosberg 43459* (US, BISH, POM, NY), 43465 (US, BISH, POM, NY), 43460 (US), 43461 (US), 43462 (US), 43463 (US, BISH), 43464 (US); Agat, Achugao, 500 ft [152 m], *Hosaka 3191* (US, BISH, POM, NY, L), 3191A (US); Umatac, 75 m, *Fosberg 31261* (US, BISH), 31262 (US, BISH, POM, NY); Com-Marianas Fuel Storage, 100 m, *Fosberg 35214* (US, BISH, POM); Cross Island Road, *Moore 538* (GUAM); Umatac River Valley, *Moore 481* (GUAM); Nav. Mag., *Moore 496* (GUAM); Tarzan Falls, near Cross Island Road, near observation tower, Cotal, *Fosberg 59788* (US, BISH, POM, NY, L), 59789 (US, BISH, POM, NY, L); N on trail to Tarzan Falls, Cotal, *Fosberg 59796* (US, BISH, POM, NY, L); Haputo Pt., N.C.S., *P.H. Moore 466* (US, BISH).

***Timonius ponapensis* Valetton**

Timonius ponapensis Valetton, Bot. Jahrb., 63:306–307, 1930.—Kanehira, Fl. Micr., 388, 1933; Enum. Micr. Pl., 426, 1935.—Fosberg, Occ. Pap. Bish. Mus., 15:217, 1940.—Hosokawa, Trans. Nat. Hist. Soc. Formosa, 33:121, 1943.—Glassman, Bish. Mus. Bull., 209:97, 1952.—Fosberg, Sachtel, and Oliver, Micronesica, 15:279, 1979.—Fosberg and Sachtel, Micronesica, 20:157–158, 1987.

Tree or shrub to 15 m tall, young parts sparsely to densely appressed villous, branching tending to be “terminalioid”: Lower internodes are elongate, becoming very short distally; leaves chartaceous, obovate to rather broadly elliptic, up to 14 × 7 cm, rarely (*Takamatsu 588*, probably a young plant or sprout) much larger, apex abruptly narrowly acuminate, base rather cuneately contracted, veins 6 to 8 (rarely 10 on very large leaves) on a side, upper surface very sparsely strigose, midrib and veins appressed villous, lower surface more densely, but still thinly, appressed-hairy, petiole 1–2.5 cm long, subappressed pilose; stipules broadly triangular-acuminate, densely appressed hairy within and without, less so toward margins, 6–8 mm long, erect becoming spreading, caducous rather tardily; cymes in upper axils; staminate cymes 2–3 cm long, somewhat appressed pilose, peduncle straight, divergent, 1–1.5 cm long, about twice dichotomous with a sessile flower in the fork, then 3–4 flowers sessile on a branch scorpioidly arranged, often crowded; calyx turbinate, hairy, 5-toothed; corolla bud

blunt at tip, tube densely sericeous, 8–10 mm long slightly dilated upward, lobes (4-) 5, spreading to reflexed, blunt; anthers 5, linear, 4 mm long, base bifid, apical 1 mm exserted, pistillode cylindrical, bifid at tip; pistillate cymes appressed hairy to spreading pilose, about 3–4 cm long, twice dichotomous, a sessile flower in each fork, flowers 5–7 sessile, lateral ones subtended by 2 subulate bractlets; hypanthium plus calyx urceolate, hairy, corolla hypocrateriform, tube 5 mm long, densely sericeous, lobes 6, lanceolate-ovate, style unequally about 6-branched, apparently tubular, branches somewhat exserted, antherodes linear, 1.5 mm long, in throat; fruit globose, about 9–10 mm diameter crowned with persistent calyx cup, pyrenes about 24, oblong, packed together in vertical rows about 5 mm long and 1.5 mm wide.

Endemic to Ponape at rather low elevations; related to the complex of species in Palau and Yap.

VERNACULAR NAME.—kehrn (Ponape: *Glassman 2874*).

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Ponape: s. l., *Kanehira 1510* (BISH, US); *Kanehira 1624* (P); Reitau genseirin, 100 m, *Hosokawa 9576* (BISH, A, US); vicinity of Kolonia, *Glassman 2874* (BISH, US); Sharabok (Salabrik), 100 m, *Takamatsu 588* (BISH); *Kanehira 1521* (US); Tolealuka, *Takamatsu 826* (BISH); Pailapalap, 20–40 m, *Ledermann 13390a* (B), *13465a* (B), *13726a* (B), *13873* (B, lectotype), *13487* (B); Patapat, 4–600 m, *Ledermann 13361* (B); near Merlap, W coast 1–1.5 mi [1.6–2.4 km] N of Palang, *Fosberg and Falanruw 58371* (US, BISH, POM, CHR, L), *58372* (US, BISH, POM, CHR, L, QLD, TI, MO, NY, BM, P, A).

Timonius salsedoi Fosberg & Sachet

Timonius salsedoi Fosberg & Sachet, *Micronesica*, 20:162, 1987.

Notably hirsute-pilose small shrub, branchlets slender; leaves thin, elliptic to slightly obovate, up to 17 × 8–9 cm, apex acuminate, base cuneate, upper surface very sparsely appressed hirsute, more on midrib and veins, much more so beneath, veins 9 on a side, network rather obscure; petioles hirsute, 1–2 cm long; stipules tardily caducous, ovate strongly acuminate, to 10 mm long, sericeous without, more on midrib, strongly so within; staminate cymes not seen; pistillate reduced to a single flower on a slender straight peduncle 2 cm long, with 2 connate, densely sericeous ovate-acuminate bracts at summit subtending fruit, drupe (immature) subglobose, densely sericeous, crowned with calyx with 5 or 6 unequal ovate lobes, pistillate corolla densely sericeous without, glabrous within, tube 7 mm long, lobes 5, broadly oblong-ovate, spreading, glabrous internally, fleshy, 5 linear antherodes 1.8 mm long half-way up corolla tube, style 9 mm long, branches flattened, coherent, tridentate; mature fruit lacking.

Perhaps close to *T. corymbosus*, more resembling *T. mollis* in solitary pistillate flowers, but more slender with different

shaped leaves, longer pistillate peduncle, ovate calyx lobes, and 5-lobed corolla.

Known only from the type locality in Palau (Belau).

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

CAROLINE ISLANDS.—Palau: Malakal: 100 m, rare in undergrowth in forest on slopes of hill on volcanic soil, 25 Aug 1965, *Fosberg 47508* (US, holotype).

Timonius subauritus Valeton

Timonius subauritus Valeton, *Bot. Jahrb.*, 63:308, 1929–1930.—Kanehira, *Fl. Micr.*, 389, 1933; *Enum. Micr. Pl.*, 426, 1935.—Fosberg, *Occ. Pap. Bish. Mus.*, 15:217–218, 1940.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:279, 1979.—Fosberg et al., *Vascular Pl. Palau*, 42, 1980.—Fosberg and Sachet, *Micronesica*, 20:162–163, 1987.

Shrub or small tree, branchlets tending to be somewhat fistulose, lower internodes of a flowering branchlet up to 15 cm long, distal ones much shorter, to as little as 5 or even 3 mm, glabrous, not or only obscurely quadrangular, becoming nodose from leaf scars; leaves broadly elliptic to somewhat obovate, up to 15 × 8 cm, apex acute or obtusely subacuminate, base from obtuse to somewhat cuneate, principal nerves 7 to 10 (11) on a side, blade thick-chartaceous to subcoriaceous, glabrous, petiole strong, 8–15 mm long; stipules triangular-acuminate, firm, apex strongly involute, 10–12 mm long, externally slightly strigose when young, becoming glabrous, internally densely appressed pilose, persistent on 1–2 nodes, then caducous; staminate cymes 1–3 cm long, in uppermost leaf axils, strigose, glabrate, peduncle 0.5–1.5 cm, once dichotomous with a sessile terminal flower, branches short, subscorpioid, each with 3 to 5 subsessile secund flowers, usually rather crowded; hypanthium and calyx strigose, glabrate, lobes 4–5, triangular to obscure; corolla densely white strigose, in bud 8–10 mm long, clavate, tube 11 mm long, 4–5 lobed, lobes ovate, recurved, 4 mm long, anthers subexserted; pistillate flowers on axillary peduncles 0.5–3 (–4) cm long, strigose, glabrate, with a pair of ovate-acuminate ciliate bracts at summit closely subtending flower; hypanthium plus calyx urceolate, strigose, glabrate, calyx lobes 4–5, triangular acute; corolla externally densely white strigose, tube cylindrical, 6–7 mm long, about 4 mm thick, lobes 6–7, oblong ovate, acutish, 3–3.5 mm long, spreading, papillose within, stigmas 4–5 or more, exserted, lanceolate, fleshy; fruit globose or depressed-globose, about 1–1.5 cm long, fleshy, probably black when ripe.

Endemic in volcanic parts of Palau, in savannas and scrubby forests, especially around edges, known from Babeldaob, Koror, Malakal Islands, and 70 Islands.

This species is probably closest to *T. mollis* Valeton. It approaches *T. mollis* through its var. *strigosus* and through *T. mollis* var. *submollis*.

Two varieties may be distinguished, the typical, vegetatively

glabrous var. *subauritus*, and a vegetatively strigose var. *strigosus*. They seem to occur sympatrically, but no information is available as to whether or not they occur in different ecological situations.

Timonius subauritus* Valeton var. *subauritus

This is the common form, vegetatively glabrous or subglabrous, to which the above description applies.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Babeldaob: Central Ngeremlengui Munic., savanna above upper Ngarniskan R., 50 m, *Canfield 601* (US); Ngetpang, *Otobed P-10152* (US); Ngatpang, *Hosokawa 9671* (BISH, A, US); Ibang, 10 m, *Raulerson 6051* (US); SW of Mt. Yekigaroto, 130 m, *Fosberg 47681* (US); Melekeok [= Melekiok] Munic., S of Lake Ngardok, 65 m, *Canfield 355* (US); Garudokku [= Ngardok], *Takamatsu 1418* (BISH); Lake Ngardok, 75–100 m, *Fosberg 32573* (US, BISH, POM, L); Mt. Unkesyu, Garasumao, *Hosokawa 7125* (A); Gapip, 100 ft [30 m] *Hosaka 3362* (US); Ngergiil Arraii, *Salsedo 319* (US); Nekken, *Fosberg 50593* (US); dam site, Airai, *Fisher 127a* (US), *123* (US), *115* (US); Airai Munic. E of reservoir, 15 m, *Canfield 594 B* (US), *594 A* (US), *772* (US, BISH); Airai Munic., E of reservoir, 15 m, *Canfield 588* (US); Airai, *Hosaka 3416* (US); river upstream from Airae, *Stemmermann 3285* (BISH); “Garikiyai,” 18 Apr 1936, *Takamatsu 1733* (BISH, 2 sheets). Koror: 10–20 m, *Ledermann 14196* (B, lectotype, B, isolectotype), *14196* (cymes very congested, 1–2 cm long at most, buds only, calyx and hypanthium sparsely sericeous-canescens, pedicels less than 1 cm Malakal); *Tuyama 9329* (GUAM); Makarukol, *Hosokawa 9282* (A); “Peleliu” s. l., *Kanehira 2344* (P), *2284* (US), *1962* (US). 70 Islands: Island 24, *Manner LR 16745* (US); Bikulomekerall, 5 m, *Raulerson 16550* (US).

***Timonius subauritus* var. *strigosus* Fosberg & Sachet**

Timonius subauritus var. *strigosus* Fosberg & Sachet, *Micronesica*, 20:163, 1987.

This differs in its notably strigose young growth, leaf veins and petioles. In its hairiness and thinner leaf texture it approaches *T. mollis*, especially *T. mollis* var. *submollis*.

It is known only from Palau, Babeldaob Island, especially in Airai Municipality.

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Babeldaob: “Aimiliiki-son and Ailai Island,” *Hosokawa 7279* (A, holotype, US, isotype); Airai Municipality, 0.2 mi [0.3 km] E of reservoir, 15 ft [5 m], *Canfield 593* (US); Gakip, 100 ft [30 m], *Hosaka 3362A* (US,

BISH) (leaves rather broader, thicker and less strigose than other specimens, toward var. *subauritus*).

***Timonius timon* (Sprengel) Merrill**

Timonius timon (Sprengel) Merrill, *Journ. Arn. Arb.*, 18:131, 1937.—Fosberg, Sachet, and Oliver, *Micronesica*, 15:279, 1979.—Fosberg et al., *Vascular Pl. Palau*, 42, 1980.—Fosberg and Canfield, *Micronesica*, 16:200, 1980 [1981].—Fosberg and Sachet, *Micronesica*, 20:163–164, 1987.

Erithalis timon Sprengel, *Pl. Min. Cog. Pug.*, 1:18, 1813.

Polyphragmon sericeus Desfontaines, *Mem. Mus. Hist. Nat. Paris*, 6:6, t. 2, 1820.

Timonius sericeus (Desfontaines) K. Schumann in Schumann and Hollrung, *Fl. Kaiser Wilhelmsland*, 131, 1889.

Timonius rumphii de Candolle, *Prodr.*, 4:461, 1830 [nom. illegit.].

Shrub or small tree, to 8 m, stems spreading to subappressed or appressed villous, or even silky, internodes 0.5–10 cm long, terete or, when short, somewhat squarish, when young with 4 slightly longitudinal ridges; leaves to 15 × 5 cm, somewhat obovate to elliptic, apex acuminate to prominently so, tip blunt, base contracted, acute or very slightly decurrent, thin, slightly appressed villous on upper side of midrib, slightly or more so beneath, sometimes with tufts of hair in vein axils, main veins 5 to 8 on a side, petioles 1–1.5 cm long, slightly sericeous to villous; stipules linear-lanceolate attenuate, 1–4 cm long, sheathing terminal bud, caducous from about second node, silky-villous without, glabrous within; staminate cymes 1.5–3 cm long, sericeous, pedunculate, few-flowered, compact, only buds seen, corolla in bud, calyx lobes 5, unequal, apices rounded, sericeous, narrowly clavate, limb somewhat tapering, blunt; pistillate flowers solitary or very rarely 2–3 on axillary peduncles, bracts at summit minute, caducous or absent, hypanthium and calyx not much swollen at anthesis, thinly sericeous, lobes slightly unequal, erect, ovate to oblong from an erect collar, corolla sericeous without, tube about 5 mm long, lobes 7, 2.5 mm long, erect to spreading, glabrous within; fruit globose, 15 mm diameter, crowned by remains of calyx, pyrenes in vertical rows, about 2 mm long, dorsiventrally somewhat compressed.

Native from Timor and the Moluccas, Northern Australia, New Guinea, and the Solomon Islands. Introduced to Palau during or since World War II and thoroughly naturalized in Peleliu and Angaur.

VERNACULAR NAME.—liberal (Palau: *Otobed P-10119*).

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: Peleliu: s. l., *Otobed P-10119* (US); between small cemetery and beach, *Raulerson 17045A* (US); S part, near NE end of airstrip, 2–4 m, *Fosberg 47638* (US, BISH, POM, MO, K, NY), *47640* (US, BISH, POM), *47639* (US, BISH, POM, L, MO); between airport and Bloody Nose Ridge, *Raulerson 17045* (US). Angaur: NE of former phosphate drying plant, 3 m, *Canfield 408* (US); N of power plant, 3 m, *Canfield 701* (US); NE of power plant, 4 m,

Canfield 695 (US); just N of phosphate drying plant, 8 m, *Canfield 177* (US); NW interior, 10 m, *Canfield 752* (US), *753* (US).

Timonius sp.

Slender gray stems branching at 45° angle, internodes low on branch to at least 5.5 cm, becoming very short 3–5 mm distally, glabrous except stipule scars; leaves obovate to elliptic (scaly), to 9 × 3.5 cm, glabrous, veins inconspicuous, 4 or 5 on a side, base cuneate, apex slightly bluntly acuminate; stipules narrowly triangular acuminate, 3–5 mm long, thinly strigose without, densely so within, pistillate flowers on axillary slender stiff pedicels 2–3 cm long, or more, rarely in 3(–2) flowered cymes to 7 cm long, peduncle 1.5–5 cm, central flower sessile, hypanthium urceolate, 2 mm long, calyx 2 mm, lobes 4(–5 ?) low triangular, 1 mm long; corolla densely sericeous, tube 4 mm long, lobes 4–5, narrowly oblong, spreading-recurved; stigma lobes exserted, 2(–4 ?), very acute.

GEOGRAPHIC RECORD AND SPECIMEN EXAMINED

CAROLINE ISLANDS.—“Ins. Carol.” “N. J. A.” (*N.J. Andersson* ?) (S).

Trukia Kanehira

Trukia Kanehira, Bot. Mag. Tokyo, 49:278–279, 1935.—Fosberg, Phytologia, 62:171–176, 1987.

Randia pro min. parte, non L., Gen. Pl., 1753; Sp. Pl., 1192, 1753.

Small trees or large shrubs, unarmed, diffusely branched; leaves opposite, petiolate, coriaceous or subcoriaceous or membranous (?), elliptic, oblong, or obovate; stipules ovate to lanceolate, subpersistent; inflorescence fasciculate to cymose, axillary or at terminal node and becoming axillary; flowers pedicellate, calyx cup-shaped; corolla salverform, tube short, enlarged upward, limb tapering and pointed in bud, lobes 5, spreading or reflexed; anthers oblong, dorsifixed near base of throat; style slender, stigma fusiform of 2 coherent lobes tardily separating; ovary bilocular, ovules many; fruit subglobose, 2–3 cm or more diameter, becoming scurfy on drying, locules filled with fleshy placenta; seeds 8 to 10 or more in a locule, embedded in placenta, irregularly compressed.

A small, poorly known genus, a segregate from *Randia*, perhaps closest to *Rothmannia*, extending from India to Thailand and Australia, eastward in the Pacific to Truk and Tahiti.

Trukia carolinensis (Valeton) Kanehira & Hatusima

Trukia carolinensis (Valeton) Kanehira & Hatusima, Bot. Mag. Tokyo, 50:606, 1936.—Hosokawa, Bull. Biogeogr. Soc. Japan, 7:20, 1937.—Fosberg, Phytologia, 62:173–174, 1987.

Randia carolinensis Valeton, Bot. Jahrb., 63:302, 1930.—Kanehira, Enum. Micr. Pl., 424, 1935.—Fosberg, Occ. Pap. Bish. Mus., 15:216, 1940.—Fosberg, Sacht, and Oliver, Micronesica, 15:277, 1979.

Timonius megacarpus Kanehira, Bot. Mag. Tokyo, 46:494, 1932.

Rhopalobrachium megacarpum (Kanehira) Kanehira, Bot. Mag. Tokyo, 46:674, 1932; Fl. Micr., 376, 1933.

Trukia megacarpa (Kanehira) Kanehira, Bot. Mag. Tokyo, 49:279, 1935; Enum. Micr. Pl., 426, 1935.—Hosokawa in Yamamoto et al., Mat. for Study of Fl. Form. and Micr., 36, 1936.

Shrub or small tree, to 10 m tall, vegetative parts glabrous or subglabrous, stems gray, squarish but not sharply angled; leaves obovate to elliptic, to 30 × 14 cm, usually much smaller, shortly and bluntly acuminate at apex, base cuneate, veins 9 or 10 (12) on a side, network not prominent, petiole rather stout, 1–2 cm long; stipules ovate-lanceolate, acute to acuminate, dorsally carinate, shortly connate at base; inflorescence a once or twice dichotomous cyme, variously reduced to subfasciculate, axillary or more rarely at terminal node and becoming axillary, branches somewhat scorpioid or subhelicoid, flowers very few on a branch at any one time, pedicellate, pedicels 5 (–10) mm long, jointed to very short “branchlets” (actually short successive axes), subtended by ovate scale-like bracts in pairs, whole cyme glabrous; hypanthium and calyx turbinate-cup-shaped, truncate or margin obscurely obtusely dentate; corolla white with short swollen tube to 7 mm long, densely white sericeous-strigose, “tubus intus dense hirsutus pilis erectis,” lobes to 1 cm long, broadly lanceolate, slightly hastulate at base, glabrous, in bud tapering, very slightly contorted and overlapping to left; anthers narrowly oblong, apiculate, dorsifixed at base of throat; style glabrous, stigma fusiform, obtuse, of 2 coherent tardily separate halves; fruit globose, to about 4 cm diam, lepidote externally, and somewhat rugose when dry, mesocarp very thin, endocarp thin but hard, indurated, circular scar of calyx 10 mm broad, surrounding disk 6 mm broad, septum very thin, breaking away from endocarp; seeds compressed, hard, 16–20 embedded in the loosened placental mass.

Very common in thickets and forests on the larger islands of Truk, one doubtful sterile collection from Yap.

VERNACULAR NAMES.—

maluag (Yap: *Fosberg 25533*)
aespot (Truk, Tol: *Pelzer 30*)
asappuer (Truk, Tol: *Wong 266*)
asepar (Truk, Moen: *Pelzer 30*)
aspwen (Truk, Tol: *Wong 266*)
chomis (Truk, Dublon: *Pelzer 42*)
kisinom (Truk, Moen: *Fosberg 24552, 24540*)

GEOGRAPHIC RECORDS AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Yap: Mt. Matude, 160 m, *Fosberg 25533* (US, BISH).

Truk: Moen: Mt. Trokken, *Hosokawa 8405* (BISH, A, US); slopes and main ridge of Mt. Teroken, *Fosberg 24610* (US, BISH, POM, NY, L); Mt. Teroken, *Stone 2059* (US); on slope back of Moen village, 5 m, *Anderson 767* (US, BISH, POM, NY, L), *788* (US, BISH, POM, NY, L); Mwan, 150–200 m,

Falanruw 3506 (US); above water tower and Japanese gun emplacement, *Grimm* 72 (US); *Spence* 443 (BISH); E ridge of Mt. Winipion, *Fosberg* 60249 (US, BISH, POM, NY, L); Wichen River, *Stemmermann* 3053 (BISH). Dublon: Upper ridge and top of Mt. Tolomen, 200–360 m, *Fosberg* 24552 (US, BISH, POM, NY, L), 24540 (US, BISH, POM); Toloas, *Pelzer* 42 (US, BISH, POM, NY, L); "Auf dem Rusken IIs. Tolowan" *Hallier* 22 X 03 (HBG, 2 sheets, US); Natsushima (Dublon), *Takamatsu* 155 (BISH); 158 (BISH), 83 (BISH) 69 (BISH); 800 ft [245 m], *Hosaka* 2766 (US, BISH, POM, NY, L). Tol: *Takamatsu* 38 (BISH); 300–400 m, *Kanehira* 1275 (BISH, US, NY, P); Uriribot, *Hosokawa* 8279 (BISH, A, US); s. l., *Pelzer* 30 (US, BISH); Mt. Winipwoot, 1400 ft [425 m], *Wong* 266 (A, US, BISH); Mt. Tumuital (Uniboet), 200–460 m, *Fosberg* 24470 (US, BISH, POM, NY, L), 24469 (US, BISH, POM, NY, L). Udot: Monowe, hill back of village *Fosberg* 60242 (US, BISH, POM, NY, L). Fefan: Mt. Ibal, *Hosokawa* 8368 (BISH, A, US); Messa village, 100–200 m, *Falanruw* 3528 (US).

Uncaria Schreber

Uncaria Schreber, Gen. Pl., 1:125, 1789 [Nom. Cons.].

Lianas with a main stem and differentiated (plagiotropic) branches originating supra-axillarily from the main shoot, producing reduced leafless lateral branchlets that either become recurved forming hooks or act as peduncles that bear the "heads," usually really many-flowered umbels, flowers sessile or usually pedicellate, sometimes conspicuously so, bracteolate or not, heads or umbels subtended by stipular bracts, leaves opposite, pinnately few veined, often with domatia in vein axils; stipules entire to bifid, those forming stipular bracts sometimes foliaceous, with glands (colleters) at base inside; flowers always borne in heads or umbels, 5-merous, calyx tube short, 5 lobes various, sometimes with diminutive secondary lobes (epicalyx) alternating with them; corolla funnelform to hypocrateriform, lobes valvate or sub-imbricate; stamens inserted in upper part of corolla tube, anthers well exerted, spreading; style longer than corolla tube, stigma exerted, globose to turbinate; ovary 2-locular, placentas axile, attached to septum in upper part, ovules many, imbricate upward; fruit a septicidal (later somewhat loculicidal) capsule; seeds with a wing on each end, the lower one bifid.

A pan-tropical genus, with most species in the Indo-Malaysian region, one in Micronesia, related to, sometimes regarded as a variety of a Malesian one.

Uncaria korrensis Kanehira

Uncaria korrensis Kanehira, Bot. Mag. Tokyo, 48:924, 1934; Enum. Micr. Pl., 427, 1935.—Fosberg, Sachet, and Oliver, Micronesica, 15:279, 1979.—Fosberg et al., Vasc. Pl. Palau, 42, 1980.

Uncaria glabrata sensu Kanehira, Bot. Mag. Tokyo, 45:352, 1931; Fl. Micr., 466, 1933 [non (Blume) DC. (1830)].

Uncaria gambir sensu Okabe, Bull. Trop. Indust. Inst., Palau, 5:14, 1940 [as *Gambier*; non (Hunter) Roxb. (1814)].

Uncaria lanosa var. *korrensis* (Kanehira) Ridsdale, Blumea, 24:88, 1978.

Vine, stems square, glabrous except pilose in axils of stipules, branching very slightly supra-axillary, leaves broadly ovate to broadly elliptic, to 8 × 4 cm, acuminate, base obtuse to rounded, blade thin, glabrous except for a few hairs on upper side of midrib, veins 5–6 on a side, petiole slender 5–6 mm long; stipules early caducous, bracteal ones red, somewhat bifid; nodes either bearing axillary branchlets or these modified into recurved or even coiled spines, unmodified ones with a node about $\frac{3}{4}$ the way up, the part below the node curved, glabrous, the part above slender, brown sericeous, bearing a globose receptacle with many short villous pedicels, these enlarging upward into fusiform ovaries, appressed villous below or to summit, crowned with 5 lanceolate-subulate filiform, pilosulous pink calyx lobes; corolla pinkish yellow, with filiform tube 6–8 (–10) mm long, lobes oblong to broadly oval about 2 mm long, apices rounded, outer surfaces minutely puberulent, margin tending to be revolute; anthers ovate-lanceolate to oblong, apex blunt; style glabrous filiform, long exerted, stigma clavate; fruit narrowly fusiform, up to 1 cm long, dehiscent only septicidally, valves eventually opening out flat, not or scarcely split at apex; seeds including narrowly lanceolate white wing 4–5 mm long, body sub-orbicular, 0.2–0.3 mm long, dull brown, muriculate.

Ridsdale has made this one of many varieties of the Malesian *U. lanosa* Wallich, which he construes in a very broad sense, which may be justified. However, he discusses only the calyx and hypanthium characters. Since we have no material available of *U. lanosa*, sensu stricto, and have not seen a modern description of it, we will continue to treat *U. korrensis* as a separate species, endemic to Palau. We give a rather full description so that it can be compared in detail. Ridsdale has also reported *U. lanosa* f. *appendiculata* from Micronesia on a sterile specimen on which he gives no other data, locality or collector.

GEOGRAPHIC RECORD AND SPECIMENS EXAMINED

CAROLINE ISLANDS.—Palau: *Ledermann* 14355 (B). Koror: *Hobdy* 1506 (BISH).

SYNONYMS AND MISAPPLIED NAMES OF Rubiaceae

Amaracarpus Blume; see *Psychotria* L. at least for Micronesian species

Amaracarpus carolinensis Valetton; see *Psychotria hombroniana* var. *squarrosa* (Valetton) Fosberg

Amaracarpus carolinensis var. *squarrosa* Valetton; see *Psychotria hombroniana* var. *squarrosa* (Valetton) Fosberg

Amaracarpus heteropoides Valetton; see *Psychotria hombroniana* var. *squarrosa* (Valetton) Fosberg

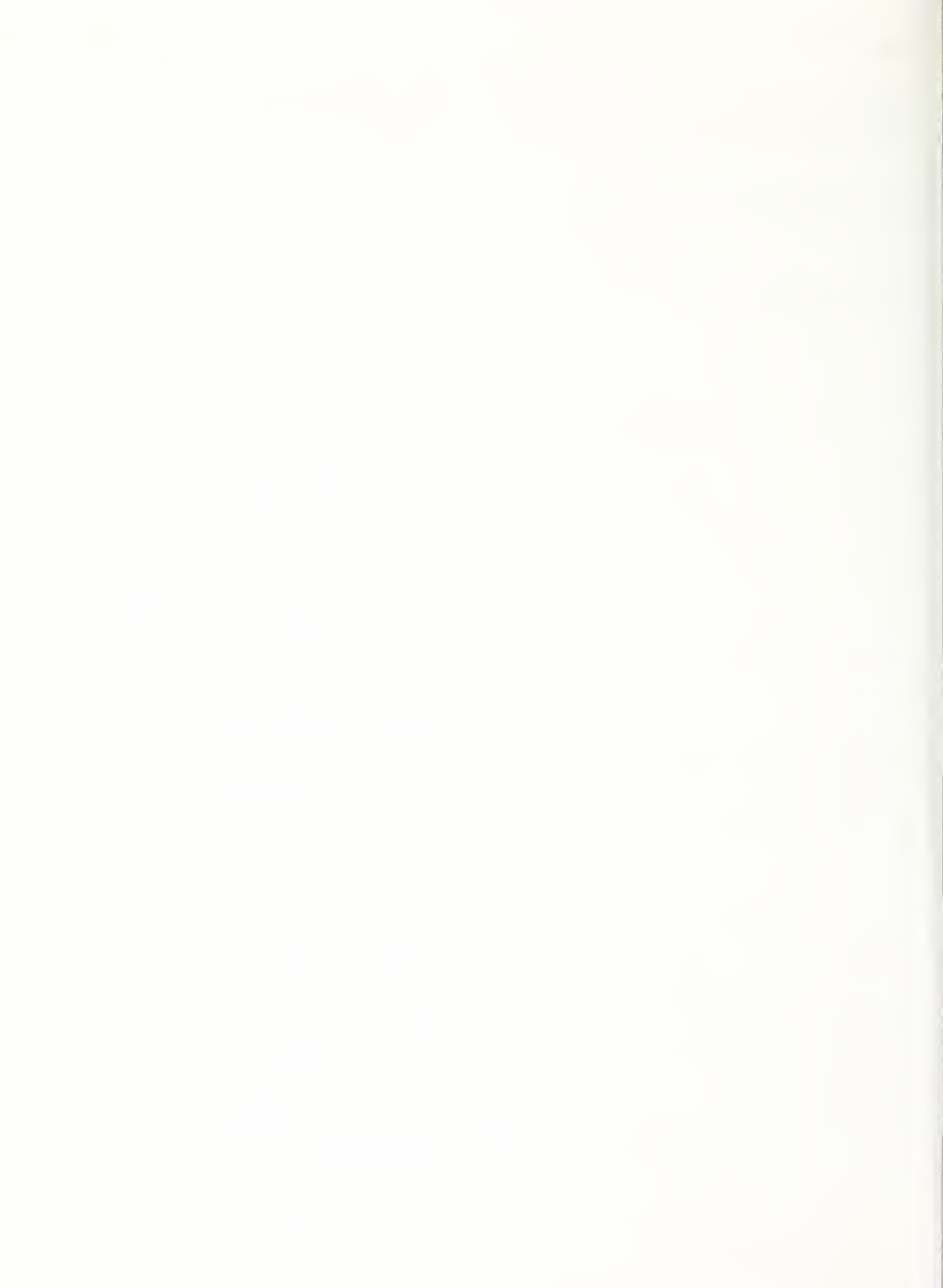
Amaracarpus hirtellus Valetton; see *Psychotria hombroniana*

- var. *hirtella* (Valeton) Fosberg
Amaracarpus kanehirae Hosokawa; see *Psychotria hombroniana* var. *kusaiensis* (Kanehira) Fosberg
Amaracarpus kraemeri Valeton; see *Psychotria hombroniana* var. *squarrosa* (Valeton) Fosberg
Amaracarpus kusaiensis Kanehira; see *Psychotria hombroniana* var. *kusaiensis* (Kanehira) Fosberg
Amaracarpus ladronicus Hosokawa; see *Psychotria hombroniana* var. *ladronica* (Hosokawa) Fosberg
Amaracarpus macrophyllus Valeton; see *Psychotria hombroniana* var. *hirtella* (Valeton) Fosberg
Amaracarpus malaspinae (Merrill) Kanehira; see *Psychotria malaspinae* Merrill
Amaracarpus mariannensis Kanehira; see *Psychotria malaspinae* Merrill
Amaracarpus rotensis Hosokawa; see *Psychotria hombroniana* (Baillon) Fosberg var. *hombroniana*
Bikkia grandiflora var. *tenuiflora* Valeton; see *Bikkia palauensis* Valeton for Micronesian records
Bikkia longicarpa Valeton; see *Bikkia tetrandra* (L. f.) A. Richard
Bikkia mariannensis Brongniart; see *Bikkia tetrandra* (L. f.) A. Richard
Bikkia mariannensis var. *longicarpa* (Valeton) Fosberg; see *Bikkia tetrandra* (L. f.) A. Richard
Borreria G.F.W. Meyer; see *Spermacoce* L.
Borreria hispida (L.) Schumann; see *Spermacoce hispida* L.
Borreria laevis (Lamarck) Grisebach; see *Spermacoce assurgens* Ruiz & Pavon for Micronesian records
Borreria ocymoides (Burmans f.) de Candolle; see *Spermacoce mauritiana* Gideon in Verdcourt for Micronesian plants
Borreria rotundifolia Valeton; see *Spermacoce hispida* L.
Canthium korrense (Valeton) Kanehira (sphalm.); see *Canthium barbatum* var. *korrorense* (Valeton) Fosberg
Canthium korrorense (Valeton) Kanehira; see *Canthium barbatum* var. *korrorense* (Valeton) Fosberg
Canthium oblongum (Valeton) Kanehira; see *Canthium barbatum* var. *korrorense* (Valeton) Fosberg
Canthium polyneurum (Valeton) Kanehira; see *Psychotria merrillii* Kanehira var. *polyneurum* (Valeton) Fosberg
Canthium tinianense (Kanehira) Kanehira; see *Canthium odoratum* var. *tinianense* (Kanehira) Fosberg
Canthium verticillatum (Valeton) Kanehira; see *Gynochthodes ovalifolia* (Valeton) Kanehira
Carinta Wight; see *Geophila* D. Don
Carinta herbacea (Jacquin) Wight; see *Geophila repens* var. *asiatica* (Rheede ex Chamisso & Schlechtendal) Fosberg
Cinchona ledgeriana Moens; see *Cinchona calisaya* Weddell
Cormigonus Rafinesque; see *Bikkia* Reinwardt
Cormigonus mariannensis (Brongniart) Wight in Safford; see *Bikkia tetrandra* (L. f.) A. Richard
Gardenia jasminoides Ellis; see *Gardenia augusta* (L.) Merrill at least for Micronesian records
Geocardia Standley; see *Geophila* D. Don
Geophila reniformis var. *asiatica* Rheede ex Chamisso & Schlechtendal; see *Geophila repens* var. *asiatica* (Rheede ex Chamisso & Schlechtendal) Fosberg
Gynochthodes trukensis Hosokawa; see *Gynochthodes ovalifolia* (Valeton) Kanehira
Hedyotis almagananensis Hosokawa; see *Hedyotis laciniata* Kanehira
Hedyotis albido-punctata (Merrill) Fosberg; see *Hedyotis strigulosa* (Bartling ex de Candolle) Fosberg
Hedyotis auriculata L. ex Hatusima; see *Hedyotis auricularia* L.
Hedyotis corniphyllo Kanehira spelling error for *Hedyotis cornifolia* Kanehira
Hedyotis costata var. *lutescens* (Kanehira) Fosberg; see *Hedyotis vestita* var. *lutescens* (Kanehira) Fosberg
Hedyotis laciniata var. *takamatsui* Fosberg; see *Hedyotis divaricata* (Valeton) Hosokawa
Hedyotis lutescens Kanehira; see *Hedyotis vestita* var. *lutescens* (Kanehira) Fosberg
Hedyotis mariannensis Merrill; see *Hedyotis foetida* var. *mariannensis* (Merrill) Fosberg
Hedyotis plurifurcata Hosokawa; see *Hedyotis divaricata* (Valeton) Hosokawa
Hedyotis saipanensis Hosokawa; see *Hedyotis scabridifolia* Kanehira
Hedyotis unicelloides (Valeton) Hosokawa error for *Hedyotis uncinelloides* (Valeton) Hosokawa
Hedyotis vestita R. Brown ex G. Don; see *Hedyotis vestita* var. *lutescens* (Kanehira) Fosberg for Micronesian plants
Ixora amplifolia (sensu Micronesian authors; see *Eugenia stelechantha* (Diels) Kanehira
Ixora carolinensis Hosokawa (including varieties); see *Ixora casei* Hance
Ixora confertiflora Valeton; see *Ixora casei* Hance
Ixora confertiflora var. *parvifolia* Hosokawa; see *Ixora casei* Hance
Ixora duffi Baine; see *Ixora casei* Hance
Ixora fraseri Hort. ex Gentil; see *Ixora coccinea* L.
Ixora macrothyrsa sensu auct. plur. esp. hort. [non (Teysmann & Binnendijk) T. Moore]; see *Ixora casei* Hance
Ixora pulcherrima Volken; see *Ixora casei* Hance
Ixora pulcherrima var. *lanceolata* Kanehira; see *Ixora casei* Hance var. *lanceolata* (Kanehira) Fosberg & Sacht
Ixora volkensis Kanehira; see *Ixora casei* Hance
Ixora volkensis var. *lanceolata* (Kanehira) Kanehira; see *Ixora casei* Hance var. *lanceolata* (Kanehira) Fosberg & Sacht
Leptopetalum Hooker & Arnott; see *Hedyotis* L.
Leptopetalum kanehirae Hatusima; see *Hedyotis kanehirae* (Hatusima) Fosberg
Mitracarpus Zuccarini; see *Mitracarpus* Zuccarini
Mitracarpus torresianum Chamisso & Schlechtendal; see *Mitracarpus hirtus* (L.) de Candolle
Morinda glandulosa Merrill; see *Morinda umbellata* var. *glandulosa* (Merrill) Fosberg

- Morinda indica* L.; see *Morinda citrifolia* L.
Morinda longipetala Kanehira; unpublished name for *Morinda salomoniensis* Engler
Morinda volubilis (Blanco) Merrill; see *Morinda salomonensis* Engler for Micronesian records
Mussaenda sericea Blume; see *Mussaenda philippica* A. Richard for Micronesian records
Oldenlandia L.; see *Hedyotis* L.
Oldenlandia albido-punctata Merrill; see *Hedyotis strigulosa* (Bartling ex de Candolle) Fosberg
Oldenlandia auricularia (L.) F. Mueller; see *Hedyotis auricularia* L.
Oldenlandia biflora L.; see *Hedyotis biflora* (L.) Lamarck
Oldenlandia corymbosa L.; see *Hedyotis corymbosa* (L.) Lamarck
Oldenlandia divaricata Valetton; see *Hedyotis divaricata* (Valetton) Hosokawa
Oldenlandia foetida Forster f.; see *Hedyotis foetida* var. *mariannensis* (Merrill) Fosberg for Micronesian records
Oldenlandia fruticulosa Volkens; see *Hedyotis fruticulosa* (Volkens) Merrill
Oldenlandia herbacea (L.) Roxburg; see *Hedyotis lancifolia* Schumacher for Micronesian records
Oldenlandia korrorensis Valetton; see *Hedyotis korrorensis* (Valetton) Hosokawa
Oldenlandia korrorensis var. *mollis* Valetton; see *Hedyotis korrorensis* var. *mollis* (Valetton) Hosokawa
Oldenlandia mariannensis (Merrill) Valetton; see *Hedyotis foetida* var. *mariannensis* (Merrill) Fosberg
Oldenlandia megalantha (Merrill) Valetton; see *Hedyotis megalantha* Merrill
Oldenlandia paniculata L.; see *Hedyotis biflora* (L.) Lamarck
Oldenlandia ponapensis Valetton; see *Hedyotis ponapensis* (Valetton) Kanehira
Oldenlandia strigulosa Bartling ex de Candolle; see *Hedyotis strigulosa* (Bartling ex de Candolle) Fosberg
Oldenlandia tomentosa Valetton; see *Hedyotis tomentosa* (Valetton) Hosokawa
Oldenlandia uncinelloides Valetton; see *Hedyotis uncinelloides* (Valetton) Hosokawa
Oldenlandia verticillata L.; see *Hedyotis verticillata* (L.) Lamarck
Oldenlandia vestita (R. Brown ex G. Don) Drake; see *Hedyotis vestita* var. *lutescens* Kanehira
Ophiorrhiza palauensis var. *biseta* Fosberg; see *Ophiorrhiza palauensis* Valetton
Pentas carnea Benthams; see *Pentas lanceolata* (Forsskål) DeFlers var. *carnea* (Benthams) Verdcourt
Petesia P. Brown; see *Timonius* de Candolle for Micronesian species
Petesia nitida Bartling ex de Candolle; see *Timonius nitidus* (Bartling ex de Candolle) F.-Villars
Plectronia L.; see *Canthium* Lamarck for most Pacific species
Plectronia korrorensis Valetton; see *Canthium barbatum* var. *korrorense* (Valetton) Fosberg
Plectronia oblonga Valetton; see *Coffea liberica* for type, but *Canthium barbatum* var. *korrorense* (Valetton) Fosberg for Kanehira records of *Canthium oblongum* (Valetton) Kanehira
Plectronia obovata Valetton; see *Psychotria merrillii* Kanehira
Plectronia ovalifolia Valetton; see *Gynochthodes ovalifolia* (Valetton) Kanehira
Plectronia verticillata Valetton; see *Gynochthodes ovalifolia* (Valetton) Hosokawa
Portlandia L.; see *Bikkia* Reinwardt for Micronesian records
Portlandia tetrandra Forster; see *Bikkia tetrandra* (L. f.) A. Richard
Psychotria carolinensis (Valetton) Fosberg; see *Psychotria hombroniana* var. *squarrosa* (Valetton) Fosberg
Psychotria gaudichaudii Kanehira; see *Psychotria mariana* Bartling ex de Candolle
Psychotria herbacea Jacquin; see *Geophila repens*
Psychotria ipecacuanha Stokes; see *Cephaelis ipecacuanha* (Stokes) A. Richard
Psychotria ponapensis Fosberg; see *Psychotria hombroniana* var. *hirtella* (Valetton) Fosberg
Randia carolinensis Valetton; see *Trukia carolinensis* (Valetton) Kanehira & Hatusima
Randia cochinchinensis (Loureiro) Merrill; see *Aidia cochinchinensis* Loureiro
Randia densiflora (Wallich) Benthams; see *Aidia cochinchinensis* Loureiro
Randia graeffei Reinecke; see *Aidia cochinchinensis* Loureiro
Randia tinianensis Kanehira; see *Canthium odoratum* var. *tinianense* (Kanehira) Fosberg
Rhopalobranchium Schlechter & Krause; see *Trukia* Kanehira for Micronesian species
Rhopalobranchium megacarpum (Kanehira) Kanehira; see *Trukia carolinensis* (Valetton) Kanehira & Hatusima
Spermacoce ocymoides Burmann f.; see *Spermacoce mauritiana* Gideon in Verdcourt for Micronesian records
Spermacoce suffrutescens Jacquin; see *Spermacoce assurgens* Ruiz & Pavon
Tarenna glabra Merrill; see *Tarenna sambucina* (Forster) Durand ex Drake
Timonius korrensis Kanehira [pro parte]; see *Timonius corymbosus* Valetton
Timonius megacarpus Kanehira; see *Trukia carolinensis* (Valetton) Kanehira & Hatusima
Timonius villosissimus Kanehira; see *Timonius mollis* Valetton
Trukia megacarpa (Kanehira) Kanehira; see *Trukia carolinensis* (Valetton) Kanehira & Hatusima
Uncaria gambir L.; see *Uncaria korrensis* Kanehira for Micronesian species
Uncaria glabrata de Candolle; see *Uncaria korrensis* Kanehira for Micronesian species
Uncaria lanosa var. *korrorensis* (Kanehira) Ridsdale; see *Uncaria korrorensis* Kanehira

Uragoga L.; see *Psychotria* L. and *Cephaelis* Swartz for
Micronesian records
Uragoga hombroniana Baillon; see *Psychotria hombroniana*

(Baillon) Fosberg
Uragoga ipecacuanha (Stokes) Baillon; see *Cephaelis ipe-*
cacuanha (Stokes) A. Richard



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Tabulations within text (lists of data, often in parallel columns) can be typed on the text page where they occur, but they should not contain rules or numbered table captions.

Formal tables (numbered, with captions, boxheads, stubs, rules) should be submitted as carefully typed, double-spaced copy separate from the text; they will be typeset unless otherwise requested. If camera-copy use is anticipated, do not draw rules on manuscript copy.

Taxonomic keys in natural history papers should use the aligned-couplet form for zoology and may use the multi-level indent form for botany. If cross referencing is required between key and text, do not include page references within the key, but number the keyed-out taxa, using the same numbers with their corresponding heads in the text.

Synonymy in zoology must use the short form (taxon, author, year:page), with full reference at the end of the paper under "Literature Cited." For botany the long form (taxon, author, abbreviated journal or book title, volume, page, year, with no reference in "Literature Cited") is optional.

Text-reference system (author, year:page used within the text, with full citation in "Literature Cited" at the end of the text) must be used in place of bibliographic footnotes in all Contributions Series and is strongly recommended in the Studies Series: "(Jones, 1910:122)" or "... Jones (1910:122)." If bibliographic

footnotes are required, use the short form (author, brief title, page) with the full citation in the bibliography.

Footnotes, when few in number, whether annotative or bibliographic, should be typed on separate sheet, and inserted immediately after the text pages or which the references occur. Extensive notes must be gathered together and placed at the end of the text in a notes section.

Bibliography, depending upon use is termed "Literature Cited," "References," or "Bibliography." Spell out titles of books, articles, journals, and monographic series. For book and article titles use sentence-style capitalization according to the rules of the language employed (exception: capitalize all major words in English). For journal and series titles capitalize the initial word and all subsequent words except articles, conjunctions, and prepositions. Transliterate languages that use a non-Roman alphabet according to the Library of Congress system. Underline (for italics) titles of journals and series and titles of books that are not part of a series. Use the parentheses/colon system for volume (number): pagination: "10(2):5-9." For alignment and arrangement of elements, follow the format of recent publications in the series for which the manuscript is intended. Guidelines for preparing bibliography may be secured from Series Section, SI Press.

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Some points of style: Do not use periods after such abbreviations as "mm, ft, USNM, NNE." Spell out numbers "one" through "nine" in expository text, but use digits in all other cases if possible. Use of the metric system of measurement is preferable; where use of the English system is unavoidable, supply metric equivalents in parentheses. Use the decimal system for precise measurements and relationships, common fractions for approximations. Use day/month/year sequence for dates: "9 April 1976." For months in tabular listings or data sections, use three-letter abbreviations with no periods: "Jan, Mar, Jun," etc. Omit space between initials of a personal name: "J.B. Jones."

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