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NOTES ON NEOTROPICAL MALPIGHIACEAE–II

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This paper treats thirty-two miscellaneous new species, new combinations, and already named but poorly known species that deserve new descriptions based on the collections now available. The genera and species are arranged alphabetically. For an explanation of the morphology of the Malpighiaceae and the terms I use to describe it, see my 1981 description of the Malpighiaceae of the Guayana Highland.

Aspicarpa brevipes (DC.) W. Anderson, comb. nov.

Banisteria brevipes DC., Prodr. 1: 591. 1824.

Gaudichaudia brevipes (DC.) Adr. Juss., Arch. Mus. Hist. Nat. 3: 597. 1843.

This is an earlier name for the plant generally called *Aspicarpa lanata* Rose. The type is a Sessé and Mociño plate, number 6331.951 in the Torner Collection of Sessé and Mocĩno Biological Illustrations at the Hunt Institute for Botanical Documentation. The drawing is very suggestive of *A. lanata;* especially noteworthy are the sometimes ternate leaves that are green above and whitish below due to the dense appressed vesture, the short crowded axillary inflorescences, the circinate flower buds, and the five stamens and one style. On these bases alone I would be willing to apply the name to this species, but that conviction is greatly strengthened by study of a Sessé & Mociño specimen at G, ex herb. Barbey-Boissier. The specimen, which is definitely the species now called *A. lanata,* is a very close match for the Sessé and Mociño plate. After allowing for some modification by the artist and the loss of some open flowers when the specimen was pressed, I can hardly avoid the conclusion that the specimen at G should be considered a "typotype," i.e., the basis for a drawing that is a type. The species is common in the area of Guadalajara and west to near Tepic. It usually begins to flower in July, continuing until October or November. According to McVaugh (1972, p. 306), Sessé and Mociño reached Guadalajara early in April, 1791, stayed about four months, then traveled to Tepic near the end of July. They probably collected and drew this species in early July from around Guadalajara or in late July or early August from between Guadalajara and Tepic.

Another name that antedates Rose's 1903 name is *Banisteria virgata* Sessé & Mociño, Fl. Mex. 128. 1894?; ed. 2. 117. 1894. The description in the protologue fits this species very well; perhaps it was written to accompany the plate that DeCandolle named *Banisteria brevipes.* Sessé and Mociño described *B. virgata* from plants found blooming near Guadalajara in July, 1791.

Aspicarpa harleyi W. Anderson, sp. nov. Fig. 1.

Suffrutex erectus 25–50 cm altus, ramis sericeis. Foliorum majorum lamina 2.6–6 cm longa, 1–2.5 cm lata, elliptica, basi cuneata vel rotundata, apice acuta, obtusa, vel raro rotundata, plerumque mucronata, supra velutina, subtus sericea

FIG. 1. *Aspicarpa harleyi.* a) habit, ×0.6; b) leaf hairs, ×12, upper from adaxial surface, lower from abaxial surface; c) node with axillary peduncles, ×3; d) flower bud from above, anterior sepal lowermost, × ca 4; e) flower from above, posterior petal uppermost, ×3; f) flower, side view, with sepals and petals removed to show androecium and gynoecium, claw of posterior petal to left, ×8; g) intact fruit, oblique-anterior view, and above the anterior nutlet, side view, both ×3.5. Drawn by Karin Douthit, a–c from *Harley 16823,* d–g from *Anderson 11758.*

vel subsericea, subtus prope basim utrinque (1–) 2 (–3) glandulas cylindricas ferens; petiolus 1.5–4 mm longus, laxe sericeus; stipulae 1.3–2 mm longae, subulatae. Flores omnes chasmogami, plerumque 1 in quaque axilla, pedunculo 2.5–6.5 mm longo, pedicello 4–10 mm longo. Sepala ovata, abaxialiter dense subsericea, adaxialiter appresso-tomentosa, per anthesin inter petala inflexa. Petala subaequalia, limbo brevifimbriato fimbriis plerumque glandulosis. Stamina fertilia 3, sepalis postico-lateralibus et antico opposita; antherae glabrae vel proximaliter in loculis tomentosae; staminodia 2, sepalis antico-lateralibus opposita, brevia, gracilia, glabra, per anthesin invisibilia. Nucula alula dorsali angusta dissecta instructa, sine alulis lateralibus, utrinque costata.

Subshrub 25–50 cm tall, much branched from the base, the stems erect, slender, woody but brittle, densely and persistently sericeous or belatedly glabrescent, the hairs very fine, appressed or somewhat spreading, originally stramineous or golden, fading to white in age; shoots springing in a clump from a short, knotty, swollen stock just below soil surface, also the source of relatively slender woody roots, with neither a vertically oriented turbinate tuber nor a laterally elongating and proliferating rhizome formed. Leaves decussate, bluish green above, silvery below; lamina of larger leaves 2.5–6 cm long, 1–2.5 cm wide, elliptical or slightly ovate, cuneate or rounded at base, entire at margin, acute, obtuse, or rarely rounded and usually mucronate at apex, bearing below on each side (1–) 2 (–3) cylindrical or slightly peltate glands 0.4–0.8 mm long, on veins just above base, very densely and persistently velutinous above with most hairs fine, white, V-shaped and 0.2–0.5 mm long but with an admixture (especially above midvein) of longer (1–2.5 mm) thicker yellow hairs that are sub-basifixed through suppression of 1 branch, very densely and persistently sericeous or subsericeous below with multiple layers of sessile or short-stalked, straight and appressed to somewhat sinuous and/or somewhat spreading hairs 0.4–3 mm long, the hairs between veins finer, shorter, white, those on veins thicker, longer, yellowish, the midrib and principal lateral veins [(4–) 5–6 (–7) on each side] flush or sunken above and very prominent below, the lateral veins strongly ascending and subparallel; petiole 1.5–4 (–8) mm long, loosely sericeous, eglandular; stipules 1.3–2 mm long, subulate, sericeous or distally glabrous, borne on stem beside petiole, persistent. Flowers all chasmogamous, borne in axils of full-sized leaves, mostly 1 per axil but occasionally 2 (–4) in a cluster, the floriferous peduncle or cluster of peduncles sessile or raised on an obscure stalk up to 2 mm long and subtended by several subulate or narrowly triangular bracts resembling stipules, 1.3–2.5 (–3.5) mm long; bracts and bracteoles abaxially loosely sericeous, adaxially sericeous to glabrous, eglandular, persistent; peduncle 2.5–6.5 mm long (–9 mm in fruit), loosely sericeous; bracteoles apical, subulate to narrowly elliptical, appressed or spreading, 1–2.1 mm long; pedicel 4–10 mm long (–16 mm in fruit), usually longer than peduncle, loosely sericeous. Flowers 15–19 mm in diameter, ± flat (i.e., all petals lying in 1 plane). Sepals quite distinct, 4–4.5 mm long, 2.3–3 mm wide, abaxially densely subsericeous, adaxially appressed-tomentose with fine white hairs except proximally in center, broadly ovate, acute at apex, valvate in bud, bent inward between petals in anthesis, the anterior eglandular and narrower, the lateral 4 biglandular, the glands green, yellow-green, dark red, or reddish purple, 1.2–1.7 mm long, 0.7–1 mm wide, separated and not compressed, attached nearly their whole length, free just at apex; sepals and glands enlarging somewhat as fruit matures and enclosing nutlets until maturity. Petals orange-yellow, glabrous or abaxially sparsely tomentose, the claw 2–3 mm long, the limb 5–6.5 mm long, 5.5–7 mm wide, flat, subcir-

cular, short-fimbriate all around margin except toward base with the fimbriae mostly tipped with tiny glands; posterior petal not or hardly different from lateral 4, its claw sometimes thicker, its limb more likely to be oblate. Fertile stamens 3, opposite anterior and posterior-lateral sepals; filaments 2–2.5 mm long, glabrous, distinct or connate just at base with adjacent filament or staminode; anthers 1–1.3 mm long, glabrous or finely tomentose proximally on locules, pressed against style in anthesis; staminodes 2, opposite anterior-lateral sepals, 1.5–2 mm long, straight or incurled at apex, hidden under sepals in anthesis, glabrous, slender, without remnant of anther or with a tiny globose apical swelling; minute nubbin of tissue with tuft of hairs present inside and between 2 posterior stamens, perhaps a rudiment of a sixth stamen. Ovary apparently glabrous, actually minutely puberulent, the 3 carpels free from each other, borne on a low common receptacle, the posterior 2 rotated so that all face the posterior petal; style 1, 3.3–3.6 mm long, glabrous, borne low on inner face of anterior carpel, the stigma capitate; stigma held above anthers or at the same level in anthesis. Fruit comprising 3 nutlets, or fewer through failure of 1 or 2 carpels to mature, all nutlets oriented toward posterior petal, minutely but very densely and persistently velutinous, the hairs very fine, white, basifixed, erect, 0.2–0.3 mm long; nutlet (in side view) 5.5–7.5 mm × 4.5–6 mm including a dorsal winglet 0.5–1.5 mm wide and proximally coarsely dissected into several obtuse or rounded teeth, the sides with prominent veins radiating from areole; lateral winglets absent, represented only by a rib along each side of nut, parallel to dorsal crest, continuous or not around base of nut, sometimes extruded into a few short knobs proximally; carpophore quite absent; ventral areole ovate, ca 2.5 mm × 2.5 mm, deeply concave and crescent-shaped in side view at maturity; torus after fall of nutlets only a low, rounded, inconspicuous mound. Chromosome number: $n = 40$ (counted in *Anderson 11758*).

TYPE: BRAZIL. Bahia: 26 km NW of Jacobina on road to Delfino (11°S, 40°17′W), 750 m, ridge with outcrop of blocky sandstone, abundant among rocks, 9 Mar 1976 fl/fr, *Anderson 11758* (MBM, holotype; CAS, CTES, F, G, K, M, MICH, NY, P, RB, SP, US, isotypes).

PARATYPES: BRAZIL. Bahia: Mpio Caitité, road from Caitité to Bom Jesus de Lapa, Km 22, cerrado, 1100 m, Apr fl/fr, *Carvalho et al. 1835* (MICH); Serra do Rio de Contas, 3 km N of Rio de Contas, 13°35′S, 41°50′W, 980 m, cut-over woodland by river, Jan fl/fr, *Harley 15351* (CEPEC, MICH); Serra do Curral Feio, 22 km NW of Lagoinha (which is 5.5 km SW of Delfino) on side road to Minas do Mimoso, 10°20′S, 41°20′W, 980 m, cerrado over sandstone rocks, Mar fl/fr, *Harley 16823* (CEPEC, MICH); Serra do Açuruá, ca 4 km N of São Inácio on road to Xique Xique, 11°05′S, 42°43′W, 500 m, cerrado on stony ground with shallow soils, Feb fl/fr, *Harley 19046* (MICH); Serra Geral de Caitité ca 5 km S of Caitité on road to Brejinhos das Ametistas, 14°07′S, 42°29′W, 1000 m, campos gerais, shrub- and herb-rich grassland with acaulous palms but few trees, Apr fl/fr, *Harley 21145* (MICH).

I am happy to name this interesting species for R. M. Harley, who first collected it and has found it repeatedly since. The species, which is endemic to Bahia, is disjunct from its relatives, a group of species found between 20°S and 35°S. That group includes *A. pulchella* (Griseb.) O'Don. & Lourt. [called *A. sericea* (St.-Hil.) Nied. by Niedenzu], *A. salicifolia* (Chodat) Nied., *A. schininii* W. Anderson [called *A. lanata* (Chodat) Nied. by Niedenzu], and *A. sericea* Griseb. [called *A. argentea* (Griseb.) Nied. by Niedenzu]. None of those species has vesture like that of *A. harleyi,* although there is a superficial similarity between the leaves of *A. harleyi* and those of the Paraguayan endemic *A. schininii.*

Among other differences, *A. schininii* is notable for having broader, subcordate leaves, cleistogamous flowers, chasmogamous flowers borne mostly in pairs raised on a well-developed common stalk, anthers with an apical tuft of hairs, long curved staminodes with an enlarged hairy apex, and a chromosome number of $n=20$ (counted in *Anderson 11777*).

Aspicarpa schininii W. Anderson, nom. nov.

Camarea lanata Chodat, Arch. Sci. Phys. Nat., sér. 3, 24: 499. 1890; Mém. Soc. Phys. Genève 31, pt. 2, n. 3: 20, fig. 49. 1892.

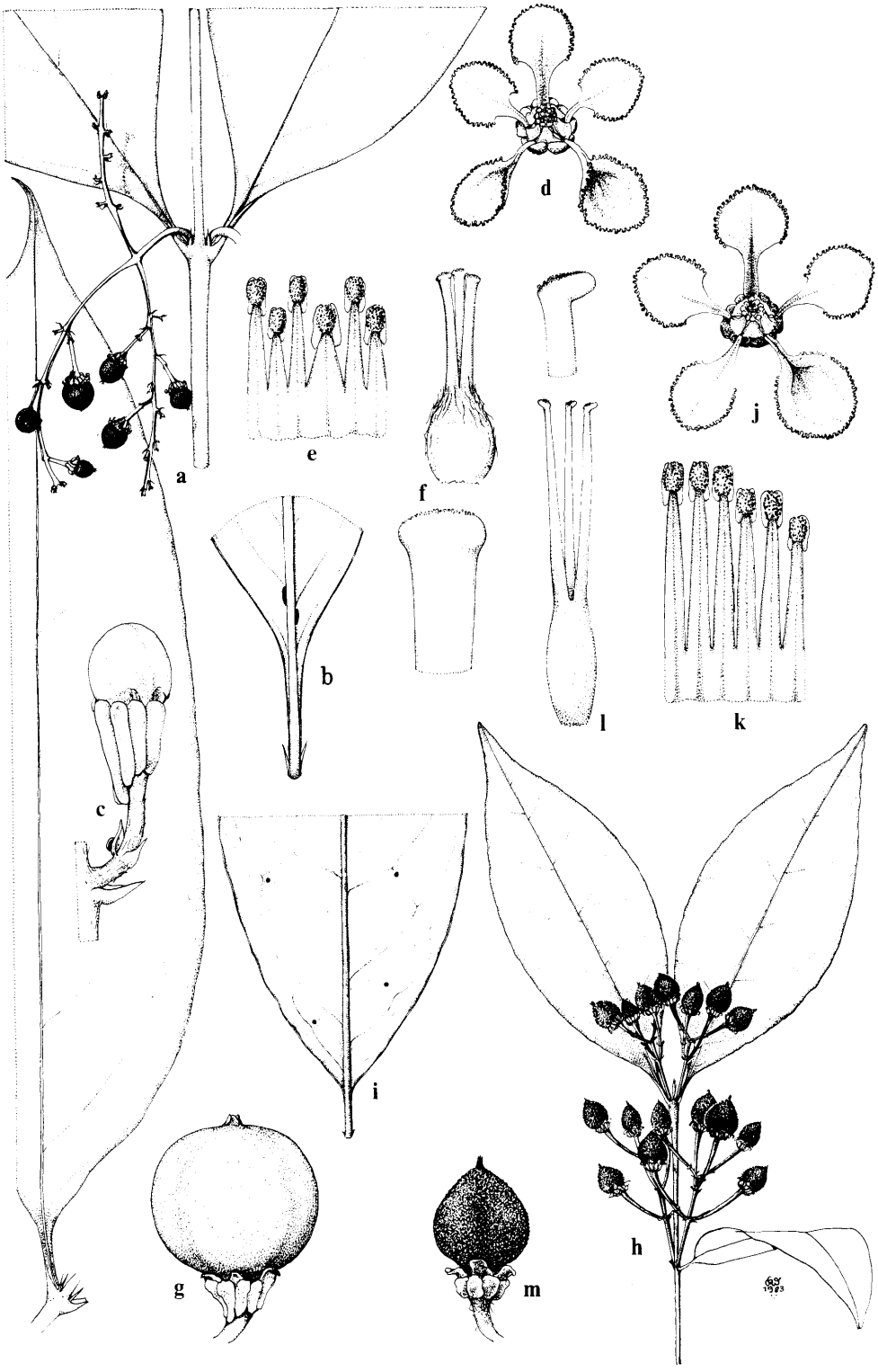
Aspicarpa lanata (Chodat) Nied., Verz. Vorles. Königl. Akad. Braunsberg Winter-Semester 1912/13: 59. 1912, non *Aspicarpa lanata* Rose, Contr. U.S. Natl. Herb. 8: 49. 1903.

Gaudichaudia lanata (Chodat) Chodat, Bull. Soc. Bot. Genève, sér. 2, 9: 101. 1917.

It is a pleasure to name this wholly Paraguayan species in honor of an excellent Paraguayan botanist, Aurelio Schinini. I shall treat it in detail in my monograph of *Aspicarpa*. See notes above under *A. harleyi*.

Bunchosia acuminata Dobson, Syst. Bot. 8: 275. 1983. Fig. 2, a–g.

Shrub 1–2.5 m tall; stems initially very sparsely sericeous but soon glabrous, initially flattened, becoming terete in age. Lamina of larger leaves 16–28 cm long, 4–10 cm wide, narrowly to broadly elliptical, cuneate at base, acuminate at apex with the acumen 4–22 mm long, initially bearing scattered appressed hairs but glabrous at maturity, bearing 1 gland below on each side near base or up to 15 mm above it and beside midrib or between midrib and margin, the fine reticulum usually prominulous above; petiole 10–15 (–19) mm long, soon glabrate; stipules 1.2–3.5 mm long. Inflorescences axillary or terminal, simple or ternate, when ternate the lateral branches axillary to much-reduced biglandular leaves ("bracts"), sericeous to glabrate, the individual branches 3–12 cm long and containing 4–22 flowers, these mostly decussate; bracts 1.5–3 mm long, narrowly triangular or ovate, often acuminate; peduncle rarely lacking, usually 0.7–3 mm long; bracteoles 1–1.7 mm long, ovate, 1 of the pair (occasionally both) bearing 1 (rarely 2) raised eccentric basal-abaxial glands 0.5–1 mm in diameter; pedicel 3–7.5 mm long, sericeous to glabrate. Sepals extending 0.2–1 mm beyond glands, obtuse or rounded, glabrous or ciliate on margin; glands 8, 1.5–3.5 mm long, the anterior 2 shortest and the posterior 2 longest, elliptical, compressed, glabrous, detached at apex, the posterior 2 decurrent with about ½ their length on pedicel. Petals light yellow, glabrous, the outermost with the limb concave and glandular-erose or bearing very small glands on margin, the other 4 ± flat and bearing sessile or short-stalked glands all around margin; lateral petals with the claw 1–2 mm long, the limb 4–5.5 mm long, 4–6 mm wide; posterior petal with the thick claw 3 mm long, the limb 3.5–4 mm in diameter. Filaments 2.3–2.5 mm long opposite sepals, 1.5–1.8 mm long opposite petals, glabrous, ca ⅓–½ connate; anthers 0.8–1.1 mm long, glabrous, pressed against styles, the connectives light brown and somewhat glandular-swollen at apex. Gynoecium 3-carpellate; ovary ca 1.5 mm high, globose, 3-locular, loosely sericeous on distal ½; styles 3, ⅔ connate or coherent to quite distinct, 1.7–2 mm long, glabrous, held erect and together at or just above level of anthers; stigmas capitate. Fruit orange to red at maturity, 10–13 mm long and 15–16 mm in diameter (dried), oblate, 3-lobed, glabrous, smooth.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SPECIMENS STUDIED. BRAZIL. Bahia: Mpio Itambé, Sapucaia, basin of Rio Pardo, Nov fl, *Fróes 12660/26* (NY, holotype); Mpio Prado, 45 km N of Alcobaça, wet forest, 25–75 m, Mar fr, *Mori et al. 9728* (MICH); Mpio Maraú, Km 15 on Ubaitaba/Maraú road, disturbed wet forest, Feb imm fl, *Mori et al. 11342* (MICH); Uruçuca-Taboquinha highway, forest, Apr fr, *Pinheiro 1242* (CEPEC, MICH); Uruçuca/Ilheus, cacao plantation, Jul fr, *Pinheiro 1498* (CEPEC, MICH); 16 km from Itapé at Faz. Santa Helena on Rio Colonia, Oct fl, *Pinheiro 2025* (CEPEC, MICH); Km 25 on Guaratinga/São Paulinho highway, forest, Apr fl, *Pinheiro 2083* (CEPEC, MICH); Uruçuca/Banco do Pedro, forest, Apr fr, *Santos 664* (CEPEC, MICH); Mpio Ilhéus, area of CEPEC, Sep fr, *Santos 3661* (MICH).

This species and *B. macilenta* were described by Dobson, without illustration, on the basis of few and incomplete specimens. I provide here expanded descriptions of both, the only tricarpellate species in Bahia, with an illustration that shows comparable structures. The following couplet will aid in distinguishing between them.

1. Stems soon glabrous; lamina of larger leaves 16–28 cm long, 4–10 cm wide; leaf glands 2; inflorescence simple or ternate; filaments 1.5–2.5 mm long, alternately long (opposite sepals) and short (opposite petals); ovary sericeous on distal ½; styles 1.7–2 mm long; fruit 10–13 mm long, 15–16 mm in diameter (dried), smooth. *B. acuminata.*
1. Stems persistently hairy, eventually glabrate; lamina of larger leaves 7–13 cm long, 2.5–5.1 cm wide; leaf glands usually 4; inflorescence simple; filaments 3–4 mm long, the anterior 5 long, the posterior 5 short; ovary glabrous; styles 4 mm long; fruit 7–9 mm long, 7–8 mm in diameter (dried), granulate. *B. macilenta.*

Bunchosia berlinii W. Anderson, sp. nov. Fig. 3.

Frutex vel arbor parva 2–3 m alta. Foliorum majorum lamina 26–43 cm longa, 11–15.5 cm lata, elliptica, apice acuminata, abaxialiter dense et pertinaciter argenteo-sericea; petiolus 12–20 mm longus; stipulae 2.5–3.5 mm longae. Inflorescentia 7–20 cm longa, simplex et sine foliis, sericea, floribus 30–90, congestis, ca 4–5 per cm; bracteae 4–6 mm longae; pedunculus plerumque nullus; bracteolae 1.5–2.5 mm longae, 1 bracteola cujusque paris 1 glandula abaxiali excentrica 1–1.5 mm diametro instructa. Sepala abaxialiter sericea, glandulis 8, 3–4.7 mm longis. Petalum extimum limbo concavo, eroso vel proximaliter fimbriato; cetera 4 petala limbo ± plano, toto circuitu fimbriato, aliquot fimbriis ut videtur glandulosis. Antherarum connectivum pallide brunneum. Gynoecium 3-carpellatum, glabrum; stylus 1 (ex 3 stylis omnino connatis), stigmate trilobo. Fructus aurantiacus vel ruber, siccus 12–15 mm longus et diametro, glaber, granulatus.

Shrub or small tree 2–3 m tall; stems sericeous to glabrate. Lamina of larger leaves 26–43 cm long, 11–15.5 cm wide, elliptical, cuneate at base, abruptly acuminate at apex with the acumen 15–35 mm long, bearing 1 large gland on each side of midrib below at base and distally an inframarginal row of 6–10 small glands, soon glabrate above, densely and persistently silvery-sericeous below, completely covered by 2 layers of straight sessile hairs, the outer layer of stouter, longer hairs 1–1.5 mm long; petiole 12–20 mm long, sericeous; stipules 2.5–3.5 mm long. Inflorescence 7–20 cm long, without leaves and unbranched, sericeous, the flowers 30–90 or more, crowded, mostly 4–5 or more per cm, borne in no

FIG. 2. *Bunchosia acuminata* and *B. macilenta.* a–g, *B. acuminata:* a) node with infructescence, and separate leaf, ×0.5; b) base of leaf and stipules, abaxial side, ×1; c) flower bud, posterior calyx glands to left, ×3.5; d) flower from above, oblique view, posterior petal uppermost, ×2; e) partial androecium, laid out, abaxial view, the stamen at right opposite posterior petal, ×7; f) gynoecium, ×7, with apex of 1 style below, ×30; g) fruit, ×1.5. h–m, *B. macilenta:* h) fruiting branch, ×0.5; i) base of leaf and stipules, abaxial side, ×1; j) flower from above, oblique view, posterior petal uppermost, ×2; k) partial androecium, laid out, abaxial view, the stamen at right opposite posterior petal, ×7; l) gynoecium, ×7, with apex of 1 style above, ×30; m) fruit, ×1.5. Drawn by Karin Douthit, a from *Pinheiro 1242,* b and g from *Pinheiro 1498,* c–f from *Pinheiro 2083,* h, i, m from *Santos 2389,* j–l from *Pinheiro 1757.*

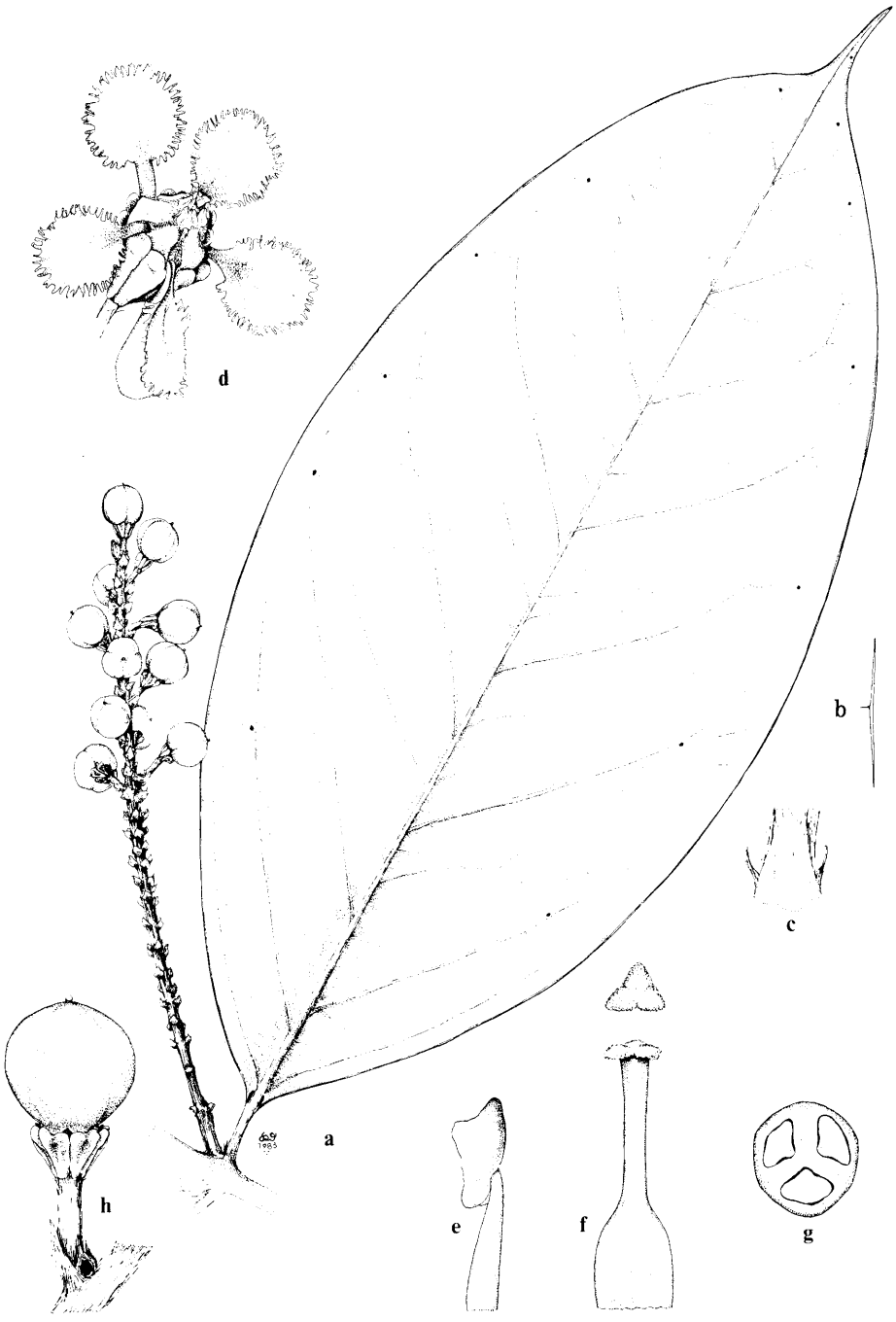

FIG. 3. *Bunchosia berlinii.* a) leaf (abaxial side) and inflorescence, ×0.5; b) hair from abaxial surface of lamina, ×15; c) stipules on base of petiole, ×2.5; d) flower, posterior petal uppermost, ×2.5; e) stamen, side view, ×10; f) gynoecium, ×10, with separate view of stigma from above; g) cross section of ovary, ×15; h) fruit, ×1.5. Drawn by Karin Douthit, a–c and h from *Berlin 1777*, d–g from *Berlin 856*.

regular arrangement; bracts 4–6 mm long, narrowly triangular; peduncle mostly none, rarely up to 1 mm long; bracteoles 1.5–2.5 mm long, triangular, 1 of the pair bearing 1 large eccentric abaxial gland 1–1.5 mm in diameter; pedicel 4.5–7.5 mm long in flower, up to 9 mm and thickened in fruit, sericeous. Sepals extending 0.5–1.5 mm beyond glands, rounded, abaxially sericeous, ciliate on margin, adaxially glabrous, pressed inward against filaments; glands 8, 3–4.7 mm long, obtriangular, compressed, decurrent with about ½ their length on pedicel, marginally and adaxially pilose, slightly recurved at apex. Petals light yellow except pigmented (red?) in claw and base of limb, glabrous, the outermost with the limb deeply concave and erose or proximally fimbriate, the other 4 ± flat, all fimbriate all around margin, the fimbriae sometimes somewhat glandular, especially proximally on posterior petal; lateral petals with the claw 2.5–3.5 mm long, the limb 5–5.5 mm long, 4.5–7 mm wide; posterior petal with the claw 3–3.5 mm long, bearing 2 short projections at apex, the limb 4–5 mm in diameter. Filaments 2.2–2.5 mm long, longer opposite sepals than petals, ca ½ connate, those opposite petals sometimes with an apical tuft of hairs; anthers 0.8–1.5 mm long, longer and with more pendulous locules opposite sepals than petals, glabrous, pressed against styles, the connectives light brown and somewhat glandular-swollen at apex. Gynoecium 3-carpellate, glabrous; ovary ca 1.5 mm high, globose, 3-loculed; style 1 (formed from 3 completely connate), ca 2 mm long, the stigma large, 3-lobed, the 3 stigmas nearly distinct. Fruit orange to red, 12–15 mm long and in diameter (dried), globose or ovoid, glabrous, granulate.

TYPE: PERU. Amazonas: Ca 10 km N of Quebrada Huampami, primary forest, 180–240 m, 24 Jul 1974 fr, *Berlin 1777* (MICH, holotype; MO, isotype).

PARATYPES: PERU. Amazonas: all from vicinity of Huampami, Río Cenepa, 4°30'S, ca 78°30'W, 180–330 m: Apr imm fr, *Ancuash 249* (MO); 5 km E of Chávez Valdívia, primary forest, Jul fr, *Ancuash 1110* (MICH); primary forest, *Ancuash 1291* (MO); abandoned chacra, Sep fr, *Berlin 117* (MICH, MO); old secondary forest, Feb fl, *Berlin 856* (MICH, MO); Quebrada Shimpunts, primary forest, Feb fl/imm fr, *Berlin 879* (MO); primary forest, S of Río Cenepa, Jul fr, *Berlin 1663* (MICH, MO); primary forest, Jul fr, *Berlin 1839* (MICH, MO); secondary forest, Aug fr, *Berlin 2006* (MO); Quebrada Chigkishinuk, Jan fl, *Kayap 289* (MO), Apr fl/imm fr, *626* (MO); Jul fr, *Kayap 1049* (MO), *1193* (MICH, MO); Aug fr, *Kayap 1472* (MICH, MO); 5 km E of Chávez Valdívia, *Kujikat 14* (MICH), Aug fr, *Kujikat 276* (MICH, MO).

Very few species of *Bunchosia* have densely silvery-sericeous leaves, and among those the only one previously described from Amazonia is *B. argentea* (Jacq.) DC., a bicarpellate species with smaller leaves, shorter inflorescences containing fewer flowers, dentate petals, a sericeous ovary, and free styles. The relationships of *B. berlinii* probably lie elsewhere, perhaps with the large-leaved tricarpellate species most diverse in Central America, such as *B. lanieri* Watson and *B. macrophylla* Rose. From that difficult group, none of which occurs in Amazonia, *B. berlinii* is amply distinguished by its large sericeous leaves, long many-flowered inflorescences, large bracts and bracteoles, sessile pedicels, and glabrous ovary.

This species is named in honor of Brent Berlin, an anthropologist who collected it repeatedly between September, 1972, and August, 1975.

Bunchosia bonplandiana Adr. Juss., Ann. Sci. Nat. 2° Sér. Bot. 13: 324. 1840; Arch. Mus. Hist. Nat. 3: 332. 1843. Fig. 4.

Jussieu based this name on a specimen without locality data found in Bonpland's American herbarium. I have not seen the type, which could not be found when I worked at P in 1981, but there is a photograph at MICH (F negative 35566). That photograph and Jussieu's description combine to show that Bonpland's specimen had an unusual combination of characters: gynoecium 3-carpellate, glabrous,

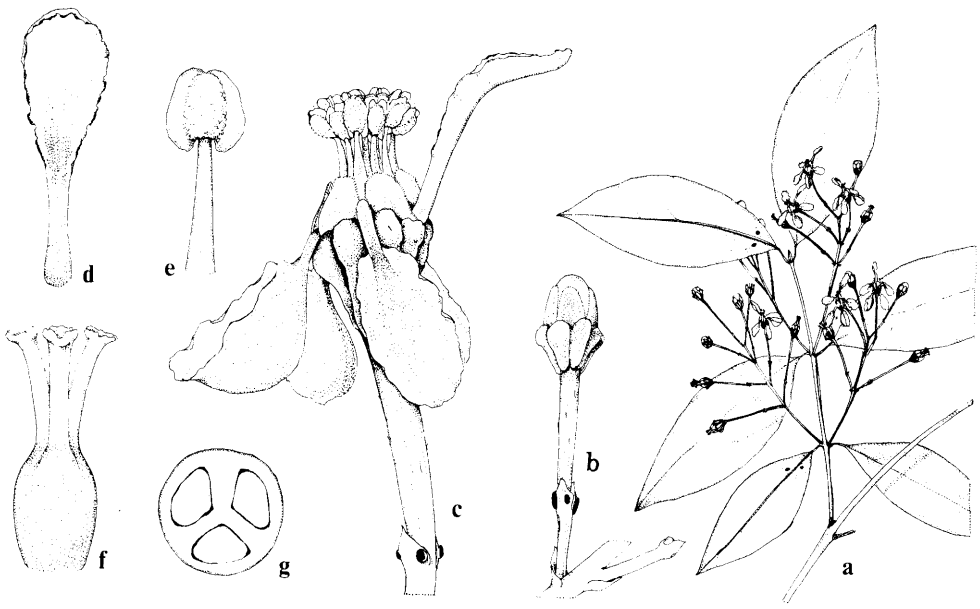

FIG. 4. *Bunchosia bonplandiana.* a) flowering branch, ×0.5; b) flower bud and portion of inflorescence, ×2.5; c) flower, side view, ×5; d) posterior petal, adaxial side, ×5; e) stamen, abaxial side, ×10; f) gynoecium, ×10; g) cross section of ovary, ×15. Drawn by Karin Douthit from *Hutchison & Wright 4032.*

with the styles free; leaves nearly glabrous, biglandular near the base; inflorescence leafless, unbranched, short, and few-flowered; sepals glabrous except for the ciliate margin. To that description Dobson (1976), who studied the type, added that the petals were eglandular-erose and the calyx glands were 7–8, not 10 as stated by Jussieu. Dobson thought the species must exist, but he did not find any specimens that match the above description in the course of his work. I have encountered one such collection. It is *Hutchison & Wright 4032,* collected 5 February 1964 in flower in Peru, Amazonas, Bongara, along the road to La Rioja, 3 km N of north end of Lago Pomacocha, rich ceja forest with many epiphytes, 2100–2200 m (MICH). The locality is noteworthy for two reasons: 1) It is unusually high for Malpighiaceae, and that kind of forest is an unusual habitat for the family; 2) Humboldt and Bonpland passed near that area in August, 1802, as they travelled from Huancabamba to Cajamarca (Sandwith 1926), when they could have collected the type. *Hutchison & Wright 4032* is not a perfect match for the type of *B. bonplandiana.* Its leaves are only about half as large, and at least one of every pair of bracteoles bears well-developed glands, whereas Jussieu said the bracteoles were only "glandular-thickened at base" and Dobson called them eglandular. However, the similarity is great enough to make me unwilling to describe *4032* as a new species at this time. It is described in full below, as a start toward an expanded concept of *B. bonplandiana* and as a contribution toward our record of the flora of Peru; Macbride (1950) did not treat any specimens that could be this species. If *Hutchison & Wright 4032* is really *B. bonplandiana,* future collections should fill in the range between the small leaves described here and the larger leaves of the type. The description below is based only on *Hutchison & Wright 4032.*

Shrub 2.5 m tall; stems initially sericeous but immediately glabrescent. Lamina of larger leaves 5.8–7.2 cm long, 2.2–2.7 cm wide, elliptical, cuneate at base, acute or acuminate at apex, bearing 1 fairly large gland on each side of

midrib below near base, between midrib and margin, glabrous at maturity, the reticulum prominulous on both sides; petiole 5–8 mm long, sparsely sericeous to glabrate; stipules ca 1 mm long. Inflorescence 2.5–5 cm long, without leaves and unbranched, single in axils of current leaves, very sparsely sericeous to glabrate, the flowers 6–10, distant; bracts 1–1.4 mm long, triangular; peduncle 3–5 mm long; bracteoles ca 1 mm long, broadly triangular, 1 or more often both of each pair bearing 1–2 abaxial glands, the second gland smaller when present; pedicel 6.5–9.5 mm long, sparsely sericeous to glabrate. Sepals extending 1–1.4 mm beyond glands, rounded, glabrous except for the ciliate margin; glands 8 (or 7 due to partial to complete fusion of 2), 1.8–2.3 mm long, elliptical or obovate, compressed, not or only slightly decurrent, glabrous. Petals "clear bright yellow," glabrous, the outermost deeply concave, the other 4 shallowly concave; lateral petals with the claw 2 mm long, the limb 4 mm long, 3–5 mm wide, erose, eglandular; posterior petal spatulate, the thick claw 2.5–2.8 mm long, the limb 3.8–4 mm long, 1.8–2 mm wide, erose, the margin glandular-thickened in proximal ½. Filaments 2.4–3 mm long, longer opposite sepals than petals, ca ⅓ connate; anthers 0.7–1 mm long, glabrous, the connectives yellow or light brown and not notably glandular-swollen. Gynoecium 3-carpellate, glabrous; ovary ca 1.5 mm high, 3-loculed; styles 3, quite distinct, ca 1.5 mm long, lengthening in age. Fruit unknown.

Bunchosia macilenta Dobson, Syst. Bot. 8: 274. 1983. Fig. 2, h–m.

Shrub 1–1.5 m tall; stems subvelutinous or subsericeous to eventually glabrate, slightly flattened or terete. Lamina of larger leaves 7–13 cm long, 2.5–5.1 cm wide, elliptical, cuneate or decurrent at base, acuminate at apex with the acumen 5–15 (–20) mm long, thinly sericeous to glabrate, the hairs longer persistent below than above, bearing usually 2 glands below on each side between midrib and margin in proximal ⅓–½, the fine reticulum often prominulous on both sides; petiole 6–10 mm long, sericeous to glabrate; stipules 0.5–1.5 mm long. Inflorescences 0.7–2.5 cm long, axillary, without leaves and unbranched, loosely sericeous, the flowers 4–8, decussate; bracts 1.3–2.2 mm long, triangular; peduncle 2–3 mm long (–6 mm in fruit); bracteoles 0.8–1.5 mm long, triangular or ovate, eglandular or 1 or both bearing 1 or 2 small glandular areas abaxially on margin, these never raised or well-defined glands; pedicel 6–13 mm long, thinly sericeous to glabrate. Sepals extending 1–1.6 mm beyond glands, broadly obtuse or rounded, abaxially sparsely sericeous, ciliate on margin, adaxially glabrous; glands 8, 1.3–2.2 mm long, obovate or orbicular, slightly compressed, glabrous, detached just at apex, the posterior 2 slightly decurrent. Petals light yellow, glabrous, glandular-laciniate all around limb or entire at base; outermost petal with the claw 2.5–3 mm long, the limb deeply concave, 4.5–5.5 mm long, 6–7 mm wide; other lateral petals with the claw 2–3 mm long, the limb flat, 3.5–4 mm long, 3–4 mm wide; posterior petal with the thick claw 3.5 mm long, the limb 4 mm long, 4.5–5 mm wide. Filaments 3–4 mm long, the anterior 5 longer than the posterior 5, the 1 opposite posterior petal shortest of all, glabrous, up to ⅓ connate, erect or somewhat spreading; anthers 0.7–1 mm long, glabrous, the connectives yellow or pale brown and slightly swollen. Gynoecium 3-carpellate; ovary 1.5 mm high, ovoid, 3-locular, glabrous; styles 3, distinct except connate just at base, 4 mm long, glabrous, very slender, erect or divergent distally, held well above anthers (ca 1 mm); stigmas obliquely capitate with a short abaxial extension. Fruit color at maturity not known, 7–9 mm long and 7–8 mm in diameter (dried), ovoid, glabrous, granulate.

SPECIMENS STUDIED. BRAZIL. Bahia: *Blanchet 1512* (F, P, isotypes); Mpio Sta. Cruz de Cabrália, 4–6 km E of Estação Ecológica do Pau-brasil (ca 17 km W of Porto Seguro), wet forest, Aug fl, *Mori et al. 10793* (MICH); Alcobaça branch toward S. Antonio, thicket, Jan fl, *Pinheiro 1757* (CEPEC, MICH); Km 36 on highway from Teixeira de Freitas to Itamaraju, forest, Aug fr, *Santos 2389* (CEPEC, MICH).

See discussion under *Bunchosia acuminata.*

Bunchosia plowmanii W. Anderson, sp. nov. Fig. 5.

Frutex vel arbor parva 1.5–4 m alta. Foliorum majorum lamina 7–14 cm longa, 3.5–6.5 cm lata, abaxialiter pertinaciter sericea vel subvelutina et glandulis et basalibus et distalibus instructa. Inflorescentia 3–10 cm longa, simplex et sine foliis, floribus (4–) 8–26; 1 bracteola 1 glandula abaxiali excentrica 0.5–1 mm diametro instructa. Petala limbo eglanduloso vel irregulariter eroso-glanduloso vel toto circuitu glanduloso. Antherarum connectivum flavidum vel pallide brunneum. Gynoecium 2 (–3)-carpellatum, glabrum vel sparsim sericeum; styli 2 (–3), liberi vel proximaliter cohaerentes. Fructus aurantiacus vel ruber, siccus 5–8 mm longus, 4.5–8 mm diametro, glaber vel glabratus, granulatus.

Shrub or small tree 1.5–4 m tall; stems sericeous or subvelutinous to soon glabrate. Lamina of larger leaves 7–14 cm long, 3.5–6.5 cm wide, elliptical or slightly obovate, cuneate at base, mostly abruptly short-acuminate at apex, initially sericeous but very soon glabrous above, persistently sericeous or subvelutinous below with the hairs varying from dense to sparse and appressed to some-

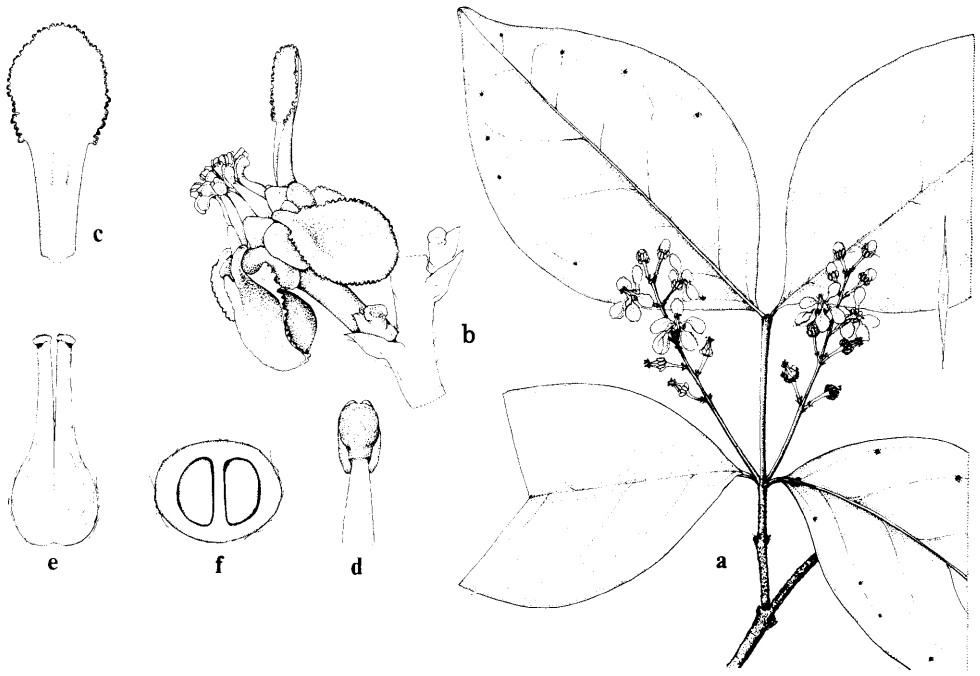

FIG. 5. *Bunchosia plowmanii.* a) flowering branch, ×0.5, with hair from abaxial surface of lamina, ×25; b) flower, side view, ×2.5; c) posterior petal, adaxial side, ×3.5; d) stamen, abaxial side, ×7.5; e) gynoecium, ×7.5; f) ovary, cross section, ×10. Drawn by Karin Douthit from the type.

what raised, bearing below 1 gland near base on each side of midrib and distally 1–10 or more in an inframarginal row, the apex with a small gland, the reticulum often prominulous on both sides; petiole 5–9 mm long, sericeous or subvelutinous to glabrate; stipules 0.5–0.8 mm long. Inflorescences 3–10 cm long, axillary and rarely terminal, without leaves and unbranched, sericeous or subvelutinous to glabrate, the flowers (4–) 8–26, mostly decussate but occasionally inserted irregularly; bracts 1–2.8 mm long, ovate or triangular; peduncle 0.5–3 mm long; bracteoles ca 1 mm long, ovate, 1 of each pair bearing 1 prominent eccentric abaxial gland 0.5–1 mm in diameter; pedicel 4–8 mm long (–11 mm in fruit), usually muricate. Sepals extending 1–2 mm beyond glands, rounded, glabrous except ciliate on margin; glands 8, 1.7–2.7 mm long, obovate, mostly compressed, glabrous, attached their whole length or detached at apex, not or hardly decurrent. Petals light yellow, glabrous, all glandular-dentate all around limb or the glands few or none, the glands (if present) increasing in size and number from outermost petal to innermost (posterior) petal; lateral petals recurved, posterior erect; outermost petal with the claw 3–3.5 mm long, the limb 5 mm long, 6 mm wide, deeply concave; other 3 lateral petals with the claw 2–2.5 mm long, the limb 4–6 mm long, 3–4.5 mm wide, shallowly concave to flat, roughly rectangular; posterior petal spatulate, the thick claw 3.5–4 mm long, the limb 4 mm long, 3.5 mm wide. Filaments 2.5–3.3 mm long, longer opposite sepals than petals, glabrous, ca ⅓–½ connate; anthers 0.8–1.3 mm long, glabrous, pressed against styles and reflexed, the connective yellow or light brown and glandular-swollen. Gynoecium 2 (–3)-carpellate; ovary 1.5 mm high, 2 (–3)-locular, glabrous or sparsely sericeous; styles 2 (–3), distinct or weakly coherent in proximal ⅓–½, 2–2.2 mm long, glabrous or sparsely sericeous, held erect and together at or just above level of anthers; stigmas capitate. Fruit orange to red at maturity, 5–8 mm long and 4.5–8 mm in diameter (dried), ovoid or globose, glabrous or glabrate, granulate.

TYPE: PERU. Tumbes: Prov. Contralmirante Villar, Huasimo, Quebrada Ucumares, 550 m, thicket along road, 12 Feb 1976 fl, *Plowman 5442* (MICH, holotype; F, isotype).

PARATYPES: ECUADOR. Guayas: Guayaquil, inner edge of mangrove thicket, Feb fl, *Asplund 15305* (S), Mar fr, *Asplund 15638* (S); Cerro Azul, near Chongon, 130 m, Mar fr, *Dodson et al. 9650* (MICH, MO). El Oro: dry disturbed tropical forest SW of Arenillas, 80 m, Apr/May fr, *Escobar 1340* (MICH, QCA, SEL), fl, *Escobar 1349* (MICH, QCA). Loja: Celica-Zapotillo Road, 5–6 km S of Sabanilla, disturbed deciduous forest, 600 m, Apr fl, *Harling & Andersson 18277* (GB, MICH); Sabiango Hill, 1400 m, Nov fl, *Townsend A.119* (US).—PERU. Tumbes: Prov. Zarumilla, below El Caucho, open thicket in dry tropical forest, 350–450 m, Feb fr, *Plowman 5479* (MICH), fl, *Plowman 5480* (MICH). Lambayeque: Prov. Lambayeque, Km 28 E of Olmos, 1150–1200 m, Jan fr, *Hutchison & Wright 3437* (F, MICH).

I am happy to dedicate this species to Timothy Plowman, an excellent field botanist who not only made three good collections of it in 1976, but even had the foresight to pickle flowers for the specialist. *Bunchosia plowmanii* is endemic to dry tropical forests on the Pacific slopes of southwestern Ecuador and adjacent Peru. The species is distinguished by its dry habitat, hairy leaves bearing distal as well as basal glands, few-flowered pseudoracemes, light-colored anther connectives, usually bicarpellate and glabrous or only sparsely sericeous gynoecium, distinct styles, and small fruits. The only collection seen with tricarpellate gynoecia is *Escobar 1340,* and in that the tricarpellate flowers are exceptions on shoots with most flowers bicarpellate.

Gaudichaudia chasei W. Anderson, sp. nov. Fig. 7, h–o.

Planta volubilis, caulibus vestustioribus lignosis. Foliorum majorum lamina 5–8 cm longa, 2.4–3.8 cm lata, basi cuneata vel truncata, apice acuta vel obtusa, utrinque sparsim sericea; petiolus 4–9 mm longus. Flores omnes chasmogami, in umbellis 4-floris portati, umbellis in dichasiis foliosis; bracteae bracteolaeque 3–5.5 mm longae, 1–2.5 mm latae; pedunculus (6–) 8–11 (–14) mm longus; pedicellus 4–5 (–6) mm longus. Sepala apice late rotundata, glandulis 1–1.4 mm longis. Petala dentata; 4 lateralia ungue 1.2–2 mm longo, limbo 4.5–6 mm longo, 4–6 mm lato; posticum ungue 2–3 mm longo, limbo 4–5.5 mm longo, 4.5–6 mm lato. Stamina 5, omnia fertilia; filamenta 1.5–1.8 mm longa, plerumque libera vel basi brevissime connata; antherae 0.6–0.9 mm longae, basi apiceque rotundatae. Styli 3, aequales, 1.2–2 mm longi. Samara obcordata, 12–14 mm longa, 10–12 mm lata; ala lateralis basi attenuata, acuta vel acuminata, apice incisa; ala dorsalis 0.5–2 mm lata; alulae intermediae utrinque 1–3.

Vine with the stems sericeous to glabrate, becoming woody with punctiform lenticels in age. Leaves strictly decussate, smaller on flowering lateral shoots than on main stems; lamina of larger leaves 5–8 cm long, 2.4–3.8 cm wide, ovate or elliptical, cuneate to truncate at base, usually bearing on each side somewhat above base 1 (–2) marginal toothlike or filamentous projections up to 1 mm long, acute or obtuse at apex, thinly but persistently sericeous on both sides or eventually glabrescent, the hairs sessile, straight, appressed, the midrib and principal lateral veins (3–5 on each side) raised below; petiole 4–9 mm long, sericeous to glabrate; stipules up to 0.5 mm long, triangular, borne on stem beside petiole. Flowers all chasmogamous, borne in 4-flowered umbels arrayed in leafy dichasia, loosely sericeous; peduncle (6–) 8–11 (–14) mm long; bracts and bracteoles 3–5.5 mm long, 1–2.5 mm wide, mostly elliptical, abaxially sparsely sericeous, adaxially glabrous, eglandular, ± spreading, the bracts deciduous in fruit, the bracteoles apical, bent together toward 1 side, persistent; pedicel 4–5 (–6) mm long, always shorter than peduncle, usually ca ½ as long, straight in bud. Flowers 13–17 mm in diameter, flat (i.e., all petals lying in 1 plane) or the lateral petals more strongly reflexed than the posterior. Sepals 2–2.8 mm long, 1.5–2.2 mm wide, abaxially sericeous in center, otherwise glabrous except for ciliolate margin, green except for hyaline margin, broadly rounded at apex, appressed in anthesis, the anterior eglandular, the lateral 4 biglandular, the glands green, 1–1.4 mm long, 0.6–0.8 mm wide, compressed or slightly separated, free just at apex. Petals orange-yellow, the outermost usually with a red spot in center, glabrous, the limb flat, subcircular or broadly elliptical, dentate and eglandular all around margin, the cutting coarser on posterior petal; lateral 4 petals with the claw 1.2–2 mm long, the limb 4.5–6 mm long, 4–6 mm wide; posterior petal with the claw 2–3 mm long, the limb 4–5.5 mm long, 4.5–6 mm wide. Stamens 5, opposite sepals, all fertile, glabrous; filaments 1.5–1.8 mm long, broad, mostly free or connate only at base; anthers 0.6–0.9 mm long, often reflexed in anthesis, rounded at base and apex, about as wide at apex as at base, the narrowly elliptical or triangular connective dark red. Ovary densely hispid; styles 3, all alike, 1.2–2 mm long, shorter than stamens or exceeding them slightly, glabrous, straight and erect or divergent, constricted below the small slightly capitate terminal stigma; gynoecium (judged from the styles) apparently rotated slightly so that no carpel lies on plane of symmetry passing through anterior sepal and posterior petal. Samara thinly sericeous, obcordate, 12–14 mm long, 10–12 mm wide, the lateral wing tapered to an acute or acuminate base and notched at apex ½–¾ of the distance to the nut, sometimes somewhat sinuous, flat or somewhat wavy;

carpophore 6 mm long; dorsal wing 0.5–2 mm wide, irregularly lobed; intermediate winglets 1–3 on each side, similar in size and shape to dorsal wing, mostly oriented parallel to lateral wing; small ventral winglet present between apex of nut and notch in lateral wing. Chromosome number: $n = 40$ (counted in *Anderson 12945*).

TYPE: MEXICO. Morelos: 6 km SE of Cuernavaca on Hwy 138 to Yautepec, Cañón de Lobos, with limestone walls and outcropping on hillsides, 1300 m, 2 Oct 1983 fl/fr, *Anderson 12945* (MICH, holotype; BM, CAS, CHAPA, DUKE, ENCB, F, G, GH, IBUG, K, M, MEXU, MO, NY, P, TEX, UC, US, W, isotypes).

PARATYPE: MEXICO: Morelos: Cañón de Lobos, 20 km al ESE de Cuernavaca, bosque tropical deciduo en la ladera sur del cañón, 1350 m, Aug fl, *Flores Crespo 18 p.p.* (MEXU; the sheet at ENCB is a different species of *Gaudichaudia*).

Gaudichaudia chasei is named for Mark W. Chase, keen student of the Orchidaceae. We visited the Cañón de Lobos at Dr. Chase's insistence, in search of *Leochilus*. We found this new species instead of the orchid, so it seems only fair to name it for Chase.

Among the diploid species without cleistogamous flowers, this one is probably closest to *G. mcvaughii* W. Anderson; see below in this paper for a comparison of the two. It also seems to be closely related to *G. cynanchoides* H. B. K., a widespread weedy species which differs in having less woody stems, more or less V-shaped leaf hairs, at least above, many cleistogamous flowers that develop early and set many fruits, shorter bracts and bracteoles, 1–2 (–3) styles in the chasmogamous flowers, and a smaller subcircular samara that is entire or just emarginate at the apex and lacks winglets between the lateral wing and the very low dorsal wing or rib. Preliminary study suggests that a tetraploid entity ($n = 80$) common in Puebla and Oaxaca may have originated through hybridization between *G. cynanchoides* and *G. chasei*.

Gaudichaudia cycloptera (DC.) W. Anderson, comb. nov.

Hiraea? cycloptera DC., Prodr. 1: 586. 1824.

This is apparently the oldest name for the species that Niedenzu (1928) called *Gaudichaudia pentandra* Adr. Juss.

Gaudichaudia krusei W. Anderson, sp. nov. Fig. 6.

Suffrutex 0.3–1.2 m altus, ramis sericeis vel subsericeis. Foliorum majorum lamina 3.5–9 cm longa, 1–4 cm lata, ovata vel elliptica, basi rotundata vel subcordata, apice acuta vel abrupte breviacuminata, supra sericea, subtus sericea, subsericea, vel appresso-tomentosa; petiolus 2–6 mm longus. Flores omnes chasmogami, in umbellis 4-floris portati; bracteae bracteolaeque 2–3.5 mm longae, 0.7–1.5 mm latae; pedunculus 1–5 mm longus; pedicellus 3–11 mm longus. Petala lateralia ungue 1.3–1.7 mm longo, limbo 4.5–6.5 mm longo latoque; posticum ungue 2.5–3 mm longo, limbo 4.5–5.5 mm longo, 5–6 mm lato. Stamina 5, omnia fertilia; antherae 1–1.5 mm longae, cordiformes. Styli 3, aequales, 2–3.3 mm longi. Samara circularis vel obcordata, 6.5–11 mm diametro; ala lateralis basi rotundata vel acuta, apice incisa; ala dorsalis 0.5–1.5 mm lata, dentata; alulae intermediae utrinque 2–7.

Shrub 0.3–1.2 m tall, with few to many slender erect non-twining stems from a woody underground base, the stems ± persistently sericeous or subsericeous. Leaves opposite or occasionally (on same plant) in 3s; lamina of larger leaves 3.5–9

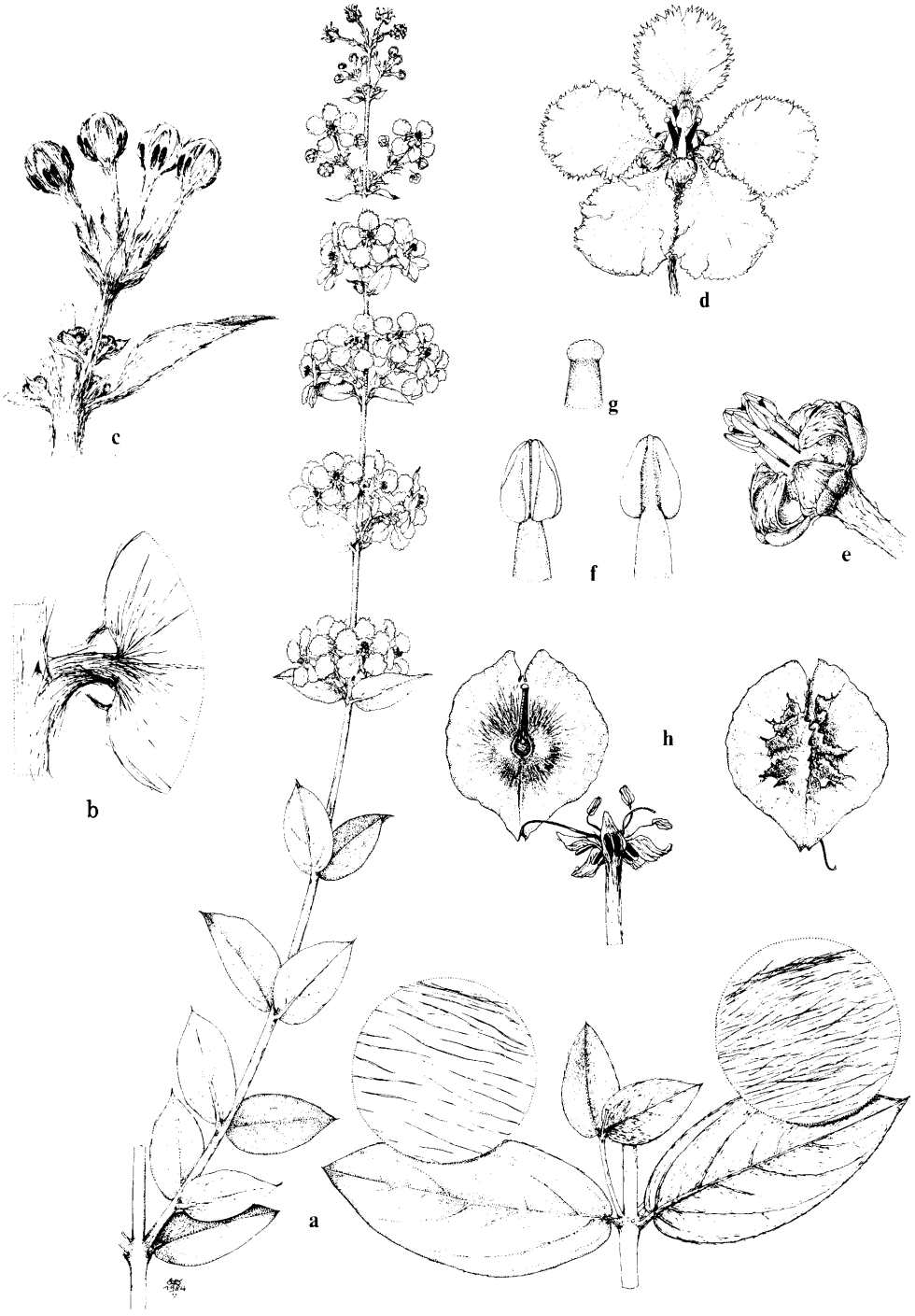

FIG. 6. *Gaudichaudia krusei.* a) flowering branch and large leaves, ×0.5, with enlargements of adaxial surface of lamina (left) and abaxial surface (right), ×5; b) base of leaf, ×5; c) umbel in bud, ×2.5; d) flower, oblique-anterior view, ×2.5; e) flower with petals removed, side view, ×4; f) anthers, adaxial side left, abaxial side right, ×10; g) stigma, ×25; h) samaras, adaxial side left, still attached by carpophore to receptacle, abaxial side right, ×2.5. Drawn by Karin Douthit, a–g from *Anderson 12868,* h from *Koch & Fryxell 8264.*

cm long, 1–4 cm wide, ovate or narrowly ovate to elliptical, rounded or subcordate at base and usually bearing a marginal filamentous process up to 1 (–1.5) mm long on each side of petiole, acute to abruptly short-acuminate at apex, sericeous above with sessile, ± straight, parallel hairs, sericeous, subsericeous, or appressed-tomentose below with the long, fine, sessile or short-stalked hairs varying from straight and appressed to somewhat sinuous or spreading, the hairs usually much denser below than above, the midrib and principal lateral veins (3–5 on each side) prominent below; petiole 2–6 mm long, sericeous to velutinous; stipules up to 1 mm long, triangular, borne on stem beside petiole. Flowers all chasmogamous, borne in 4-flowered umbels arrayed in short crowded dichasia of 1, 3, or occasionally more umbels in the axils of distally gradually smaller leaves; inflorescences loosely sericeous or appressed-tomentose; bracts and bracteoles eglandular, abaxially loosely subsericeous, adaxially glabrous, appressed or spreading, the bracts 2–3.5 mm long, 0.8–1.5 mm wide, narrowly ovate-triangular, the bracteoles 2–3 mm long, 0.7–1 mm wide, narrowly elliptical; peduncle 1–5 mm long; pedicel 3–11 mm long, usually longer than peduncle, straight in bud. Flowers 14–18 mm in diameter, ± flat (i.e., all petals lying in 1 plane). Sepals 2.4–3.5 mm long, 1.5–2 mm wide, abaxially sericeous except for a hyaline marginal band, ciliolate or denticulate on margin, adaxially glabrous, obtuse or rounded at apex, incurved between petals and inrolled at apex in anthesis, the anterior eglandular, the lateral 4 biglandular, the glands green, 1.2–1.7 mm long, 0.5–0.7 mm wide, compressed in middle of sepal, attached their whole length or free just at apex. Petals orange-yellow, glabrous, the limb flat, subcircular, irregularly dentate to short-laciniate, the cutting coarser on posterior petal, eglandular or some divisions slightly glandular, especially proximally; lateral 4 petals with the claw 1.3–1.7 mm long, the limb 4.5–6.5 mm long and wide; posterior petal with the claw 2.5–3 mm long, the limb 4.5–5.5 mm long, 5–6 mm wide. Stamens 5, opposite sepals, all fertile, glabrous; filaments 1.7–3 mm long, distinct or the posterior 2 up to ⅓ connate; anthers 1–1.5 mm long, cordiform in outline, subcordate at base, obtuse at apex, the narrowly triangular connective dark red to black in dried specimens. Ovary densely hispid; styles 3, all alike, 2–3.3 mm long, shorter than stamens or exceeding them slightly, glabrous or rarely sparsely sericeous, straight and erect or more commonly divergent, constricted below the capitate terminal stigma; gynoecium (judged from the styles) apparently rotated slightly so that no carpel lies on plane of symmetry passing through anterior sepal and posterior petal. Samara loosely sericeous to glabrate on wing, subcircular to obcordate, 6.5–11 mm in diameter, the lateral wing rounded to acute at base and notched at apex ca ½ of the distance to the nut, often somewhat sinuous and denticulate, somewhat convex as viewed dorsally; carpophore 4–5 mm long; dorsal wing 0.5–1.5 mm wide, dentate; intermediate winglets 2–7 on each side, as high as width of dorsal wing, mostly at right angles to lateral and dorsal wings; samaras separating from a short pyramidal torus. Chromosome number: n = 40 (counted in *Anderson 12868*).

TYPE: MEXICO. Guerrero: Microondas road up Cerro Alquitrán, marked "El Tejocote" on Hwy 95 W of Mazatlán, ca 6.5 km from Hwy 95, with oaks, scattered pines, open brushy understory, 1600 m, 29 Sep 1983 fl/imm fr, *Anderson 12868* (MICH, holotype; CAS, CHAPA, DUKE, ENCB, G, K, MEXU, MO, NY, isotypes).

PARATYPES: MEXICO. Guerrero: Near type locality, red clay soil, 1750 m, Jul sterile, *Anderson & Anderson 4979* (ENCB, MICH); Hwy 95, Km 39–40, ca 5 km N of El Rincón, dry slopes and rocky

ravine through sparse oak forest, ca 1500 m, Jan fl, *Croat 45687* (MO); Rincón Viejo [NW of Rincón de la Via], "laderas con bosque de encino, con suelos de arcilla arenosa con pH 6, en sombra parcial o pleno sol, entre Gramíneas," 750 m, Aug fl, Oct fr, *Kruse 82* (ENCB, Kruse Herb.), Sep fl, *Kruse 1289* (Kruse Herb.); 1 km N of Rincón de la Via, 725 m, Aug fl, *Kruse 1288,* Oct fr, *Kruse 1290* (both Kruse Herb.); Cerro "El Peregrino," "a todo lo largo del filo plano del parte aguas y unicamente dentro de una distancia de dos a tres metros del filo," 530–810 m, Aug fl, *Kruse 1920 & 1921* (Kruse Herb., not seen, MICH!, photo); 40 km S of Chilpancingo, granitic soil on mountainside beside swift stream, mixed pine and cacti, Aug fl, *Paxson et al. 17M788* (F, MEXU, NY, US); Mpio Mochitlán, 38 km S of Chilpancingo, transition from oak zone to tropical forest, clay soil, 880 m, Oct fl/fr, *Koch et al. 79137* (MICH); Mpio Acapulco, 3 km W of Cuarenta y Dos, which is 27 km N of Acapulco on road to microwave station "42 y La Providencia," grassy savannah, soil of granitic sand, 610 m, Oct fl/imm fr, *Koch et al. 79220* (ENCB, MEXU, MICH); Mpio Chilpancingo, 22 km S of Chilpancingo, 1150 m, Oct fl/fr, *Koch & Fryxell 8264* (MICH); ca 3 km S of Acahuizotla, pine-oak forest, 1050 m, Jul fl, *Rowell 3094* (MICH); Mpio Chilpancingo, E slope of Cerro Alquitrán, near Mazatlán, "ladera caliza con vegetación de bosque abierto de *Quercus, Pinus* y *Bursera,*" 1500 m, Jul fl, *Rzedowski 22681* (ENCB); Cerro "Del Alquitrán," beyond Petaquillas, SE of Chilpancingo, 1400 m, 22 Oct 1978 fl, *Schwabe et al. s.n.* (MEXU). Without state: *Haenke* [1402] (F), [1528] (F, NY), both collected in 1791.

I am naming this very distinctive species in honor of Hubert Kruse, an enthusiastic student of the flora of Guerrero, through whose collections and friendly assistance I first learned about it and its narrow distribution in the hills south and west of Chilpancingo. *Gaudichaudia krusei* is probably most closely related to *G. subverticillata* Rose, another shrubby species, endemic to Jalisco and southern Nayarit. *Gaudichaudia subverticillata* has at least the lower stem hairs long-spreading; the leaves, often in verticils of three, are larger and more loosely hairy on both sides, and lack marginal processes at the base; the inflorescence is more elaborately compound, with the umbels not displayed in simple axillary dichasia; the petals are elliptical, notably longer than wide; and the samara is larger and entire or only slightly emarginate at the apex, and lacks intermediate winglets.

Gaudichaudia mcvaughii W. Anderson, sp. nov. Fig. 7, a–g.

Planta volubilis, caulibus vetustioribus lignosis. Foliorum majorum lamina 3–8.5 cm longa, 1.8–4 cm lata, basi cordata vel brevihastata, apice plerumque rotundata vel obtusa; petiolus 1–4 mm longus. Flores omnes chasmogami, in umbellis 4-floris portati, umbellis plerumque 1 vel 3 in quaque inflorescentia axillari; bracteae (1–) 1.5–3 mm longae, 0.8–1.2 mm latae; pedunculus 3–10 mm longus; bracteolae 1.3–2.6 mm longae, 0.7–1.4 mm latae; pedicellus 4–14 mm longus. Sepala apice late rotundata, glandulis 2–3 mm longis. Petala dentata vel brevifimbriata; 4 lateralia ungue 1.5–2 mm longo, limbo (6–) 7–9.5 mm longo, (6–) 7–10 mm lato; posticum ungue 3–4 mm longo, limbo (5–) 6–7 mm longo, 6–8.5 mm lato. Stamina 5, omnia fertilia; filamenta 1.5–2.5 mm longa, plerumque ¼–¾ connata; antherae 1.2–2 mm longae, triangulares vel cordiformes. Styli 3, aequales, 2–2.8 mm longi. Samara ± circularis, 10–18 mm diametro; ala lateralis basi rotundata vel parum emarginata, apice incisa, non plana; ala dorsalis 1.5–3 (–6) mm lata; alulae intermediae utrinque (0–) 3–5.

Vine with the young stems strongly twining, densely velutinous, tomentose, or subsericeous to soon or eventually glabrate, becoming woody with small punctiform lenticels in age. Leaves strictly decussate; lamina of larger leaves 3–8.5 cm long, 1.8–4 cm wide, ovate or elliptical, cordate or short-hastate at base with the lobes rounded or triangular and often bearing 1–2 (–3) filamentous processes 0.2–0.5 (–1) mm long, mostly rounded or obtuse and often mucronate at apex but sometimes acute, initially thinly velutinous above with V-shaped hairs, these persis-

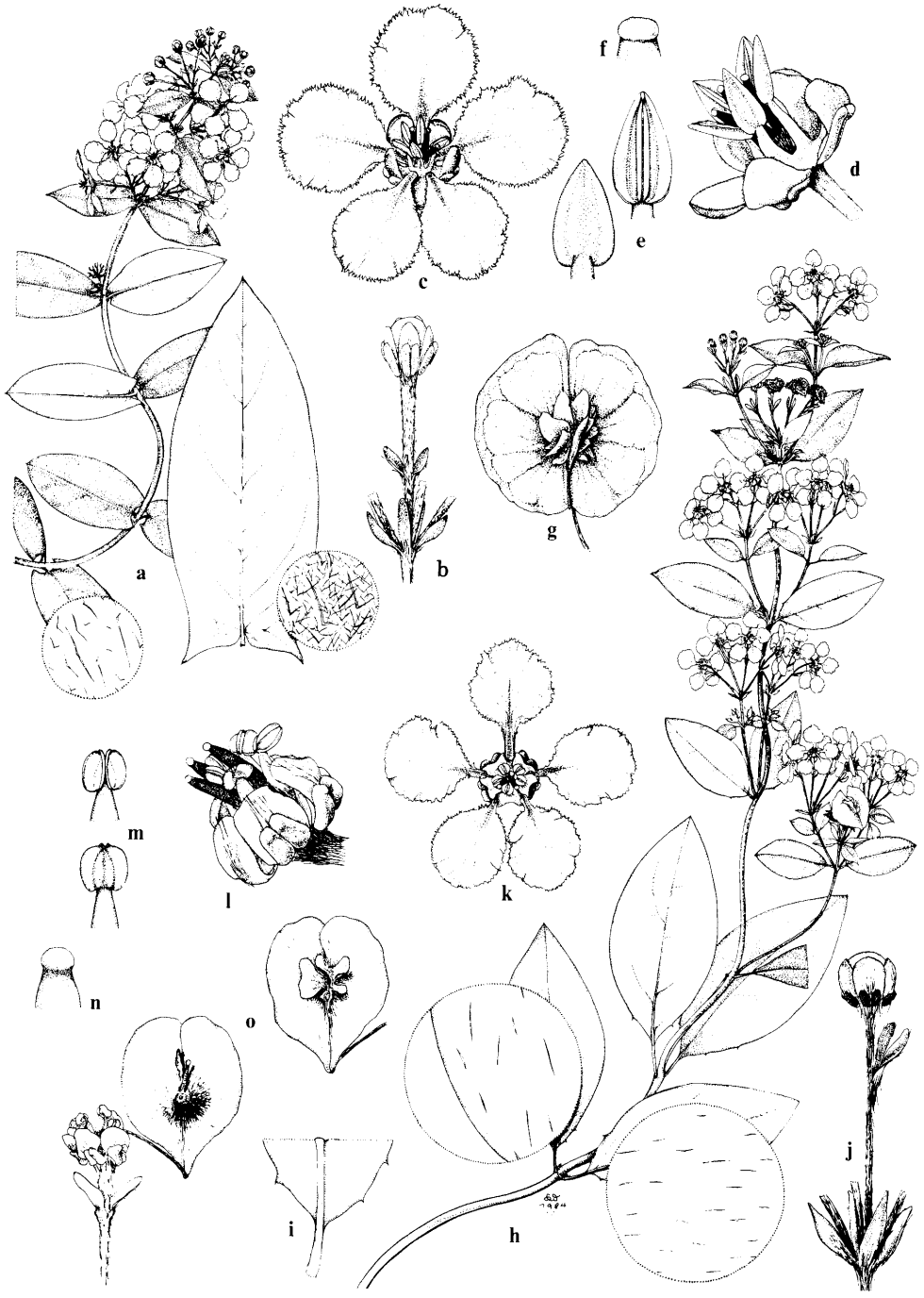

FIG. 7. *Gaudichaudia mcvaughii* and *G. chasei*. a–g, *G. mcvaughii:* a) habit and large leaf, ×0.5, with enlargements of adaxial surface of lamina (left) and abaxial surface (right), ×5; b) flower bud in umbel, ×2.5; c) flower, oblique-anterior view, ×2; d) flower with petals removed, side view, ×5; e) anthers, abaxial side left, adaxial side above, ×7.5; f) stigma, ×30; g) samara, abaxial side, ×1.5. h–o, *G. chasei:* h) habit, ×0.5, with enlargements of adaxial surface of lamina (left) and abaxial surface (right), ×5; i) base of leaf, ×1; j) flower bud in umbel, ×2.5; k) flower, from above, posterior petal in middle, ×2; l) flower with petals removed, side view, ×5; m) anthers, abaxial side below, adaxial side above, ×7.5; n) stigma, ×30; o) samaras, adaxial side left, still attached by carpophore to receptacle, abaxial side right, ×1.5. Drawn by Karin Douthit from the types.

tent or deciduous, usually more densely and persistently velutinous to tomentose to sericeous below, the hairs extremely variable in shape and density between populations, within populations, and even on the same plant, the midrib and principal lateral veins (4–6 on each side) prominent below; petiole 1–4 mm long, often shorter than basal lobes of lamina, velutinous; stipules very small (0.2–0.5 mm long), triangular, borne on stem beside petiole. Flowers all chasmogamous, borne in short-stalked 4-flowered umbels, the inflorescence a short axillary shoot comprising 1 umbel or 3, velutinous to subsericeous; bracts and bracteoles abaxially sparsely sericeous, adaxially glabrous, usually bearing a glandular marginal spot on each side near base, the bracts (1–) 1.5–3 mm long, 0.8–1.2 mm wide, ovate-triangular, the bracteoles 1.3–2.6 mm long, 0.7–1.4 mm wide, elliptical, apical, ± spreading; peduncle 3–10 mm long; pedicel 4–14 mm long, at least slightly longer than peduncle, straight in bud. Flowers 16–24 mm in diameter, ± flat (i.e., all petals lying in 1 plane). Sepals 3–4.5 mm long, 2–2.7 mm wide, sparsely sericeous abaxially in center, otherwise glabrous except for the ciliolate margin, green in the center, membranous and hyaline toward margin, broadly rounded at apex, the lateral 4 or all 5 incurved between petals in anthesis, the anterior eglandular, the lateral 4 biglandular, the glands green, 2–3 mm long, 0.5–1 mm wide, compressed in middle of sepal, attached their whole length. Petals orange-yellow, glabrous, the limb flat, subcircular, dentate or short-fimbriate and eglandular all around margin, the divisions slightly deeper on posterior petal; lateral 4 petals with the claw 1.5–2 mm long, the limb (6–) 7–9.5 mm long, (6–) 7–10 mm wide; posterior petal with the claw 3–4 mm long, the limb (5–) 6–7 mm long, 6–8.5 mm wide. Stamens 5, opposite sepals, all fertile, glabrous; filaments 1.5–2.5 mm long, broad, mostly connate for ¼–¾ of their length; anthers 1.4–2 mm long, triangular or cordiform in outline, subcordate at base and acute or obtuse at apex, the narrowly triangular connective dark red to black in dried specimens. Ovary densely hispid; styles 3, all alike, 2–2.8 mm long, shorter than stamens, glabrous, straight and erect or divergent, constricted below the slightly capitate terminal stigma; gynoecium (judged from the styles) apparently rotated slightly so that no carpel lies on plane of symmetry passing through anterior sepal and posterior petal. Samara loosely sericeous, roughly circular, 10–18 mm in diameter, the lateral wing usually rounded or slightly emarginate at base and notched or incised at apex up to ⅔ of the distance to the nut, irregularly somewhat sinuous, moderately to strongly wavy (i.e., the wing not lying in 1 plane); carpophore 4–5 mm long; dorsal wing 1.5–3 (–6) mm wide; intermediate winglets (0–) 3–5 on each side, as high as width of dorsal wing or often much shorter, mostly at right angles to lateral and dorsal wings, somewhat confluent with the lateral wing. Chromosome number: $n = 40$ (counted in *Anderson 12699*).

TYPE: MEXICO. Colima: 11 km SSW of Colima on Hwy 110, limestone hill with very dense cover of shrubs and small trees, 390 m, 18 Sep 1983 fl/fr, *Anderson 12699* (MICH, holotype; CAS, DUKE, ENCB, F, G, IBUG, K, MEXU, MO, NY, P, US, isotypes).

PARATYPES: MEXICO. Jalisco, Mpio La Huerta, Estación de Biología Chamela: Vareda Chachalaca, selva baja caducifolia, Oct fr, *Lott 692* (MEXU, MICH), Oct fl, *Magallanes 3868* (MICH), Nov fr, *Magallanes 3935* (MEXU), Oct fl, *Cervantes S. 18* (MICH). Colima: 8 km SSW of Colima on Hwy 110, brushy roadside near thorn-scrub on limestone, 390 m, Sep fl/fr, *Anderson 12703* (CAS, ENCB, MEXU, MICH, MO, NY); Microondas La Cumbre, ca 8 km SE of Colima on Hwy 110, limestone hill with brushy cover, 400–500 m, Sep fl/fr, *Anderson 12708* (CAS, DUKE, IBUG, MEXU, MICH, NY); road to Playa del Oro, ca 1.6 km S of Hwy 110 W of Santiago, limestone hills above the coast, 120 m, Sep fl/fr, *Anderson 12713* (BM, CAS, CHAPA, ENCB, F, MEXU, MICH, NY, TEX);

mountain summits near pass ca 18 km SSW of Colima on Manzanillo road, deciduous woodland now nearly in full foliage, 500 m, Aug fl, *McVaugh 16043* (CAS, DUKE, MEXU, MICH, NY); road from Hwy 15 to Playa del Oro (W of Santiago), ca 1.8 km from beach, dense low forest on steep slopes, Sep fl, *Stevens 1884* (CAS, ENCB, MICH, MO). Guerrero: Mpio Tecpan, torre de microondas cerca de Papanoa, cerro de caliza con bosque tropical caducifolia, 380 m, Oct fl/fr, *Koch & Fryxell 82218* (MICH); rocky headland in front of Hotel Mirador, Acalpulco, ca 100 m, Aug fl/fr, *MacDaniels 143* (F); Acapulco and vicinity, Oct fl/fr, *Palmer 8* in 1895 (F, GH, MEXU, MO, NY, US). Without state, *Haenke* [1401] in 1791 (F).

Gaudichaudia mcvaughii is named for my mentor, colleague, and friend, Rogers McVaugh. It is a species of the low deciduous woodland found on limestone between sea level and 500 m in the Pacific lowlands from Jalisco to Guerrero, a distribution which it shares with many other species, including *Malpighia ovata* Rose. Exploration of suitable habitats in Michoacán should lead to its eventual collection in that state.

Gaudichaudia mcvaughii seems to be rather isolated among the diploid species without cleistogamous flowers. In its short axillary inflorescences and in many details of the flowers and fruits it resembles *G. subverticillata* Rose and *G. krusei* W. Anderson, but both of those species are non-twining shrubs or subshrubs. Among the vining species the one most like *G. mcvaughii* in its flowers and fruits is *G. chasei.* The following couplet summarizes the most easily observed differences between the two species.

1. Petiole 1–4 mm long; lamina cordate or short-hastate at base, thinly velutinous to glabrescent above; bracts up to 3 mm long, bracteoles to 2.6 mm; pedicel longer than the peduncle; flowers 16–24 mm in diameter; calyx glands 2–3 mm long; filaments mostly connate for ¼–¾ of their length; anthers 1.4–2 mm long; samara rounded or emarginate at base. *G. mcvaughii.*
1. Petiole 4–9 mm long; lamina cuneate to rounded at base, thinly sericeous to glabrescent above; bracts and bracteoles 3–5.5 mm long; pedicel shorter than peduncle, usually ca ½ as long; flowers 13–17 mm in diameter; calyx glands 1–1.4 mm long; filaments mostly free or connate only at base; anthers 0.6–0.9 mm long; samara tapered to an acute or acuminate base. *G. chasei.*

Heteropterys alata (W. Anderson) W. Anderson, comb. nov.

Heteropterys beecheyana Adr. Juss. var. *alata* W. Anderson, Mem. N.Y. Bot. Gard. 32: 184. 1981.

Further consideration of this taxon has led me to the conclusion that it deserves species status as much as several other species generally recognized in the pink-flowered complex of *Heteropterys.*

Heteropterys aliciae W. Anderson, sp. nov. Fig. 8.

Planta volubilis ramis velutinis mox vel demum glabratis. Foliorum majorum lamina 4.5–7 cm longa, 2–3.8 cm lata, subtus margine biglandulosa et pertinaciter velutina vel subsericea; stipulae epipetiolares. Flores in pseudoracemis 0.8–3 cm longis portati; pedunculus 2.5–3.5 mm longus; bracteolae eglandulosae, plerumque inter medium et apicem pedunculi portatae; pedicellus 2.3–3 mm longus. Sepala appressa per anthesin. Petala flava, abaxialiter laevia. Styli apice truncati vel apiculati. Samara 23–33 mm longa; nux laevis.

Vine with slender woody stems, climbing to 2 m; stems velutinous to glabrate and soon developing raised punctiform lenticels, the hairs V-shaped with each branch 0.1–0.3 mm long. Lamina of larger leaves 4.5–7 cm long, 2–3.8 cm wide, elliptical or slightly ovate, obtuse, rounded, or subcordate at base, acute to rounded and often mucronate at apex, bearing 1 gland below on each side on

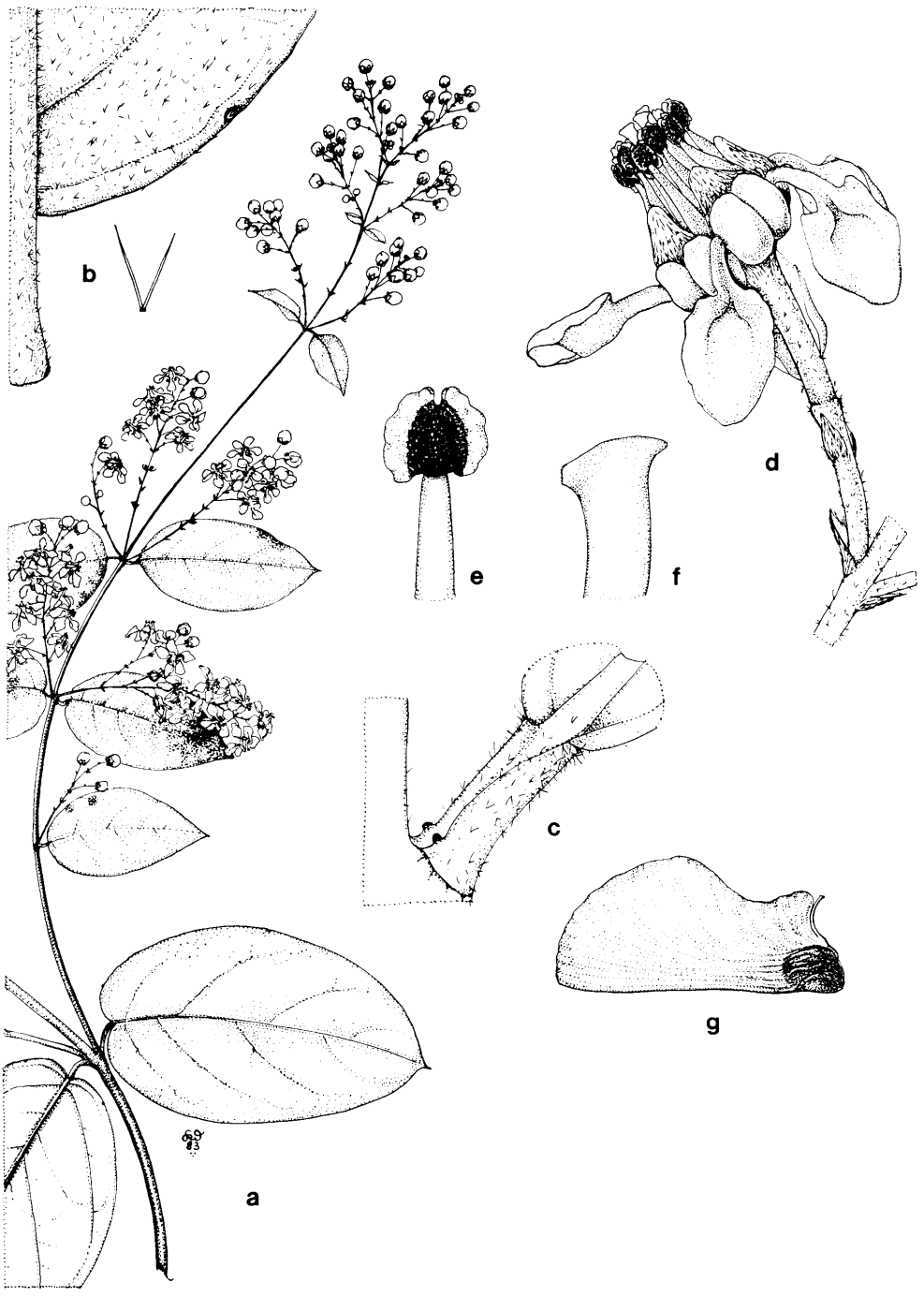

FIG. 8. *Heteropterys aliciae.* a) habit, ×0.75; b) base of leaf, abaxial side, ×6, with hair from abaxial surface, × ca 40; c) petiole and stipules, ×7.5; d) flower, side view, posterior petal to left, ×7.5; e) anther, abaxial view, ×15; f) apex of style, side view, ×30; g) samara, ×1.5. Drawn by Karin Douthit, a–f from *Anderson et al. 37119,* g from *Anderson et al. 37118.*

margin ca 5 mm above base, the glands sessile or short-cylindrical, ca 0.3 mm in diameter and up to 0.3 mm high; lamina thinly sericeous or subvelutinous to glabrate above, persistently velutinous or subsericeous below, the hairs varying from V-shaped to almost straight and appressed; petiole 3–5 mm long, persistently velutinous or eventually glabrescent; stipules 0.3–0.5 mm long, dark and somewhat glandlike, borne on petiole between base and middle. Inflorescence paniculate, velutinous, the flowers (4–) 6–18 in pseudoracemes 0.8–3 cm long; bracts 1–1.5 mm long, narrowly triangular or elliptical, abaxially sericeous, appressed, eglandular, persistent; peduncle 2.5–3.5 mm long (–7.5 mm in fruit), slightly swollen at apex; bracteoles like bracts but ovate and 0.6–1 mm long, borne between middle and apex of peduncle, sometimes 1 or both apical; pedicel 2.3–3 mm long (–5 mm in fruit). Sepals leaving petals exposed during enlargement of bud, appressed in anthesis, 1.5–2 mm long, 0.9–1.5 mm wide, rounded at apex, abaxially sericeous, adaxially glabrous, the hairs reddish brown; anterior sepal eglandular, lateral 4 all eglandular or all biglandular, the glands ca 1 mm long, green, broadly elliptical or orbicular, flat, not or only slightly compressed. Petals pale yellow, glabrous, the limb abaxially smooth, shallowly concave, entire or slightly erose-denticulate and often somewhat revolute at margin; lateral petals recurved in anthesis, the claw 1.2–1.5 mm long, the limb 2–2.6 mm long, 1.8–2.3 mm wide; posterior petal erect, otherwise hardly different, the claw 1.7–2 mm long, the limb ca 1.7 mm × 1.7 mm. Filaments glabrous, straight or somewhat recurved distally, 1.6–2.4 mm long, longest opposite anterior sepal, ca ⅓–½ connate; anthers 0.5–0.9 mm long, glabrous or sparsely sericeous, the connective swollen and uniformly dark red to almost black. Ovary sericeous; styles 1.6–2 mm long, glabrous, laterally flattened, the anterior straight, the posterior 2 slightly shorter than anterior, arcuate from base and turned so that all 3 stigmas face posterior petal, truncate or apiculate dorsally at apex. Immature samara 23–33 mm long, thinly sericeous or tomentose; dorsal wing almost as long as samara, 23–30 mm long, 11–15 mm wide, the abaxial margin nearly straight, the adaxial margin flared proximally, then truncate abruptly to nut; nut 7–9 mm long, 5–6 mm high, laterally flattened, without lateral crests or winglets, the longitudinal nerves prominent.

TYPE: BRAZIL. Bahia: Cerrado ca 5 km W of Cocos, near limestone boulders, ca 530 m, 17 Mar 1972 fl, *Anderson et al. 37119* (UB, holotype; MICH, NY, isotypes).

PARATYPE: BRAZIL. Bahia: Some locality and date as type, fl/fr, *Anderson et al. 37118* (MICH, NY, UB).

I name this species in honor of Dr. Alicia Lourteig, a good friend and fellow student of the Malpighiaceae. *Heteropterys aliciae* is probably closely related to *H. umbellata* Adr. Juss., which is usually a shrub (but an isotype at P has some clearly twining branches). In *H. umbellata* the leaves are smaller and sericeous to soon glabrate, the leaf glands are peltate and borne on the surface of the lamina, the inflorescence is umbellate or occasionally corymbose, the petals are larger, the styles are rounded dorsally at the apex, and the samaras are smaller.

Heteropterys fluminensis (Grisebach) W. Anderson, comb. nov.

Hiraea fluminensis Grisebach, Linnaea 13: 243. 1839.

Mascagnia fluminensis (Grisebach) Grisebach in Martius, Fl. Bras. 12(1): 94. 1858.

Slender woody vine, the stems sericeous to soon glabrate. Lamina of larger leaves 3.8–8 cm long, 1.2–3.5 cm wide, elliptical, cuneate to rounded at base, mostly acute or very abruptly short-acuminate at apex, initially sericeous but soon nearly to quite glabrate, bearing below a row of small impressed glands parallel to but set in from the margin; petiole 4–13 mm long, sericeous to glabrate, eglandular or biglandular at base, often both on the same plant; stipules minute, triangular, borne on stem beside petiole, or absent. Flowers borne in 4-flowered umbels; bracts 1–1.5 mm long, eglandular; peduncle 4–11 mm long; bracteoles apical, 1–1.5 mm long, dissimilar, 1 straight and eglandular, the other falcate and bearing a large eccentric abaxial gland (or occasionally both bracteoles 1-glandular); pedicel 2.5–4 (–6) mm long, shorter than peduncle in flower, elongating somewhat in fruit, usually slightly curved, thicker than peduncle and notably swollen distally, sericeous to glabrescent. Flowers small, ca 10–14 mm in diameter. Sepals abaxially densely sericeous, adaxially glabrous, somewhat revolute at apex and often at sides in anthesis, the anterior eglandular, the lateral 4 biglandular. Petals yellow, glabrous, the lateral 4 entire or erose, the posterior bearing small marginal glands on proximal ½ or all around limb. Stamens 10, alike; filaments glabrous, partly connate; anthers reflexed in anthesis, the locules densely pilose. Styles 3, erect, straight, with internal stigmas and dorsally truncate at apex, the anterior slightly shorter and slenderer than the posterior 2. Samara 20–25 mm long, the wing 7–10 mm wide; nut cylindrical, ca 7–8 mm × 2 mm, without lateral crests but with many very prominent parallel longitudinal nerves.

TYPE: BRAZIL. Rio de Janeiro: Near the city of Rio de Janeiro, *Sellow*. According to Niedenzu (1928, p. 118), Sellow collected the species twice, in 1814 and 1818. Both specimens were probably at B, and Grisebach would have studied both, so they should be considered syntypes. The 1814 syntype is shown in F negative 12688. I do not know whether either syntype is represented now by a duplicate at GOET or elsewhere.

SPECIMENS STUDIED. BRAZIL. Rio de Janeiro: Restinga de Grumaré, Aug fl/fr, *Araújo 106* (NY); Serra do Orgão, primary forest, Sep fl, *Occhioni 6064* (MICH); Jacarépaguá, Oct fl/fr, *Pereira 4354* (F); Mpio Cabo Frio, restinga opposite Manguinhes beach, Sep fl, *Souza 128/Scott 5* (MICH). Espírito Santo: Mpio Jaguaré, Agua Limpa, edge of forest, Oct fl, *Hatschbach 46977* (MICH).

Grisebach and Niedenzu both realized that this species was anomalous in *Mascagnia,* and the fruiting collections now available show that it is a *Heteropterys*. I cannot match it to any species in Niedenzu's 1928 treatment of *Heteropterys*. It seems to be closest to *H. leschenaultiana* Adr. Juss., an affinity that Grisebach noted in 1858. The two both have the petioles often biglandular at the base, flowers in umbels of four, and revolute sepals. However, in *H. leschenaultiana* the leaves are larger, the laminar glands are marginal or nearly so, the bracteoles are eglandular, the pedicel is longer than the peduncle and not or hardly inflated, the anthers are glabrous, and the nut of the samara is more typical for the genus, i.e., plumper, shorter, and with less prominent nerves.

Heteropterys huberi W. Anderson, sp. nov.

Frutex erectus usque ad 4 m altus. Foliorum majorum lamina 5–8 cm longa, 2.5–4.5 cm lata, apice obtusa vel rotundata et interdum emarginata, coriacea, subtus serie inframarginali 6–12 glandularum instructa et dense et pertinaciter sericea pilis primo rufis demum canescentibus, reticulo utrinque prominulo et

visibili; petiolus 1–4 mm longus, eglandulosus vel biglandulosus. Inflorescentiae elongatae, saepe folia subtendentia superantes, floribus in umbellis 4-floris saepe pari proximali subtentis. Sepala revoluta, utrinque appresso-tomentosa. Petala lutea. Antherarum connectivum basi atrorubrum distaliter luteum. Samara immatura 12–14 mm longa.

Shrub up to 4 m tall; stems sericeous, eventually glabrate. Leaves mostly decussate; lamina of larger leaves 5–8 cm long, 2.5–4.5 cm wide, elliptical, obtuse or rounded at base, obtuse or rounded and sometimes emarginate at apex, coriaceous, bearing an inframarginal row of 6–12 glands below on each side, thinly whitish-sericeous to eventually glabrate above, densely and ± persistently sericeous below with the hairs very short, straight, sessile, strongly appressed, initially reddish brown but fading with age, the reticulum about equally prominulous and readily visible on both sides; petiole 1–4 mm long, sericeous, eglandular or biglandular near middle; stipules not seen. Inflorescences axillary and terminal, paniculate, long-stalked and open, often longer than subtending leaves, sericeous, the flowers in terminal umbels of 4, often with an additional pair borne below and separated from the umbel; bracts and bracteoles 1–1.5 mm long, narrowly elliptical, appressed or involute, eglandular or the bracteoles with 2 marginal glands; peduncle 1–2 mm long; pedicel 4–7.5 mm long. Sepals completely concealing petals during enlargement of bud, revolute in anthesis, 3 mm long, 1.2–1.5 mm wide, triangular, appressed-tomentose on both sides but more densely and uniformly so abaxially, the hairs dark brown; anterior sepal eglandular, lateral 4 biglandular, the glands 1.3 mm long, elliptical. Petals yellow, glabrous or sparsely pilose on margin, abaxially smooth; lateral petals with the claw 2 mm long, the limb circular, ca 3 mm in diameter, erose; posterior petal hardly different, the claw ca 2.5 mm long, the limb slightly narrower and glandular-dentate near base. Filaments glabrous, straight or slightly curved, 2.1–2.5 mm long opposite sepals, 1.5–2 mm long opposite petals, basally connate; anthers 0.5–0.8 mm long, glabrous, the connective with a dark red spot just above insertion of filament, otherwise yellow. Ovary 1 mm high, sericeous; styles 1.8–2 mm long, glabrous, straight, divergent from base, truncate at apex. Immature samara 12–14 mm long, persistently reddish brown-sericeous; dorsal wing as long as samara, 5–5.5 mm wide, the abaxial margin curved upward; nut 3–3.5 mm long, 2–2.5 mm high, without lateral crests or winglets.

TYPE: VENEZUELA. Terr. Fed. Amazonas: Depto. Río Negro, arbustales, roca abierta y bosque bajo denso en la vertiente oriental del Macizo Aracamuni, 01°32′N, 65°48′W, 750 m, 10 Feb 1981 imm fr, *Huber & Medina 5893* (MICH, holotype).

PARATYPE: VENEZUELA. Terr. Fed. Amazonas: Depto. Río Negro, pequeña altiplanicie de arenisca, lado derecho (oriental) del Río Siapa o Matapire, poco arriba de su salida del Macizo Aracamuni, 01°36′N, 65°41′W, 600 m, Feb fl, *Huber 6010* (MICH).

Heteropterys huberi is referable to subgenus *Parabanisteria*. In my Guayana Highland treatment (Anderson 1981) it will key to *H. cuatrecasasii* W. Anderson, which it does resemble in its umbellate inflorescences and densely sericeous leaves, but the two species are easily distinguished. *Heteropterys cuatrecasasii* is a plant from higher elevations on the Cerros Parú, Huachamacari, and Marahuaca, which lie about 2–3° to the north of Cerro Aracamuni. It is a woody vine; its leaves are acuminate at the apex, bear few or no glands, and have the reticulum

nearly or quite invisible above; the petiole of larger leaves is 5–9 mm long; the inflorescences are short-stalked and crowded, mostly shorter than the subtending leaves; and the connective of the anthers is uniformly dark. I suspect that the species most closely related to *H. huberi* is *H. atabapensis* W. Anderson, a shrub of lower elevations, which differs from *H. huberi* in having its leaves very soon glabrate and inflorescences racemose.

This species is named in honor of Dr. Otto Huber, collector of the two known collections, in recognition of his contributions to our knowledge of the flora of southern Venezuela.

Heteropterys prunifolia (H. B. K.) W. Anderson, comb. nov.

Hiraea? prunifolia H. B. K., Nov. Gen. Sp. 5 (quarto ed.): 170. 1821 [1822].

Study of the type (herb. Humb., P!) shows that this is an older name for *Heteropterys rhombifolia* Rusby.

Heteropterys standleyana W. Anderson, nom. nov.

Banisteria rosea Standley, J. Wash. Acad. Sci. 14: 96. 1924, non *Heteropterys rosea* Kralik, Akad. Wiss. Wien, Math.-Naturwiss. Kl., Denkschr. 79: 281. 1908.

This is one of the pink-flowered species of *Heteropterys,* which form a difficult complex in Mexico and Central America. It differs from other Central American pink-flowered species in the following combination of characters: Vegetative leaves soon glabrate; inflorescences usually produced on stems lacking vegetative leaves, loosely tomentose or appressed-tomentose, gradually glabrescent in a patchy manner; nut of samara smooth-sided, quite without crests or winglets. See my forthcoming treatment in the Flora de Nicaragua for a longer description.

SPECIMENS STUDIED. GUATEMALA. El Progreso: Sierra de Las Minas, dry barranca of Río Frio, between Tulumajillo and Finca Montañita in foothills, 330–500 m, Feb fl/fr, *Steyermark 43351* (F, NY).—EL SALVADOR. La Unión: Vicinity of La Unión, dry thicket, 150 m or less, Feb fl, *Standley 20653* (NY). San Vicente, vicinity of San Vicente: In quebrada, 350–500 m, Mar fr, *Standley 21663* (NY, isotype; US, holotype); dry brushy hillside, 400–500 m, Feb fl, *Standley & Padilla 3476* (F). Santa Ana: Vicinity of Metapán, 370 m, dry brushy rocky hillside, Jan/Feb fl/fr, *Standley & Padilla 3055 & 3208* (both F).—HONDURAS. Choluteca: Rocky area, near Río Pespire, 38 m, Feb fl, *Williams & Molina 15570* (F). Morazán: Between San Buenaventura and El Sauce, area of pines, 1300 m, Feb fl, *Williams & Molina 15575* (F).—NICARAGUA. Matagalpa: E of Puertas Viejas, 400–500 m, Feb fl/fr, *Moreno 20100* (MICH) & *20111* (MO). Managua: 20 km NE of Tipitapa, 60 m, Sep ster, *Danin 76-16-13* (MICH). Masaya, Parque Nacional Volcán Masaya: NW sector of caldera, dry forest on lava flow, 300 m, Jan fl, *Neill 3135E* (MICH, MO); NE side of El Comalito, deciduous forest on lava, 325 m, Feb fl/fr, *Stevens 6269* (MICH).

Janusia christianeae W. Anderson, sp. nov. Fig. 9.

Planta volubilis, caulibus primo aureosericeis mox albotomentosis demum glabratis. Foliorum majorum lamina 4.5–6 cm longa, 2.2–3 cm lata, ovata vel paene elliptica, basi rotundata vel subcordata, apice obtusa, acuta, vel parum acuminata et saepe mucronata, supra tomentosa mox glabrata reticulo prominenti, subtus dense et pertinaciter subsericea vel appresso-tomentosa; petiolus 3–10 mm longus. Flores omnes chasmogami, in umbellis axillaribus 4-floris portati, bracteis 3.5–5.5 mm longis et deciduis, pedunculo 8–15 mm longo, bracteolis 3–5 mm longis, subulatis vel linearibus, prope medium pedunculi portatis, plerumque ante vel per anthesin deciduis, pedicello 9–13 mm longo. Sepala abaxialiter dense sericea pilis rufo-aureis praeter zonam marginalem albotomentosam. Petala gla-

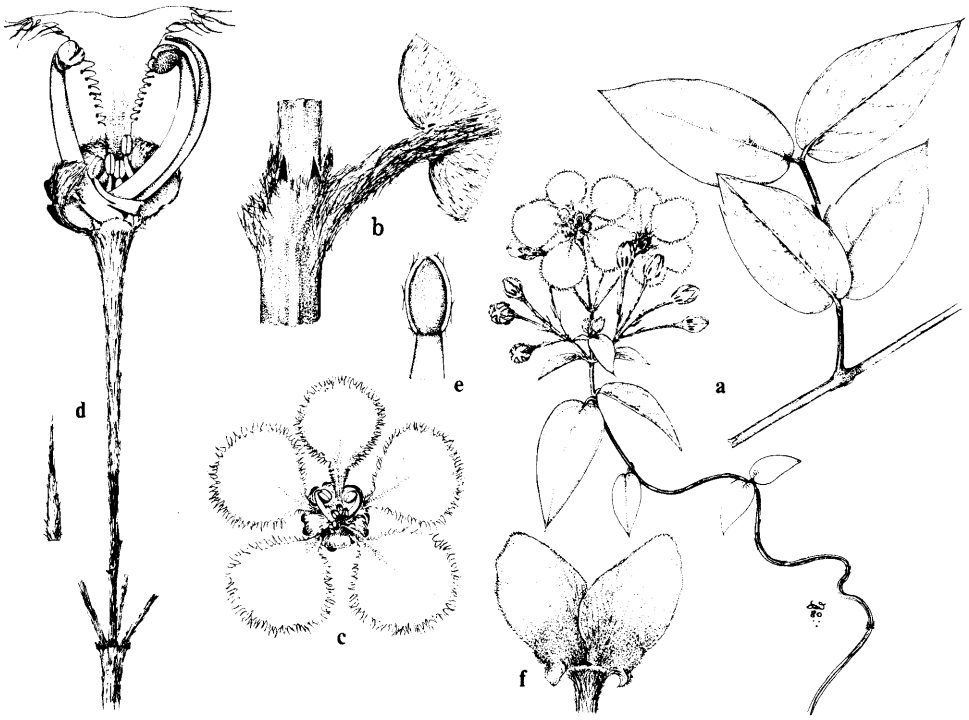

FIG. 9. *Janusia christianeae.* a) flowering branch and large leaves, ×0.5; b) base of leaf and node, ×5; c) flower, oblique-anterior view, ×1; d) right-handed flower, anterior view, with 2 sepals and 4 lateral petals removed, ×2.5, and deciduous bracteole to left, ×5; e) anther, abaxial side, ×5; f) immature fruit with only 2 samaras enlarging, sepals removed, ×1.5. Drawn by Karin Douthit, a–e from *Anderson et al. 36829,* f from *Hatschbach 42315.*

bra, laciniata, 4 lateralia ungue 2–3 mm longo, limbo 12–14 mm longo latoque et eglanduloso, posticum ungue 5 mm longo, limbo 10 mm longo, 11 mm lato, basi glandulifero. Stamina 6, valde heteromorpha, anticum et 1 antico-laterale maxima et valde arcuata, alterum antico-laterale et 3 postica minima; antherae sericeae vel pilosae, connectivo eglanduloso. Stylus 1, excentricus, cum stamine magno antico-laterali arcuatus. Samara immatura basi brevirostrata.

Vine twining in shrubs; stems initially densely sericeous with an overstory of golden hairs and an understory of white hairs, soon becoming tomentose as outer hairs fall and inner hairs spread, eventually glabrate and dark red or purplish, finally brown and lenticellate. Lamina of larger leaves 4.5–6 cm long, 2.2–3 cm wide, ovate to almost elliptical, rounded or slightly cordate at base, obtuse, acute, or slightly acuminate and often mucronate at apex, initially tomentose above but soon glabrate with some hairs often persistent proximally on midrib, densely and persistently subsericeous or appressed-tomentose below with the long, fine, stramineous hairs subsessile or short-stalked, straight or sinuous, appressed or somewhat spreading, the lateral veins and reticulum prominent above; petiole 3–10 mm long, densely and persistently sericeous or tomentose, bearing at or just above or below apex 2 sessile or subsessile disciform glands 0.5–0.8 mm in diameter, these sometimes on base of lamina just above apex of petiole; stipules 0.5–1 mm long, narrowly triangular or subulate, borne on stem at base of petiole. Flowers all chasmogamous, borne in 4-flowered umbels, the umbels mostly axil-

lary and single, subsessile or raised on a common stalk up to 13 mm long and usually bearing 2 bracts or small leaves; floriferous bracts [subtending floriferous peduncles] 3.5–5.5 mm long, narrowly triangular, loosely sericeous, deciduous before or during anthesis; peduncle 8–15 mm long (–23 mm in fruit), 0.4–0.6 mm in diameter, white-tomentose; bracteoles 3–5 mm long, subulate or linear, loosely sericeous, borne near middle of peduncle, mostly at different heights, somewhat spreading, mostly deciduous before or during anthesis; pedicel 9–13 mm long, proximally slender like peduncle but distally enlarged and often 2–3 mm in diameter at apex, proximally white-tomentose or -sericeous, distally golden-sericeous. Flowers ca 35 mm in diameter. Sepals 5–5.3 mm long, 3–3.3 mm wide, quite distinct, ovate, obtuse at apex, strongly incurved or inrolled in anthesis, abaxially densely and persistently sericeous with the hairs reddish golden except for a marginal band of white hairs, adaxially finely white-sericeous in proximal half and glabrous in distal half, the anterior eglandular or bearing 1 or 2 glands smaller than those of lateral sepals, the lateral 4 biglandular, the glands 3–3.5 mm long, 1.1–1.5 mm wide, narrowly elliptical, attached their whole length, separated (i.e., not compressed). Petals orange-yellow, glabrous, deeply laciniate or fimbriate-laciniate, eglandular except for gland-tipped divisions on base of limb and claw of posterior petal; 4 lateral petals widely spreading, the claw 2–3 mm long, the limb flat or slightly concave, roughly circular except for the broadly cuneate base, 12–14 mm long and wide; posterior petal with the thick, winged claw erect, 5 mm long, the limb reflexed, subcircular, 10 mm long, 11 mm wide. Stamens 6, 5 opposite sepals and designated like sepals as anterior (1), anterior-lateral (2), and posterior-lateral (2), plus 1 posterior, opposite posterior petal, all with glabrous and quite distinct filaments and all fertile (or at least antheriferous), but dramatically heteromorphic, with 2 very large and the other 4 very small; anterior stamen and 1 of the anterior-lateral stamens large, the filaments very thick (1 mm in diameter at base), ca 8 mm long, strongly bowed, that of the anterior-lateral stamen bent diagonally across flower to ascend between lateral sepals and in front of a posterior-lateral petal; filament of anterior stamen bent in front of the other large stamen, across flower to arise in front of the other posterior-lateral petal; anthers of large stamens 1.7–1.8 mm long, reflexed and bent sideways so that pollen is presented toward center of flower, the locules densely sericeous and containing much pollen, the ovate connective not exceeding locules and without an apical gland; 4 small stamens displayed in center of flower between tips of sepals, with slender filaments 0.5 mm in diameter at base and 0.2–0.3 mm at apex and anthers 0.7–1 mm long, ± reflexed, the short locules containing some pollen (but indehiscent?) and somewhat pilose, the connective mostly exceeding locules and acute but without an apical gland; small anterior-lateral stamen with filament 3.5 mm long and bent in same direction as large adjacent anterior stamen; other small stamens in a posterior group, all leaning forward toward anterior sepal, the posterior-lateral 2 with filaments ca 2.5 mm long, the posterior 1 with filament ca 1.5 mm long. Carpels 3, 1 anterior and 2 posterior, hairy; style 1, borne on anterior carpel, glabrous, stout (ca 0.8 mm in diameter at base), ca 10 mm long, strongly bowed, bent to 1 side, curving with (outside of) filament of large anterior-lateral stamen, tapering to a pointed apex with the small, flat, elliptical stigma displaced to 1 side so that it points upward, away from the adjacent anther. See notes below for discussion of floral symmetry. Samaras separating from a low, rounded or obscurely 3-sided torus ca 1 mm high; very immature samara loosely sericeous with the proximal hairs white and the distal ones golden;

nut without crests radiating from areole; lateral winglets restricted to base of nut, connate, forming a flattened decurved apparent extension of nut ("rostrum") 2 mm long and 1 mm wide; cartilaginous carpophore extending from receptacle down line of fusion of lateral winglets; full-sized samaras not seen.

TYPE: BRAZIL. Bahia: Mpio Cristopolis, Eng° Velho, cerrado, 800 m, 17 Jul 1979 fl/imm fr, *Hatschbach 42315* (MBM, holotype; MICH, isotype).

PARATYPES: BRAZIL. Bahia: Espigão Mestre, ca 100 km WSW of Barreiras, brushy cerrado, 750–800 m, Mar fl, *Anderson et al. 36829* (UB); BR–020, 100 km W of Barreiras, caatinga, Oct fl, *Hatschbach 45010* (MICH).

I am pleased to dedicate this handsome and distinctive species to a fine taxonomist, Christiane Eva Seidenschnur Anderson. *Janusia christianeae* is related to several other species that have more or less heteromorphic stamens and a style that curves right or left. Of those, *Janusia anisandra, J. caudata,* and *J. malmeana* have androecia similar to that of *J. christianeae* but are immediately set off by their advanced inflorescences, in which the ancestral four-flowered umbel has been reduced mostly to a single flower subtended by several bracts; *J. anisandra* differs further in having tomentose leaves, and the other two in having sessile pedicels. In *J. hexandra* and *J. occhionii* the flowers are pedunculate and borne in umbels as in *J. christianeae,* but the androecium has the posterior-lateral stamens larger than both the anterior-lateral ones; moreover, the bracts are short and persistent, the bracteoles are short, apical, and persistent, and the anthers bear an apical gland.

As Figure 9 shows, the flower in this species gives an impression of bilateral symmetry that is probably acceptable to a bee, but a botanist sees it as irregular, not symmetrical about a plane of symmetry passing through the anterior sepal and posterior petal, as is usual in the family. Not only are the style and anterior stamen strongly displaced sideways, but the two anterior-lateral stamens are very dissimilar. The flower shown in Figure 9 is right-handed, i.e., the style bends to the right as one faces the posterior petal. The same plants also make left-handed flowers, in which 1) the style bends to the left; 2) the large anterior stamen bends to the right; 3) the other large stamen is the anterior-lateral one to the right of the anterior stamen, and bends to the left; and 4) the anterior-lateral stamen to the left of the large anterior stamen is small and bends to the right with the anterior one. Right- and left-handed flowers are mirror-images of each other, and in the few cases studied two flowers in each umbel of four were right-handed and two left-handed, with opposite members of each pair mirror-images. However, I need to examine much more material before I can say with confidence that the distribution is consistent.

Janusia hexandra (Vell.) W. Anderson, comb. nov.

Banisteria hexandra Vell., Fl. Flum. 188 [text]. 1825 [1829]; vol. 4 pl. 149 [icones]. 1831.

In both the text and the plate Vellozo described this plant as having six stamens and one female part [i.e., one style]. Since his plant was clearly not a *Camarea,* it must have been a *Janusia* (*Schwannia* in the sense of Jussieu and Niedenzu). The habitat given was maritime forests, presumably in the area of Rio de Janeiro. The only species of *Janusia* found in that habitat, or indeed anywhere in the area of Rio, is *J. muricata* (Adr. Juss.) Grisebach [*Schwannia muricata*

(Adr. Juss.) Adr. Juss., based on *Fimbriaria muricata* Adr. Juss., 1840]. The characters that can be gleaned from Vellozo's brief description and crude drawing fit *J. muricata* well. The leaf shape is acceptable, the flowers are in umbels, and the petals are "dentate," a reasonable approximation to the actual condition, which is fimbriate. Especially significant are the petiole glands, which are knobby and often borne below the apex, as in *J. muricata.* Finally, I am intrigued by Vellozo's statement that the petiole is biglandular "hinc, et illinc." "Hinc . . . illinc" usually means "on one side . . . on the other," but in this case the author may have meant at both ends, referring to the glandular enlargement of the stipules that is common in *J. muricata.* The identity of Vellozo's plant seems clear, and I see no alternative to adopting his name in place of the later epithet *muricata.*

Janusia occhionii W. Anderson, sp. nov. Fig. 10.

Planta volubilis lignosa, caulibus laxe sericeis vel appresso-tomentosis demum glabratis. Foliorum majorum lamina 4.5–7 (–10) cm longa, 2.6–4.2 (–5.3) cm lata, plerumque ovata, basi rotundata vel subcordata, apice rotundata vel obtusa et plerumque mucronata vel brevicuspidata, supra mox glabrata, subtus dense et pertinaciter laxe sericea vel tomentosa et basi juxta costam biglandulosa; petiolus 6–11 mm longus; stipulae 1–1.5 mm longae, triangulares. Flores omnes chasmogami, in umbellis axillaribus 4-floris portati, bracteis 1.3–2.5 mm longis persistentibusque, bracteolis 1–2 mm longis, apicalibus, persistentibus. Petala glabra vel in ungue sericea, dentata, laciniata, vel brevifimbriata, 4 lateralia ungue 2–3 mm longo, limbo 7.5–9 mm longo, 7.5–10 mm lato, posticum ungue alato 6 mm longo et glanduloso-fimbriato, limbo 6 mm longo, 7–8.5 mm lato. Stamina 6, heteromorpha, anticum et 2 postico-lateralia filamentis longioribus arcuatisque, posticum et 2 antico-lateralia filamentis brevioribus subrectisque; antherae pilosae, connectivo glanduloso. Stylus 1, excentricus, valde arcuatus. Samara basi rostrata rostro 2–3.5 mm longo, 1.5–3 mm lato.

Woody vine twining in shrubs, or forming a shrub when nothing is available to climb on; stems densely but loosely sericeous or appressed-tomentose with somewhat spreading hairs, eventually glabrate, purplish, lenticellate. Lamina of larger leaves 4.5–7 (–10) cm long, 2.6–4.2 (–5.3) cm wide, ovate or occasionally elliptical, rounded or subcordate at base, rounded or obtuse and mostly mucronate or short-cuspidate at apex, initially loosely sericeous above but soon glabrate with some hairs usually persistent proximally on midrib, densely and persistently loosely sericeous to tomentose below with the long, fine, stramineous or white hairs subsessile or short-stalked, straight or sinuous to strongly twisted and appressed to strongly spreading, bearing below at base beside midrib 2 sessile or subsessile disciform or cupshaped glands 0.6–1.2 mm in diameter, the reticulum prominulous above, the lateral veins prominent below; petiole 6–11 mm long, densely and persistently subsericeous or tomentose, eglandular; stipules 1–1.5 mm long, triangular, borne on stem between petioles, thick, persistent. Flowers all chasmogamous, borne in 4-flowered umbels, the umbels axillary to full-sized or smaller leaves, raised on a stalk (5–) 10–25 mm long and bearing at its apex 2 much-reduced leaves ("bracts") bearing 2 abaxial glands, these bracts often deciduous, the umbels single or occasionally 2 (1 above the other) in the same axil; inflorescence with vesture like that of stems; floriferous bracts [subtending floriferous peduncles] 1.3–2.5 mm long, ovate, abaxially sericeous, adaxially glabrous, persistent; peduncle 3–10 mm long (–15 mm in fruit), often of 2 lengths in the

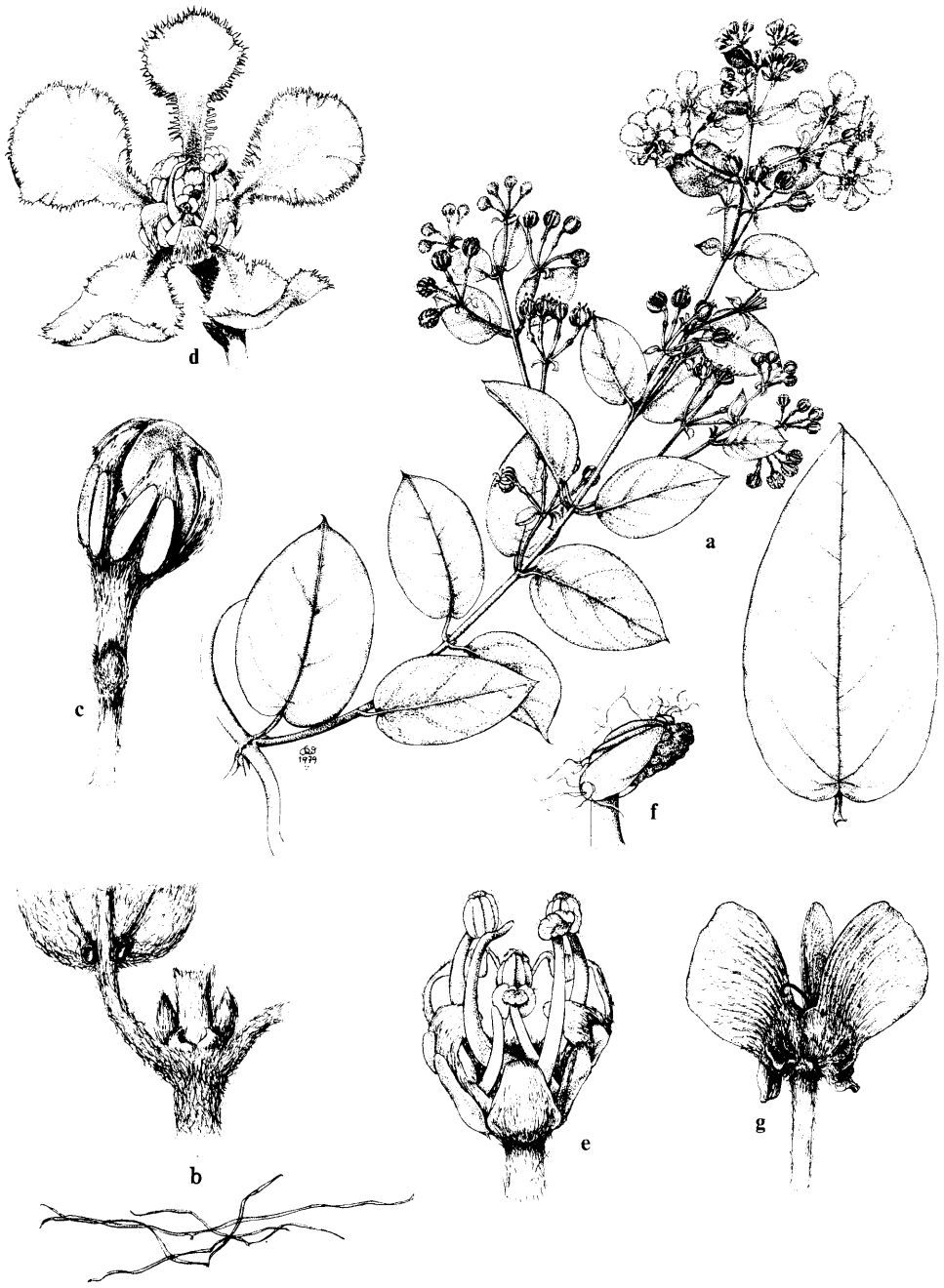

FIG. 10. *Janusia occhionii*. a) flowering branch and large leaf, ×0.5; b) base of leaf and node, ×2.5, with enlarged hairs from abaxial surface of lamina, ×25; c) flower bud, ×3.5; d) left-handed flower, oblique-anterior view, ×2; e) flower, anterior view, petals removed, ×4; f) anther, side view, ×15; g) fruit, anterior samara in middle, sepals removed, ×1.5. Drawn by Karin Douthit from *Anderson 11151* except large leaf, from *Hatschbach 21590*.

same umbel; bracteoles like bracts but 1–2 mm long, apical, persistent; pedicel 3–7 mm long, slightly thickened distally. Flowers 22–25 mm in diameter. Sepals 4.5–5 mm long, 2–2.5 mm wide, quite distinct, narrowly ovate, obtuse or acute at apex, strongly incurved or inrolled in anthesis, abaxially densely and persistently sericeous with the hairs stramineous except white just on the membranous margin, adaxially densely white-sericeous in proximal ½–⅔ and glabrous distally, the anterior eglandular, the lateral 4 biglandular, the glands 3–4 mm long, 0.7–1 mm wide, narrowly elliptical, attached their whole length, separated (i.e., not compressed). Petals orange-yellow, glabrous except loosely white-sericeous on claw of posterior petal and rarely on claws of lateral petals, dentate or laciniate to short-fimbriate, eglandular except for gland-tipped processes on winged claw of posterior petal, widely spreading and ± flat or the anterior 2 with limbs cupped upward; 4 lateral petals with the claw 2–3 mm long, the limb oblate or obovate or roughly circular except for the broadly cuneate base, 7.5–9 mm long, 7.5–10 mm wide; posterior petal with the thick, distally winged claw 6 mm long, the limb oblate, 6 mm long, 7–8.5 mm wide. Stamens 6, 5 opposite sepals and designated like sepals as anterior (1), anterior-lateral (2), and posterior-lateral (2), plus 1 posterior, opposite posterior petal, all with glabrous and quite distinct filaments and all fertile but heteromorphic, generally 3 long and 3 short; anterior stamen long, the filament thick (ca 0.7 mm in diameter at base), 5.5–6 mm long, bent to left or right to raise anther in front of 1 of the adjacent anterior-lateral petals, distally bowed; 2 anterior-lateral stamens short, with slender filaments (ca 0.4 mm in diameter at base), 3–4 mm long, alike or the 1 from which the anterior bends away longer, straight or slightly bowed, both leaning sideways toward center of flower to present anthers ± on midline between anterior sepal and posterior petal; 2 posterior-lateral stamens long, the filament thick like the anterior and about as long or slightly shorter, (4.5–) 5–5.5 mm long, alike or the 1 on same side as the anterior longer, leaning sideways to raise anther in front of the adjacent posterior-lateral petal, distally bowed; posterior stamen short, similar to the anterior-lateral 2, the filament 2.5–3 mm long, straight, leaning forward on midline toward anterior sepal; anthers alike or subequal, borne reflexed on long filaments and erect or reflexed on short filaments, 1–1.4 mm long, moderately to densely spreading-pilose on locules, the connective distally enlarged into a spherical or hemispherical dark red gland usually extending beyond locules. Carpels 3, 1 anterior and 2 posterior, hairy; style 1, borne on anterior carpel, glabrous, stout, ca 6 mm long, leaning to right or left (away from anterior stamen) to stand in front of the other anterior-lateral petal, strongly bowed and bent ca 90° near apex, the small apical stigma held in center of flower between anthers of the 3 long stamens. See notes below for discussion of floral symmetry. Samaras separating from a short pyramidal torus ca 2 mm high; samara 15–20 mm long, sericeous on nut and proximally on wing; dorsal wing 11–14 mm long, 6–8 mm wide, with a rounded or triangular projection 0.5–2 mm high at adaxial base; nut ca 2–3 mm high, 2.5–4 mm long, bearing several parallel ribs, low crests, or dissected outgrowths 0.2–0.8 mm high radiating from areole; lateral winglets restricted to base of nut, connate, forming a straight or decurved apparent extension of nut ("rostrum") 2–3.5 mm long and 1.5–3 mm wide; cartilaginous carpophore well developed and functional, extending from receptacle down line of fusion of lateral winglets. Chromosome number: $n = 20$ (counted in *Anderson 11151* and *11175*).

TYPE: BRAZIL. Mato Grosso do Sul: 65 km by road S of Naviraí, shrubby secondary growth at edge of forest, 23 Mar 1974 fl/fr, *Anderson 11175* (UB, holotype; MICH, NY, isotypes).

PARATYPES: BRAZIL. Paraná: Fazenda Lagôa, ca 20 km N of Cianorte, dense cerrado on sandy soil, Mar fl/fr, *Anderson 11151* (MICH, NY); Mpio Campo Mourão, airport road, cerrado, 625 m, Feb fl/fr, *Hatschbach 8852* (MBM, MICH, NY, P, US); Mpio Cianorte, Fazenda Lagôa, cerrado, Apr fl/fr, *Hatschbach 14253* (F, MBM, MICH, NY, P, US), May fl/fr, *Hatschbach 21590* (MBM, MICH, P); Sabauldia, cerrado, *R. Hertel s.n.* in 1946 (P); Fazenda Lagôa, S of Rio Ivaí, ca 15 km E of São Tomé, cerrado, reddish sand, 240 m, Apr fl/fr, *Lindeman & Haas 979* (MBM, NY, US). Mato Grosso do Sul: Mpio Iguatemi, Rio Piraí, woodland with sandy soil, Dec fl, *Hatschbach 45853* (MICH); vicinity of Sapucaia, edge of low forest with sandy soil, Feb fl, *Hatschbach 46204* (MICH).—PARAGUAY. Amambay: Parque Nacional Cerro Cora, roadside secondary growth, 175 m, Mar fl, *Simonis et al. 114* (MICH).

The epithet of *Janusia occhionii* honors Dr. Paulo Occhioni, Professor of Botany at the Universidade Federal do Rio de Janeiro. For many years Professor Occhioni has advanced systematic botany in Brazil through teaching, collecting, encouraging students, and publishing the journal LEANDRA. He has been a gracious host to many visiting botanists, including me, and I am happy to express my gratitude to a fine gentleman and good friend.

Janusia occhionii is a member of the group of species discussed above under *J. christianeae,* which see. It is most closely related to *J. hexandra,* a species of the vicinity of Rio de Janeiro and coastal areas north of there into Bahia. *Janusia hexandra* differs from *J. occhionii* most obviously in its leaves, which are usually cuneate at the base and always very tightly sericeous below with the fine hairs sessile, straight, strongly appressed, and parallel. This tendency toward finer appressed vesture is also evident on the petioles, stems, and inflorescence axes. The petals of *J. hexandra* are smaller and more deeply fimbriate than in *J. occhionii,* its short-stalked leaf glands are often on the petiole instead of the base of the lamina, and its stipules often enlarge into flattened glandular masses in age.

The flowers of *Janusia occhionii* are less irregular than those of *J. christianeae.* In this species the four lateral stamens usually maintain bilateral symmetry as two mirror-image pairs, a short anterior pair and a longer posterior pair. Occasional flowers have the members of those pairs unequal, but the general pattern remains nearly symmetrical. The posterior stamen is unpaired but lies on the plane of symmetry. The irregularity stems from the fact that the unpaired anterior stamen bends to the left or right, out of the plane of symmetry, and the style bends the other way. Right- and left-handed flowers occur in the same umbels.

Janusia prancei W. Anderson, sp. nov. Fig. 11.

Planta volubilis ramis sericeis demum lignosis. Foliorum majorum lamina 6–11 (–13) cm longa, 3–5.5 cm lata, plerumque elliptica, basi truncata, rotundata, vel subcordata, apice obtusa, rotundata, vel emarginata et plerumque mucronata, supra glabrescens, subtus pertinaciter sericea et basi juxta costam biglandulosa; petiolus (5–) 7–12 mm longus, eglandulosus. Flores omnes chasmogami, zygomorphi, in umbellis axillaribus 4-floris portati; umbella 2 bracteis biglandulosis subtenta; pedunculus florifer nullus; pedicellus 4–7 mm longus. Petala aurantiaca, glabra, unguibus integris, limbis fimbriato-laciniatis. Stamina 6; filamenta sepalis opposita 5–7 mm longa, petalo postico oppositum 3–4 mm longum; antherae 1–1.5 mm longae, tomentosae. Stylus 1, 6–7.5 mm longus, arcuatus et apice abrupte flexus, stigmate laterali ellipticoque. Samarae erectae parallelaeque; nux lateribus laevis basi rotundata erostrata.

Twining vine with the older stems becoming woody, or a shrub when nothing is available to climb on; stems densely and tightly sericeous, only the woody older

FIG. 11. *Janusia prancei.* a) habit, ×0.5, with adaxial surface of lamina enlarged, ×6; b) base of leaf and node, ×1.5; c) umbel in bud, ×2.5; d) flower, oblique-anterior view, ×1.5; e) flower, side view, cut away to show androecium, with claw of posterior petal to right, ×2.5; f) same as e, but with 2 lateral stamens removed to show style, ×2.5; g) anther, abaxial side, ×10; h) stigma, ×10; i) immature fruit, anterior view, and separate anterior samara, ×2.5. Drawn by Karin Douthit, a–c and i from *Prance 13770,* d–h from *Anderson 12334.*

stems glabrescent. Lamina of larger leaves 6–11 (–13) cm long, 3–5.5 cm wide, elliptical or slightly ovate, truncate, rounded, or subcordate at base, obtuse, rounded, or emarginate and usually mucronate at apex, initially sericeous above but soon glabrescent with some hairs usually persistent at least proximally, densely and persistently sericeous below with the long fine hairs generally straight and appressed but with some sinuous and/or spreading to give a somewhat loose overall effect, this becoming more marked in older leaves, bearing below at or just above base against midrib 2 flat sessile elliptical glands ca 2 mm long and 0.7–1 mm wide, the lateral veins and reticulum prominent above, the lateral veins prominent below; petiole (5–) 7–12 mm long, densely and persistently sericeous, eglandular; stipules 0.5–1 mm long, triangular, borne on stem beside petioles. Flowers all chasmogamous, borne in 4-flowered umbels, the umbels axillary to reduced leaves that are smaller at successive nodes and may be only "bracts" distally, mostly 2–3 per axil in a vertical rank with the oldest adaxial, raised on a stalk (3–) 7–25 mm long and bearing at its apex 2 persistent much-reduced leaves ("bracts") bearing 2 large abaxial glands; inflorescence with vesture like that of stems; floriferous bracts and bracteoles 1–2.5 mm long, triangular or ovate, abaxially sericeous, adaxially glabrous, stiff and erect, persistent; peduncle absent, the bract and 2 bracteoles together below pedicel; pedicel 4–7 mm long (–9 mm in fruit), somewhat thickened distally. Flowers ca 24–28 mm in diameter. Sepals 3.5–5 mm long, 2–2.9 mm wide, the anterior narrower than the lateral 4, all 5 distinct nearly to base, ovate, obtuse or acute at apex, abaxially densely and persistently sericeous with the hairs stramineous except for a narrow marginal white-tomentose zone, adaxially thinly white-sericeous in proximal ½ and glabrous distally, the anterior eglandular or rarely biglandular and ± erect, the lateral 4 biglandular and strongly incurved or inrolled in anthesis, the glands 2.2–2.8 mm long, 1–1.4 mm wide, elliptical, attached their whole length, slightly separated (i.e., not compressed). Petals orange-yellow, glabrous, fimbriate-laciniate and eglandular or the divisions at base of limb slightly glandular-thickened, the limb of the anterior-lateral 2 bent upward in distal ½ and the limb of the posterior often reflexed in distal ½, all with the claw entire; anterior-lateral petals with the claw 4.5–6 mm long, posterior-lateral petals with the claw 3–3.5 mm long, all 4 lateral petals with the limb oblate or obovate or roughly circular, 7–11 mm long, 8–12 mm wide; posterior petal with the thick claw 3–3.5 mm long, the limb roughly circular except for the broadly cuneate base, 7.5–10 mm long, 7.5–11 mm wide. Stamens 6, 5 opposite sepals plus 1 opposite posterior petal, all fertile; filaments glabrous, the anterior 3 free, the posterior 3 connate in proximal 1–2 mm and swollen at base, all crowded around style and curved downward toward anterior sepal and then upward, the posterior notably shorter than the 5 opposite sepals (anterior 6–7 mm long, anterior-laterals 5.5–6.5 mm long, posterior-laterals 5–6 mm long, posterior 3–4 mm long); anthers alike or subequal, 1–1.5 mm long, densely spreading-tomentose on locules, the connective not or only slightly exceeding locules, sometimes reddish but not enlarged or glandular. Carpels 3, 1 anterior and 2 posterior, hairy; style 1, borne on anterior carpel, 6–7.5 mm long, glabrous, stout, lying in plane of symmetry of flower, curved downward toward anterior sepal and then upward, bent abruptly upward at apex (often nearly 90°), the elliptical stigma displaced to 1 side so that it points outward away from the subtending cluster of 5 longer stamens. Samaras developing with their wings erect and parallel, the anterior samara and 1 posterior with the adaxial edge of the wing pointed in 1 direction and the other posterior samara between them and oriented

at 180° to them, separating from a low rounded torus ca 1.5 mm high; samara ca 20 mm long, sericeous on nut and proximally on wing; dorsal wing ca 17 mm long, 7–8 mm wide, with a rounded projection 1.5–2 mm high at adaxial base; nut ca 2.5 mm high, ca 3.5 mm long, globose, quite smooth on the sides, rounded at the base, without any obvious "rostrum," the lateral winglets represented by a vestigial horizontal flange ca 1 mm long and wide at base of dorsal wing, conduplicate and only with difficulty distinguishable from the dorsal wing; cartilaginous carpophore well developed and functional, extending from receptacle around base of nut and along apparent base of dorsal wing, actually the vestige of lateral winglets. Chromosome number: $n = 20$ (counted in *Anderson 12334*).

TYPE: BRAZIL. Amazônas: Fortaleza Savanna, Rio Puciari, tributary of Rio Ituxi, 20 km above mouth, 29 Jun 1971 fl/imm fr, *Prance et al. 13770* (INPA, holotype; MG, MICH, NY, isotypes).

PARATYPES: BRAZIL. Amazônas, Mpio Humaitá, on hummocks in periodically flooded savannahs SW of Humaitá along road to Pôrto Velho and W of Humaitá along road to Lábrea, ca 50 m: Apr fl, *Anderson 12334* (INPA, MICH, NY); Jun fl, *Ducke* [RB 35609] (MICH, RB); May fl, *Gottsberger & Morawetz 17–5575* (MICH); May fl, *Janssen & Gemtchujnicov 356* (INPA, MICH) and *390* (INPA); Apr fl, *Monteiro & Ramos 858* (INPA); May fl, *Teixeira et al. 286* (MICH); Jun fl, *Teixeira et al. 1054, 1097, 1278* (all MICH); May fl, *Traill 94* (K). Rondônia, vicinity of Pôrto Velho: May fl, *Black & Cordeiro 52–14468* (IAN); Aug fl/imm fr, *Monteiro* [INPA 50856] (INPA); Aug fl, *Rosa 480* (MICH).

Janusia prancei is named for Ghillean T. Prance, foremost among modern plant collectors in Amazonian Brazil. Its flowers are bilaterally symmetrical, which excludes a close relationship with the three species treated above and their relatives. The species that seems to be most clearly related to *J. prancei* is *J. mediterranea* (Vell.) W. Anderson; they are especially notable for sharing two derived character-states, samaras that are held erect and oriented parallel to each other and samaras with the nut rounded at the base ("erostrate"). *Janusia mediterranea* differs from *J. prancei* in many characters, including wider and more tomentose leaves with usually glanduliferous petioles, umbels not subtended by glanduliferous bracts, well-developed peduncles, and hairy pink-and-white petals with fimbriate claws. *Janusia mediterranea* is a rather isolated species, and *J. prancei* serves as a valuable link tying it firmly to the rest of the genus.

Malpighia emiliae W. Anderson, sp. nov. Fig. 12.

Frutex 1–2 m altus, ramulis junioribus velutinis. Foliorum majorum lamina 3–6 (–7) cm longa, 1.6–3 (–4) cm lata, ovata vel elliptica, utrinque pertinaciter velutina vel subtus subsericea. Umbella 2-flora; bracteae 0.5–1.3 mm longae; pedunculus florifer 1–5 mm longus; bracteolae 0.3–0.7 mm longae; pedicellus 6–12 mm longus, vix 0.6 mm diametro superans. Sepala abaxialiter sericea, 8–10-glandulifera. Petala rosea, abaxialiter alata ala 0.8–1.5 mm lata et sericea. Styli 2.8–3 mm longi, ± recti, subaequales, apice dorsaliter rotundati stigmatibus terminalibus vel parum internis. Fructus pyrena sine alis lateralibus dorsalive.

Shrub 1–2 m tall; young stems velutinous, the hairs V-shaped. Lamina of larger leaves 3–6 (–7) cm long, 1.6–3 (–4) cm wide, 1.5–2.5 times as long as wide, ovate or elliptical, obtuse or rounded at base, sometimes rounded but mostly obtuse, acute, or slightly acuminate at apex, biglandular below near base, persistently velutinous on both sides or subsericeous below with all hairs fine, white, V-shaped with straight arms, those below with the arms longer and often widely spread, approaching subappressed; petiole 2–3 mm long, velutinous; stipules 0.3–1 mm

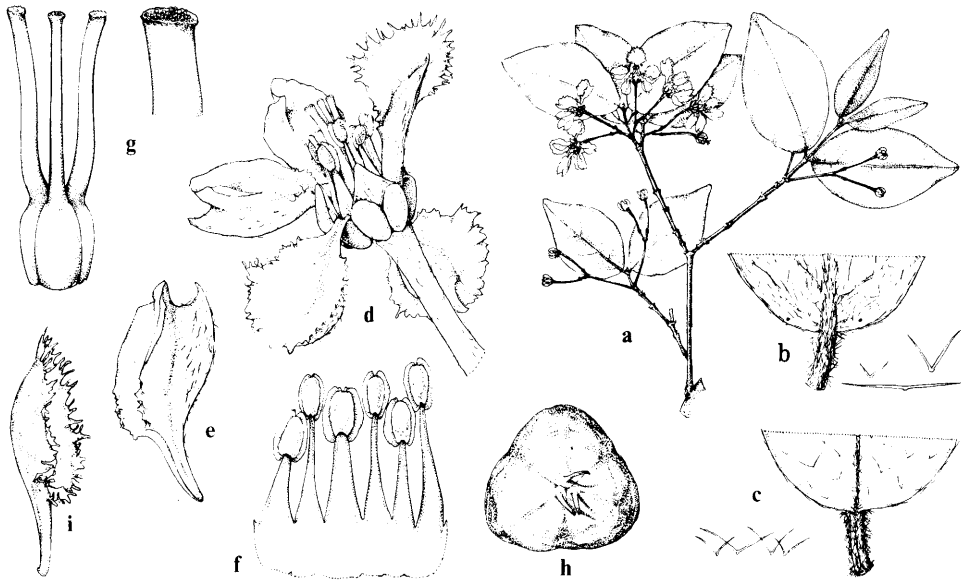

FIG. 12. *Malpighia emiliae* and *M. diversifolia*. a–h, *M. emiliae:* a) habit, ×0.5; b) abaxial surface of lamina, ×2.5, with enlarged hairs, ×15; c) adaxial surface of lamina, ×2.5, with enlarged hairs, ×15; d) flower, side view with posterior petal erect and turned to show its abaxial side, ×3.5; e) lateral petal, side view, ×4; f) partial androecium, laid out, abaxial view, the stamen at left opposite posterior petal, ×7.5; g) gynoecium, anterior style in middle, ×7.5, with apex of 1 style to right, ×25; h) fruit, viewed from above, ×1.5. i, *M. diversifolia,* lateral petal, side view, ×4. Drawn by Karin Douthit, a–g from *Lott 1658,* h from *Lott 1683,* i from *Brandegee s.n.* [UC 187362].

long, distinct, subsericeous. Inflorescence velutinous; umbel raised on a stalk 1–20 mm long, containing 2 flowers; bracts 0.5–1.3 mm long; peduncle 1–5 mm long; bracteoles 0.3–0.7 mm long; pedicel 6–12 mm long, not inflated distally, hardly exceeding 0.6 mm in diameter (dried), velutinous or subsericeous to glabrate. Sepals 1–2 mm long beyond glands, abaxially sericeous, adaxially glabrous, bearing 8–10 glands 1.5–2 mm long, those of the anterior sepal often reduced or partially to completely fused with neighboring glands. Petals pink, all with prominent abaxial wings and loosely sericeous on the wing; lateral petals with the claw 2–2.5 mm long, widening gradually into the limb ca 4.5 mm long and wide, entire distally or erose or dentate proximally or all around the margin, the abaxial wing 1.3–1.5 mm wide, often hookshaped, extending upward nearly or quite as far as apex of limb or even beyond; posterior petal with the claw ca 3.5 mm long, widening gradually into the limb 4.5 mm long and 4.5–5 mm wide, irregularly laciniate, the abaxial wing 0.8–1 mm wide, triangular, only about half as long as limb. Filaments 1.5–3 mm long, ± straight, connate basally, shortest opposite posterior petal, longest opposite anterior sepal, slightly thicker opposite posterior-lateral petals; anthers 0.8–1.2 mm long, largest opposite posterior-lateral petals, all with swollen connectives. Ovary glabrous, the carpels completely connate; styles 2.8–3 mm long, clearly exceeding anthers in anthesis, slender, straight or the posterior 2 slightly and subtly lyrate, subequal but the anterior usually slightly shorter and slenderer, dorsally rounded at apex with the stigma slightly internal to terminal. Fruit reddish at maturity, 12–14 mm wide and 7–10 mm high (dried), strongly 3-lobed or 3-angled, the pyrenes held in a common flesh at maturity; pyrene endocarp with many fibrous extensions into flesh, but without recognizable lateral or dorsal wings.

TYPE: MEXICO. Jalisco: Mpio La Huerta, Estación de Biología Chamela (UNAM), 19°30'N, 105°03'W, 6.8 km al E de la carretera Barra de Navidad–Puerto Vallarta, viejo camino a Nacastillo, selva baja caducifolia con *Croton, Jatropha, Coccoloba liebmannii, Guapira,* 140 m, 8 Dec 1982 fl, *Lott & Wendt 1658* (MICH, holotype).

PARATYPES: MEXICO. Jalisco, Mpio La Huerta, Estación de Biología Chamela (UNAM): Camino Antiguo Sur M 350, deciduous forest, Jun fl, *Bullock 1355* (MICH); same plant as type, Jan fr, *Lott et al. 1683* (MICH); viejo camino a Nacastillo, selva mediana subperennifolia con *Astronium, Crataeva, Cordia, Acalypha, Brosimum,* Jan fr, *Lott & Bullock 1687* (MICH); selva baja caducifolia, Aug fl/fr, *Magallanes 3712* (MICH); selva baja caducifolia, con *Ipomoea, Plumeria,* Jul fr, *Pérez 1390* (MICH); selva baja caducifolia, en los terrenos planos, Jul fl/fr, *Pérez 1754* (MICH).

Malpighia emiliae is named in honor of Emily J. Lott, in recognition of her fine work on the flora of Chamela. The species is closely related to *M. diversifolia* Brandegee, which is endemic to southernmost Baja California, in habitats somewhat drier but probably not so very different from the deciduous tropical woodlands of Nueva Galicia. In *M. diversifolia* the generally smaller leaves are usually broader relative to their length than in *M. emiliae* (L:W = 1–1.7), with the apex varying from obtuse to rounded or emarginate. However, the most impressive differences are in the petals and pyrenes. The petals of *M. diversifolia* are abaxially smooth or only slightly carinate and glabrous or very sparsely piliferous; compare e and i in Figure 12. The pyrenes bear well-developed lateral and dorsal wings and intermediate outgrowths. I acknowledge with thanks the loan of specimens of *M. diversifolia,* including its type, by the University of California at Berkeley for comparison with *M. emiliae.*

Malpighia novogaliciana W. Anderson, sp. nov. Fig. 13.

Frutex vel arbor parva 1.5–5 m alta, pilis ramulorum juniorum stipitatis stipitibus persistentibus. Foliorum majorum lamina 5.5–9.5 cm longa, 2.5–4.5 cm lata, apice acuminata acumine 0.8–1.7 cm longo, subtus ± pertinaciter sericea pilis 1.5–2.7 mm longis, crassis, luteis. Umbella 2–4 (–6)-flora, sessilis vel in pedunculo communi usque ad 2 mm longo elevata. Petala rosea, abaxialiter paulo carinata sericea, 4 lateralia erosa vel distaliter dentata, posticum profunde dentatum. Filamenta heteromorpha, illa petalis postico-lateralibus opposita crassiora, valde arcuata, 3.5–4.2 mm longa. Styli apice uncis dorsalibus 0.1–0.2 mm longis instructi, 2 postici 3.7–4.5 mm longi, valde arcuati. Fructus luteus vel aurantiacus, minimum 20 mm latus × 15 mm altus (vivus), indehiscens.

Shrub or small tree 1.5–5 m tall; young stems sericeous, the mostly fine white hairs borne on short, persistent, peglike bases; older stems glabrescent and lenticellate, the peglike hair-bases eventually abraded. Lamina of larger leaves 5.5–9.5 cm long, 2.5–4.5 cm wide, elliptical, cuneate at base, acuminate at apex with the acumen 0.8–1.7 cm long, biglandular below near base; adaxial surface initially loosely sericeous but soon quite glabrate; abaxial surface initially densely sericeous, many of the finer hairs soon deciduous but others thickening and stiffening, becoming stout, stiff, needle-like, yellowish or golden, 1.5–2.7 mm long, persistent, forming a dense to sparse layer over whole surface; petiole 1.5–3 mm long, sericeous to glabrate; stipules 0.5–1.2 mm long, distinct, sericeous to glabrate. Inflorescences axillary to current leaves or borne on older leafless stems, sericeous or subvelutinous; umbel sessile or raised on a stalk up to 2 mm long, containing 2–4 (–6) flowers; bracts and bracteoles 0.5–1 mm long; peduncle 1.5–

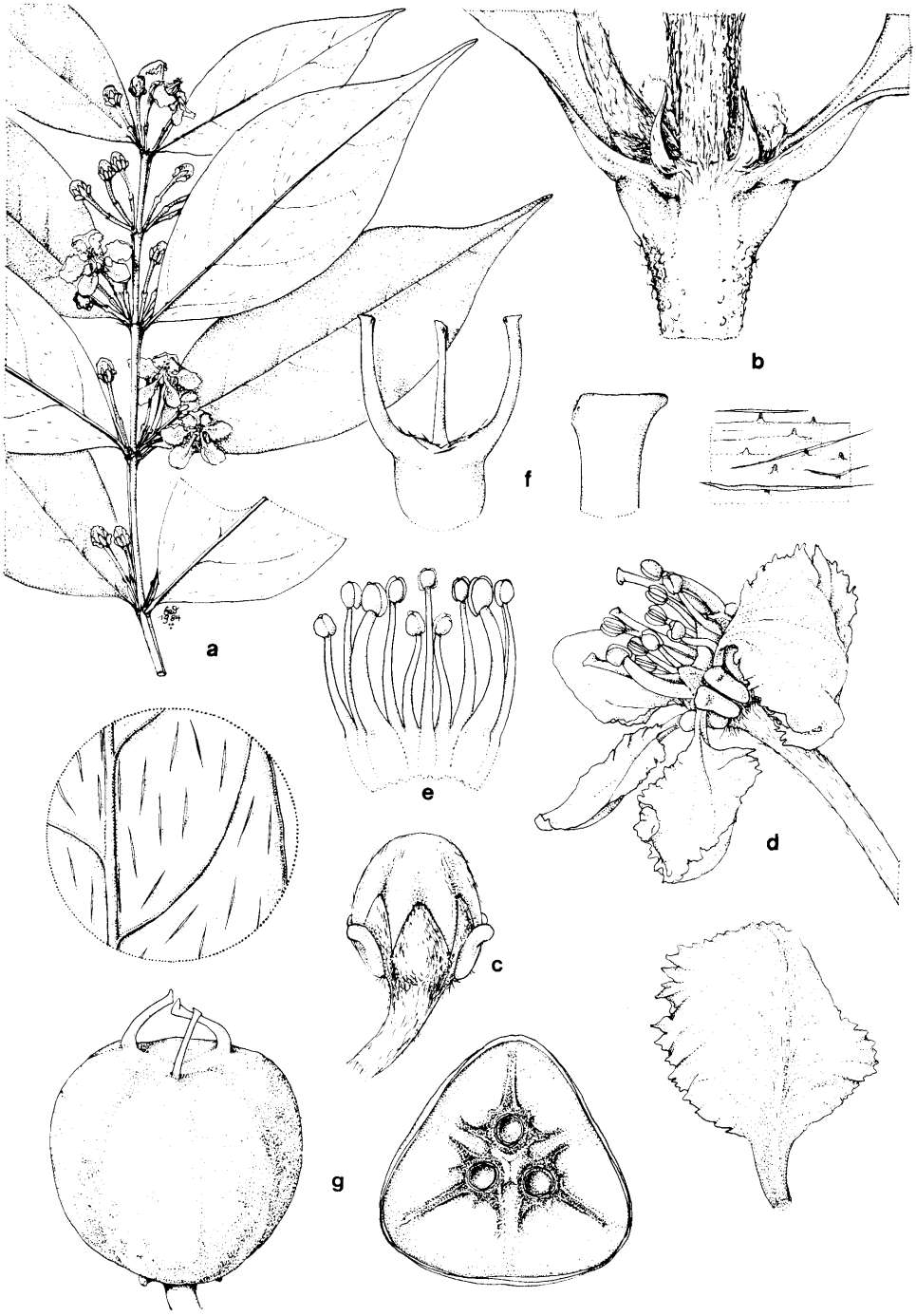

FIG. 13. *Malpighia novogaliciana.* a) habit, ×0.7, with enlargement of abaxial surface of lamina, below, showing needle-like hairs, ×2.8; b) node, showing stipules, ×10.5, with enlargement, below, of stem hairs borne on peglike bases, ×28; c) flower bud, ×5; d) flower, side view with reflexed posterior petal to right, ×3.5, and below a lateral petal, abaxial side, ×5; e) androecium, laid out, abaxial view, the stamen at left opposite posterior petal, ×6.5; f) gynoecium, anterior style in middle, ×5, with apex of 1 style to right, ×25; g) immature fruit, ×2.8, the cross section at right showing developing wings of pyrenes. Drawn by Karin Douthit, a–b from *Lott 3824,* c–f from *Bornstein 89a,* g from *Bornstein 89b.*

6.5 mm long; pedicel 5–8.5 mm long, sericeous to glabrescent. Flowers 1.5–2 cm in diameter. Sepals 0.5–1 mm long beyond glands, triangular, abaxially sericeous, adaxially glabrous, the lateral 4 bearing 6 (–8) glands free at apex, the posterior 6 glands 2–2.5 mm long, the anterior 2, if present, much smaller. Petals pink or "pink and white," abaxially very slightly carinate with the low keel hardly measurable, sparsely sericeous on and beside keel; lateral petals with the claw 2–2.3 mm long, the limb 4.5–5.5 mm long, 4.1–6 mm wide, often asymmetrical, erose or distally dentate; posterior petal with the claw 3 mm long, the limb 5.5–6 mm long, 7–7.3 mm wide, deeply dentate, somewhat crumpled, strongly reflexed. Filaments heteromorphic, those opposite posterior-lateral petals much thicker than others and strongly bowed, 3.8–4.2 mm long, the other 8 slender and straight or somewhat curved or bowed, shortest opposite the posterior petal (1.8–2.5 mm long), longest opposite the anterior sepal (3.5–4 mm long), 2–3.7 mm long in intermediate positions; anthers 0.6–1.2 mm long, largest on the 2 thicker filaments. Ovary glabrous, the carpels completely connate; styles sparsely sericeous at base, all with distinctly internal stigmas and short dorsal hooks at apex 0.1–0.2 mm long; anterior style 2.7–3.7 mm long, nearly straight, bent slightly toward posterior petal; 2 posterior styles 3.7–4.5 mm long, strongly bowed, horizontal at base and then arched inward and twisted slightly toward posterior petal. Fruit yellow or orange at maturity, at least 20 mm wide and 15 mm high when fresh, probably larger, 18 mm wide and 13 mm high when dried; pyrenes held in a common flesh at maturity; dorsal and lateral wings of pyrene well developed but completely obscured by the thick flesh; styles 7–10 mm apart in fruit.

TYPE: MEXICO. Jalisco: Ca 5 km NW of Río San Nicolás, 20 km SE of Tomatlán, tall lowland forest of *Hura, Caesalpinia, Guaiacum, Sebastiania, Jatropha,* 90–150 m, 11–12 Dec 1970 fr, *McVaugh 25242* (MICH, holotype; CAS, ENCB, F, MEXU, NY, isotypes).

PARATYPES: MEXICO. Jalisco: Chamela, Mpio La Huerta, selva mediana subperennifolia con *Brosimum, Mastichodendron, Astronium, Lott et al. 1706,* Sep fl, *Magallanes 3824* (both MICH). Colima: Ca 28 km S of Colima on side road to Ixtlahaucán, 430 m, 6 Jun fl, *Bornstein 89a* (CAS, CHAP, DUKE, GH, INIF, MEXU, MICH, NY), 14 Jun imm fr, *Bornstein 89b* (CAS, CHAP, GH, INIF, MEXU, MICH, NY); ca 25 km SSW of Colima on road to Manzanillo, deciduous woodland dominated by Leguminosae, *Bursera, Hura,* 300 m, Jul fr, *McVaugh 15549* (ENCB, MICH, US); ca 25 km WNW of Santiago on road to Cihuatlán, deciduous forest dominated by Leguminosae, *Bursera, Ficus,* sea level to 30 m, Jul fr, *McVaugh 15737* (ENCB, GH, IBUG, K, MICH, MO).

Malpighia novogaliciana is endemic to the deciduous forests of the Pacific slope in Nueva Galicia. It is most closely related to *M. souzae* Miranda, a species of the tall, wet, mostly evergreen forests of Chiapas, Veracruz, Tabasco, Yucatán, and Belize. Aside from its ecological and geographical distinctness, *M. souzae* differs from *M. novogaliciana* in these characters: Stature up to 15 m; larger leaves with the acuminate apex 1.5–3 cm long; abaxial surface of the lamina initially sericeous but nearly glabrate below at maturity except often thinly sericeous on the midrib, the hairs very fine, white, 0.5–1.3 mm long; petals with a prominent abaxial keel ca 0.2 mm wide; lateral petals erose or fimbriate on the proximal half; posterior petal deeply fimbriate; filaments opposite the posterior-lateral petals 3–3.3 mm long; styles glabrous or with a few basal hairs, bearing apical-dorsal hooks 0.2–0.3 mm long; fruit reported to be 35 mm wide and high when fresh, 17–25 mm when dried.

Malpighia rzedowskii W. Anderson, sp. nov. Fig. 14.

Frutex vel arbor parva 1–4 m alta, ramulis junioribus velutinis. Foliorum majorum lamina 7–14 (–16.5) cm longa, 4–7 cm lata, apice plerumque acuminata, utrinque pertinaciter velutina, pilis supra V- vel Y-formibus, subtus Y- vel T-formibus. Umbella 4-flora; bracteae 2–6 mm longae; pedunculus florifer 1–3 (–4) mm longus; bracteolae 1–2 mm longae; pedicellus 2–4 mm longus (–5.5 mm in fructu), distaliter 1–1.5 mm diametro. Sepala abaxialiter sericea, 8–10-glandulifera. Petala rosea, abaxialiter carinata carina angusta crassaque, glabra. Styli ca 2 mm longi, recti, subaequales, apice parum inflexi. Fructus pyrena alis lateralibus et dorsali instructa.

Shrub or small tree 1–4 m tall; young stems velutinous, the hairs V- or Y-shaped. Lamina of larger leaves 7–14 (–16.5) cm long, 4–7 cm wide, ovate or elliptical, obtuse at base, mostly acuminate at apex, bearing 0–1 gland below near each margin 10–15 mm above base, persistently velutinous on both sides with all hairs fine and white, those on adaxial surface shorter, V- or Y-shaped, those on abaxial surface Y- or T-shaped, most with the arms nearly or quite straight; petiole 3–5 mm long, velutinous like the stems; stipules 0.5–1.5 mm long, distinct, subsericeous to glabrate. Inflorescence velutinous like the stems; umbel raised on a stalk 7–13 mm long, containing 4 flowers; bracts 2–6 mm long; peduncle 1–3 (–4) mm long; bracteoles 1–2 mm long; pedicel 2–4 mm long (–5.5 mm in fruit), distally swollen, 1–1.5 mm in diameter, subvelutinous to subsericeous. Sepals ca 1 mm long beyond glands, abaxially sericeous, adaxially glabrous, bearing 8–10 glands 1.5–2.8 mm long, often with partial to complete fusion of 1 or 2 pairs of neighboring glands on the anterior 3 sepals. Petals pink, abaxially carinate with the low thick inconspicuous keel not reaching apex of petal, glabrous; lateral petals with the claw 1.5–2 mm long, the limb 3–4 mm long, 2.5–4 mm wide, often asymmetrical, distally entire or denticulate, proximally dentate to laciniate; posterior petal with the claw 2 mm long, the limb 3.5–4.5 mm long, 6–7 mm wide (spread flat), laciniate. Filaments 2–2.8 mm long, straight, connate basally, subequal in thickness or the 2 opposite posterior-lateral petals slightly thicker; anthers 0.9–1.2 mm long, longest opposite posterior-lateral petals. Ovary glabrous or bearing a few hairs distally, the carpels completely connate; styles ca 2 mm long, not or hardly exceeding anthers in anthesis, straight, alike or the anterior slightly shorter, slightly inbent at apex, the stigma internal or appearing nearly terminal. Fruit red and glabrous at maturity, "2.5 cm diam." (*McVaugh 16037*) when fresh, 15 mm wide and 12–13 mm high when dried, the pyrenes held in a common flesh at maturity; pyrene with well-developed lateral wings and narrower dorsal wing and intermediate winglets, all visible in dried fruit.

TYPE: MEXICO. Jalisco: Mpio La Huerta, 2 km al NW de Chamela, orilla de una laguna costera salobre con vegetación de mangle y otras plantas, 28 Aug 1976 fl, *Rzedowski & McVaugh 1409* (MICH, holotype; ENCB, MEXU, isotypes).

PARATYPES: MEXICO. Jalisco: Mpio La Huerta, Los Angeles Locos de Tenacatita, 4 km de la carretera Barra de Navidad–Puerto Vallarta, selva baja caducifolia perturbada con *Acalypha, Croton, Jatropha,* Oct fr, *Lott 1377* (MICH). Colima: Mountain summits near pass ca 18 km SSW of Colima on Manzanillo road, deciduous woodland now nearly in full foliage, dominated by various Leguminosae, *Bursera, Cnidoscolus,* 500 m, Aug fr, *McVaugh 16037* (CAS, ENCB, MEXU, MICH, MO, NY).

Malpighia rzedowskii is named for Jerzy Rzedowski, in recognition of his many contributions to Mexican botany. It is most closely related to *M. mexicana* Adr. Juss., in which the umbel usually contains more flowers (4–8 or more,

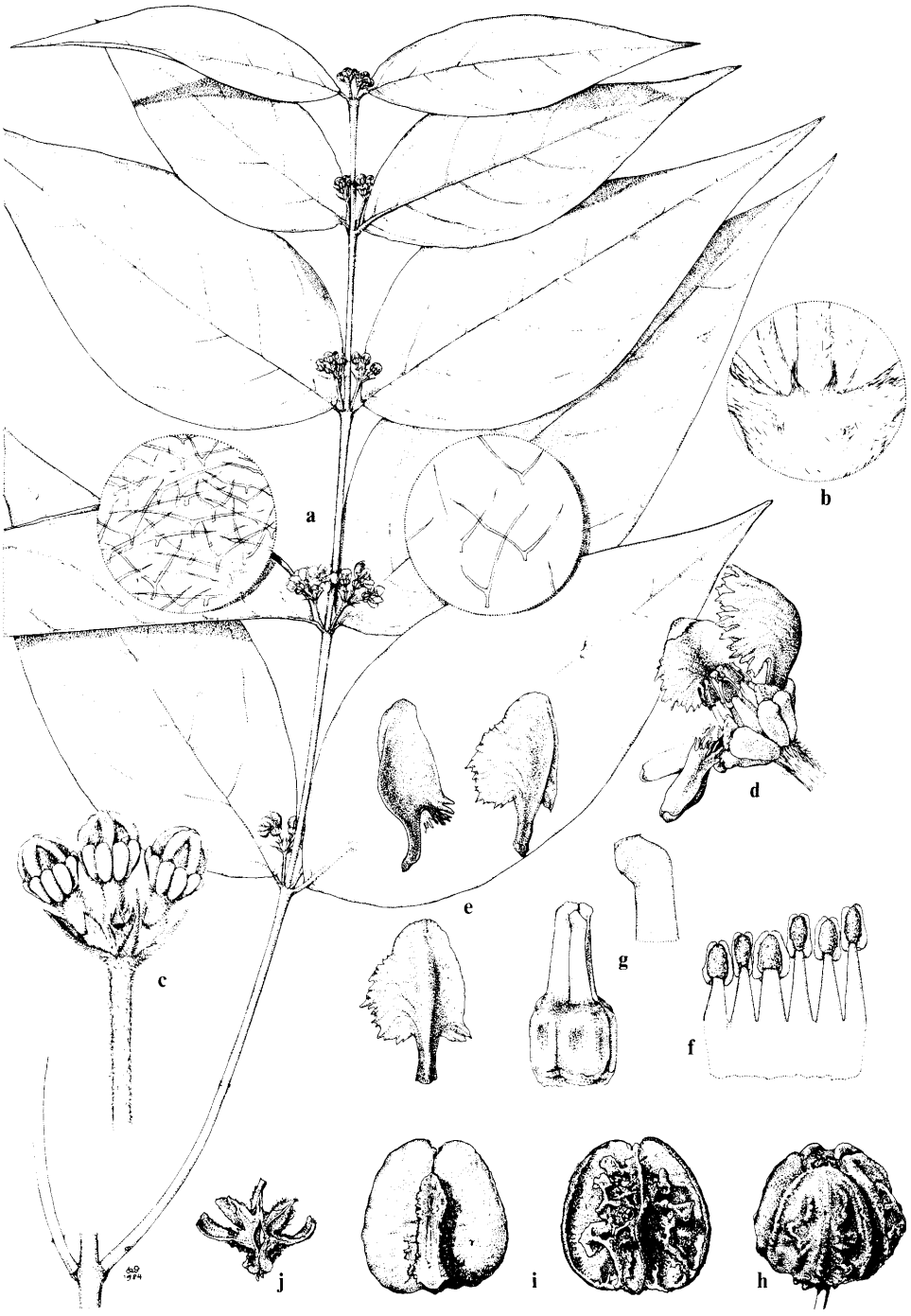

FIG. 14. *Malpighia rzedowskii.* a) habit, ×0.5, with enlarged hairs from both surfaces of lamina, ×25, abaxial to left, adaxial to right; b) node, showing stipules, ×5; c) umbel of flower buds, with 1 removed, ×2.5; d) flower, side view with posterior petal erect and 1 posterior-lateral petal removed, ×3; e) petals, ×4, above left an anterior-lateral petal, above right and below 2 posterior-lateral petals; f) partial androecium, laid out, abaxial view, the stamen at left opposite posterior petal, ×6; g) gynoecium, anterior style in middle, ×6, with apex of 1 style above, ×10; h) fruit, dried but intact, ×1.5; i) 1 pyrene of fruit with flesh removed, adaxial side left, abaxial side right, ×1.5; j) cross section of 1 pyrene of fruit with flesh removed, ×1.5. Drawn by Karin Douthit, a–g from *Rzedowski & McVaugh 1409,* h–j from *McVaugh 16037.*

commonly at least 6) and the pedicel is longer and not inflated. The most dramatic difference lies in the hairs of the leaves, stems, and inflorescence, which are strongly twisted in *M. mexicana,* producing a tomentose vesture.

Malpighia stevensii W. Anderson, sp. nov. Fig. 15.

Frutex vel arbor parva 2–8 m alta, ramulis dense tomentosis. Folia nunc in ramis lateralibus brevissimis conferta, nunc in ramis elongatis portata; foliorum majorum lamina 3–8.5 (–9.5) cm longa, 2–6 (–7.5) cm lata, elliptica, subrotunda, vel saepius obovata, apice obtusa vel rotundata, subtus basi margine 2–4-glandulifera, supra tomentosa mox vel demum glabrata, subtus pertinaciter tomentosa. Umbella 2–4-flora, in pedunculo communi 0.5–5 (–12) mm longo elevata. Petala rosea. Stamina heteromorpha, illa petalis postico-lateralibus opposita filamentis crassioribus et antheris majoribus. Ovarium plerumque dense pilosum, interdum glabrum; styli apice apiculati, 2 postici e basi arcuati. Fructus 13–20 mm latus, 9–15 mm altus.

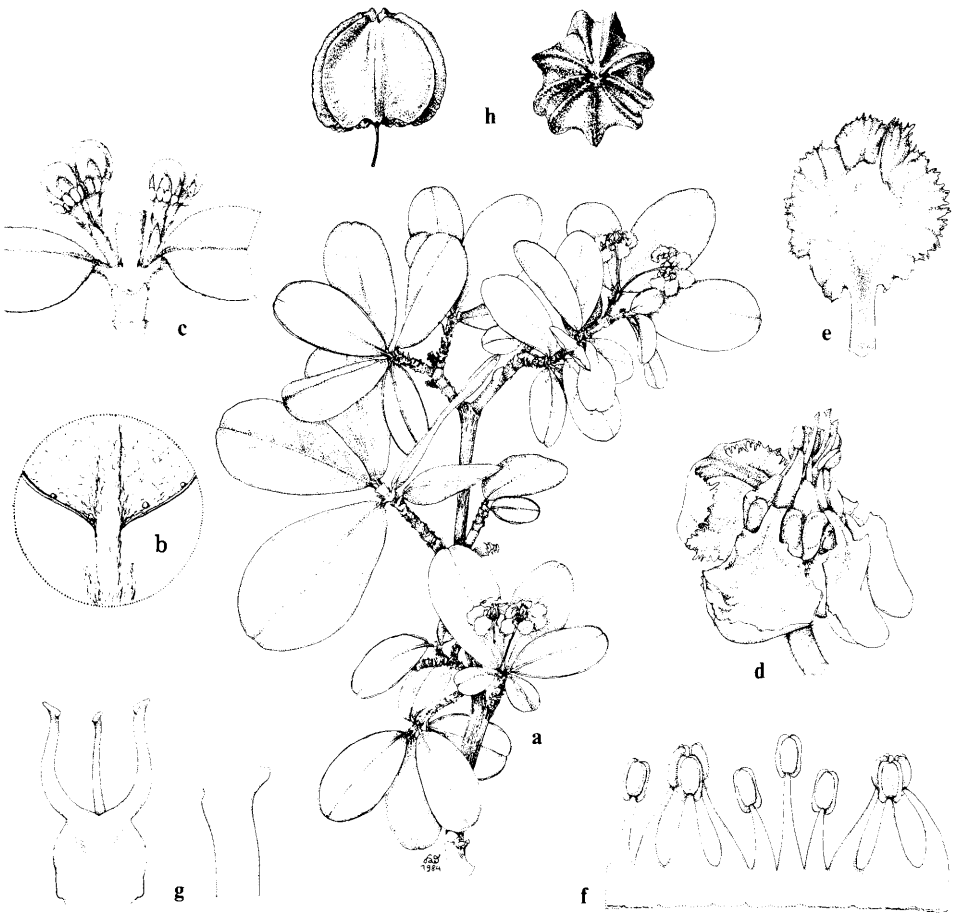

FIG. 15. *Malpighia stevensii.* a, flowering branch, ×0.5; b, base of leaf and stipules, abaxial side, ×3; c) axillary 2-flowered umbels, ×1; d) flower, side view, posterior petal to left, ×3; e) posterior petal, flattened, ×3; f) androecium, laid flat, abaxial view, the stamen to left opposite posterior petal, ×5; g) gynoecium, anterior style in middle, ×5, with apex of 1 style to right, ×20; h) dried fruit, side view (left) and from above (right), both ×1. Drawn by Karin Douthit, a from *Stevens 14675,* b–g from *Stevens 22927,* h from *Stevens 9123.*

Shrub or small tree 2–8 m tall; stems initially densely tomentose, eventually glabrate. Some leaves usually borne on short lateral shoots on old stems, with little or no internode between successive pairs, the same plants also bearing stems with well-developed internodes; lamina of larger leaves 3–8.5 (–9.5) cm long, 2–6 (–7.5) cm wide, elliptical, subrotund, or most often obovate, broadly cuneate or rounded at base, obtuse or rounded and often apiculate or emarginate at apex, bearing 2–4 glands below at base on or by margin, densely tomentose on both sides initially, soon or eventually glabrate above, persistently tomentose below or belatedly glabrescent; petiole 2–5 mm long, tomentose to glabrate; stipules 0.5–1.5 mm long, distinct. Inflorescence tomentose or subsericeous; umbel raised on a stalk 0.5–5 (–12) mm long, containing 2–4 flowers; bracts 0.7–1.5 mm long; peduncle 1–5 mm long; bracteoles 0.5–1 mm long; pedicel 6–9 mm long, appressed-tomentose. Sepals 1–1.5 mm long beyond glands, abaxially uniformly appressed-tomentose, adaxially glabrous, bearing 6–10 glands, the posterior 6 2–2.8 mm long, the anterior 1–4, if present, usually smaller. Petals pink, abaxially smooth or keeled on claw and lower limb, sparsely sericeous or glabrous; lateral petals with the claw 2–3 mm long, the limb (4–) 5–6 mm long, 5–6.5 (–7.5) mm wide, irregularly shaped and often asymmetrical, entire or somewhat erose; posterior petal with the claw 2.5–3 mm long, the limb erect to strongly reflexed, 6–8 mm long and wide, orbicular, puckered toward margin, erose or dentate. Stamens heteromorphic, those opposite posterior-lateral petals with thicker filaments and somewhat larger anthers than others; filaments 2–3.5 mm long, basally connate; anthers 1–1.5 mm long. Ovary usually densely hairy, occasionally glabrous, the carpels completely connate; styles with distinctly internal stigmas, usually apiculate dorsally at apex, rarely truncate; anterior style 2.2–2.5 mm long, slenderer than posterior ones, ± straight and erect or leaning slightly backward; 2 posterior styles ca 2.5–3 mm long, bowed outward from base, then ascending. Fruit "pink" or "orange" at maturity, sparsely tomentose or glabrous, 13–20 mm wide, 9–15 mm high, the pyrenes firmly united and held in a common flesh at maturity; pyrene with well-developed dorsal and lateral wings and several intermediate outgrowths, all obscured by the flesh.

TYPE: NICARAGUA. Estelí: Km 163 on Hwy 1, ca 11.2 km N of entrance to Estelí, 13°13′N, 86°23′W, 920 m, level rocky plain on old basalt, thorn scrub with cacti and *Agave* conspicuous, 29 Jun 1978 fr, *Stevens 9123* (MICH, holotype).

PARATYPES: NICARAGUA. Estelí: Llano de Santa Adelaida, 13°14′N, 86°22′W, ca 850 m, Jan fl, *Moreno 14095* (MO), Apr fl, *Moreno 16154* (MO), Dec fl/fr, *Moreno 25144* (MICH); type locality, Sep fl, *Stevens 23124* (MO). León: Río El Tamarindo, bosque de galería, suelo rocoso, Oct fr, *Grijalva et al. 3053* (MICH); camino a El Velero, 4.3 km de la carretera a Puerto Sandino, 20 m, Feb fl, *Moreno 6525* (MO); La Paz Centro, 12°15′N, 86°43′W, 60 m, Jun fl, *Moreno 24248* (MICH); Hwy 12, 12°15′N, 86°43′W, 30 m, rocky savanna, Dec fr, *Stevens 11183* (MICH), Oct fl, *Stevens 14675* (MICH, MO); El Velero, at mouth of Estero San José, 12°08′N, 86°45′W, mangrove margin, Sep ster, *Stevens 23081* (MICH). Matagalpa: camino de "Puertas Viejas," 12°36–38′N, 86°03–04′W, 500–600 m, Sep fl, *Araquistain 3665* (MO); Puertas Viejas, 1–2 km camino a San José de los Remates, 430–470 m, May fl/fr, *Moreno 16229* (MICH), Nov fr, *Moreno 18308* (MICH); Quebrada Santa Cruz, between Puertas Viejas and Esquipulas, 420 m, Jul fl, *Stevens 22346* (MICH). Managua: Rancho Grande, al N de Río Pacora, 12°27–29′N, 86°11–13′W, 80–90 m, bosque tropical muy seco, caducifolio, May fr, *Araquistain 3510* (MICH); Las Maderas, "Las Pilas" y "El Platanal," 12°27′N, 86°04′W, 60–80 m, Nov fr, *Moreno 18705* (MICH); La Mojarra, 12°35′N, 86°21′W, 60–80 m, Jun fl, *Moreno 21433* (MICH); Km 64, 1 km al W del caserío "El Madroño," 12°32′N, 86°04′W, 500 m, Dec fl/fr, *Moreno 22544* (MO). Boaco: 4 km al S de Boaquito, 12°26′N, 85°44′W, 200 m, Oct fr, *Moreno 18051* (MICH); 2 km al N de Boaquito, 300 m, Oct fr, *Moreno 18097B* (MO); 1 km al E de Santa Cruz, 12°24′N, 85°49′W, 200 m, Nov fl, *Moreno 22467A* (MICH); Finca San Antonio, 9 km al SW de Boaco,

12°26'N, 85°44'W, 200 m, Jul fl/fr, *Moreno 24341* (MICH), Sep fl/fr, *Moreno 24793* (MO); 3 km N of Tecolostote, along Río San Lorenzo, 12°16'N, 85°39'W, 120 m, gallery forest, Jan fl, *Stevens 22927* (MICH). Granada: Isla Zapatera, Cerro El Llano (falda norte), 100 m, bosque seco tropical, Aug fr, *Grijalva 821* (MICH). Chontales: Km 82 de la carretera al Rama, 12°15'N, 85°39'W, 120–200 m, Nov fl, *Moreno 18691* (MO).—COSTA RICA. Guanacaste: 28 km N of Cañas, 100 m, dry forest, Oct fl, *Frankie 312 C* (F); El Coco, Carrillo, en pendientes rocosas al borde de la playa, Aug fl, *Jiménez M. 980* (F, NY).

This species is named for Warren Douglas Stevens, who has made a superb contribution to our knowledge of the plants of Nicaragua. *Malpighia stevensii* is closely related to *M. emarginata* DC., which differs most notably in having the stems and leaves sparsely sericeous to glabrate; also, its leaves are usually narrower, the leaf glands are usually only 2 and set in from the margin, and its ovary is usually glabrous.

Malpighia verruculosa W. Anderson, sp. nov.

Frutex 1–3.5 m altus, pilis ramulorum hornotinorum stipitatis stipitibus persistentibus. Foliorum majorum lamina 4–6.5 (–7.5) cm longa, 2–3.2 cm lata, elliptica, apice plerumque acuminata, subtus pertinaciter sparsim sericea pilis 1.5–2.5 mm longis, crassis, luteis. Umbella (1–) 2 (–3)-flora. Petala rosea, anguste carinata, glabra vel paucipilifera. Stamina heteromorpha, illa petalis postico-lateralibus opposita filamentis crassioribus et antheris majoribus. Styli postici ca 3 mm longi, e basi arcuati, apice apiculati. Fructus dehiscens.

Shrub 1–3.5 m tall; young stems initially subsericeous or subhispid with the short stiff hairs borne on persistent, thickened, peglike bases up to 0.2 mm long, the hairs soon deciduous, the bases eventually abraded from older stems. Leaves evenly spaced, successive pairs separated by internodes; lamina of larger leaves 4–6.5 (–7.5) cm long, 2–3.2 cm wide, elliptical, cuneate or rounded at base, acuminate or rarely acute at apex, biglandular below near base, soon glabrate above, thinly but persistently sericeous below with the longer hairs 1.5–2.5 mm long, stout, yellow, sessile, straight, strongly appressed, parallel to midrib; petiole 1–2 mm long, sericeous to glabrate; stipules 0.5–1.5 mm long, distinct. Inflorescence thinly sericeous to glabrate; umbel raised on a stalk (2–) 4–11 (–15) mm long, containing (1–) 2 (–3) flowers; bracts 0.8–1.3 mm long; peduncle 3–6 mm long; bracteoles 0.6–1 mm long; pedicel 6–13 mm long, soon glabrate. Sepals ca 2.5 mm long, bearing a few hairs abaxially, glabrous adaxially, the lateral 4 bearing 6 (–7) glands 2 mm long. Petals pink, abaxially narrowly keeled, glabrous or very sparsely pilose; lateral petals with the claw 1.5–2 mm long, the limb 5–6 mm long, 4–6 mm wide, somewhat conduplicate, erose; posterior petal with the claw 3 mm long, the limb 6 mm long, 7.5 mm wide, flat, coarsely toothed or laciniate. Stamens strongly heteromorphic, those opposite posterior-lateral petals with much thicker filaments and larger anthers than others; filaments 1–3 mm long, basally connate; anthers 0.8–1.7 mm long. Ovary glabrous, the carpels connate only along shared ventral faces; styles with distinctly internal stigmas; anterior style ca 2.3 mm long, slenderer than posterior styles, slightly curved toward posterior petal, truncate at apex; 2 posterior styles ca 3 mm long, strongly bowed outward from base, then ascending, dorsally apiculate at apex. Fruit red at maturity, the pyrenes joined only along a narrow ventral areole 3–5 mm long, breaking apart at maturity; pyrene 1.1–1.5 cm long (dried), with well-developed dorsal and lateral winglets and an intermediate crest on each side.

TYPE: NICARAGUA. Rivas: Slopes of Volcán Maderas above coffee plantations above Balgüe, Isla de Ometepe, 11°28'N, 85°31'W, 600–800 m, cloud forest-rain forest, 14 Sep 1983 fl/fr, *Nee & Téllez 28038* (MICH, holotype).

PARATYPES: HONDURAS. Colón: Tropical forest, Guarunta, Wispemini Camp, 15–25 m, Mar fr, *von Hagen & von Hagen 1405* (F).—NICARAGUA. Zelaya: El Naranjo, carretera Waslala a Siuna, 13°34'N, 85°11'W, 280–300 m, Dec fr, *Moreno 19169* (MO); montañas y bosques lluviosos entre Toro Bay y Esquipulas, drenajes de los Ríos Jícaro y Esquipulas, 130 m, Nov fr, *Shank & Molina 4617 & 4681* (both F); bosque lluvioso de montañas de Esquipulas y Alemán, drenaje de Río Alemán, 150 m, Nov fr, *Shank & Molina 4768, 4781, 4816 &* 4881 (all F); matorrales y potreros húmedos, drenajes de los Ríos Punta Gorda, Alemán y Zapote, 30 m, Dec fr, *Shank & Molina 4981* (F). Matagalpa: 78 km de Matagalpa, sobre la carretera Matagalpa–Siuna, La Gloria, 13°15'N, 85°35'W, 600 m, Sep fr, *Moreno 17202* (MICH). Rivas, Isla Ometepe, Volcán Maderas: Faldas del lado N del Volcán, 900–1200 m, Jan fr, *Moreno 19695* (MICH); camino de descenso de la laguna hacia la hacienda Magdalena, bosque húmedo, de lluvia constante, 800–1200 m, Sep fr, *Robleto 1172* (MICH); falda W del Volcán, 700–900 m, Jul fr, *Sandino 952* (MICH).—COSTA RICA. Guanacaste: Heavily forested northern slopes of Volcán Orosí along lower reaches of broad ridge running to N at 650 m, Jan fr, *Wilbur & Stone 9751* (DUKE, F).

Malpighia verruculosa is closely related to *M. albiflora* (Cuatr.) Cuatr., which grows in wet forests from Nicaragua to Colombia. In *M. albiflora* the stem hairs are not borne on persistent bases, the leaf hairs are short, fine, white, and mostly soon deciduous, the umbels usually contain 4–6 flowers, and the petals are white. *Malpighia verruculosa* seems to agree well with the protologue of *M. albiflora* subsp. *antillana* Vivaldi, Brittonia 36: 330. 1984, and may be the same taxon. However, Vivaldi has seen eight of the paratypes cited above and in 1980 annotated them as *M. albiflora* subsp. *albiflora,* so apparently he reserves the name *antillana* for specimens from Cuba and Hispaniola. In any case, there are clearly two recognizable taxa in Nicaragua, which I feel should both be treated as species, and since I am uncertain of the correct application of Vivaldi's name I am giving the Central American plants a name at the level of species. If the plants of Cuba and Hispaniola are conspecific with those of Central America, they will have to be called *M. verruculosa,* too. The epithet refers to the dense layer of persistent peglike hair-bases on the young stems, which differentiate the species immediately from all other Central American species of *Malpighia.*

The fruits of *Malpighia albiflora* and *M. verruculosa* give dramatic support to the hypothesis that *Malpighia* is derived from some element in *Mascagnia* through reduction of the samara wings and elaboration of a fleshy exocarp. The pyrenes in these two species are joined only along a narrow ventral areole, like the samaras of *Mascagnia,* and separate at maturity. Beneath their thin flesh the endocarp extends into dorsal and lateral winglets clearly homologous with the wings of a samara in *Mascagnia.*

Malpighia wendtii W. Anderson, sp. nov. Fig. 16.

Frutex vel arbor usque ad 24 m alta, ramulis glabris mox multis lenticellis instructis. Foliorum majorum lamina 7–10.5 cm longa, 2.5–4.5 cm lata, elliptica, apice acuminata, subtus utrinque in tertio medio 0–2 (–3)-glandulifera, glabra; stipulae distinctae. Umbella (4–) 6–8 (–10)-flora, sparsim sericea mox glabrata, in pedunculo communi 2–5 mm longo elevata. Sepala glabra. Petala alba, laevia, glabra. Stamina heteromorpha, illa petalis postico-lateralibus opposita filamentis crassioribus et antheris majoribus. Ovarium glabrum; 2 styli postici leviter curvati demum valde arcuati, apice uncinati. Fructus ca 16 mm latus, 11–13 mm altus, indehiscens.

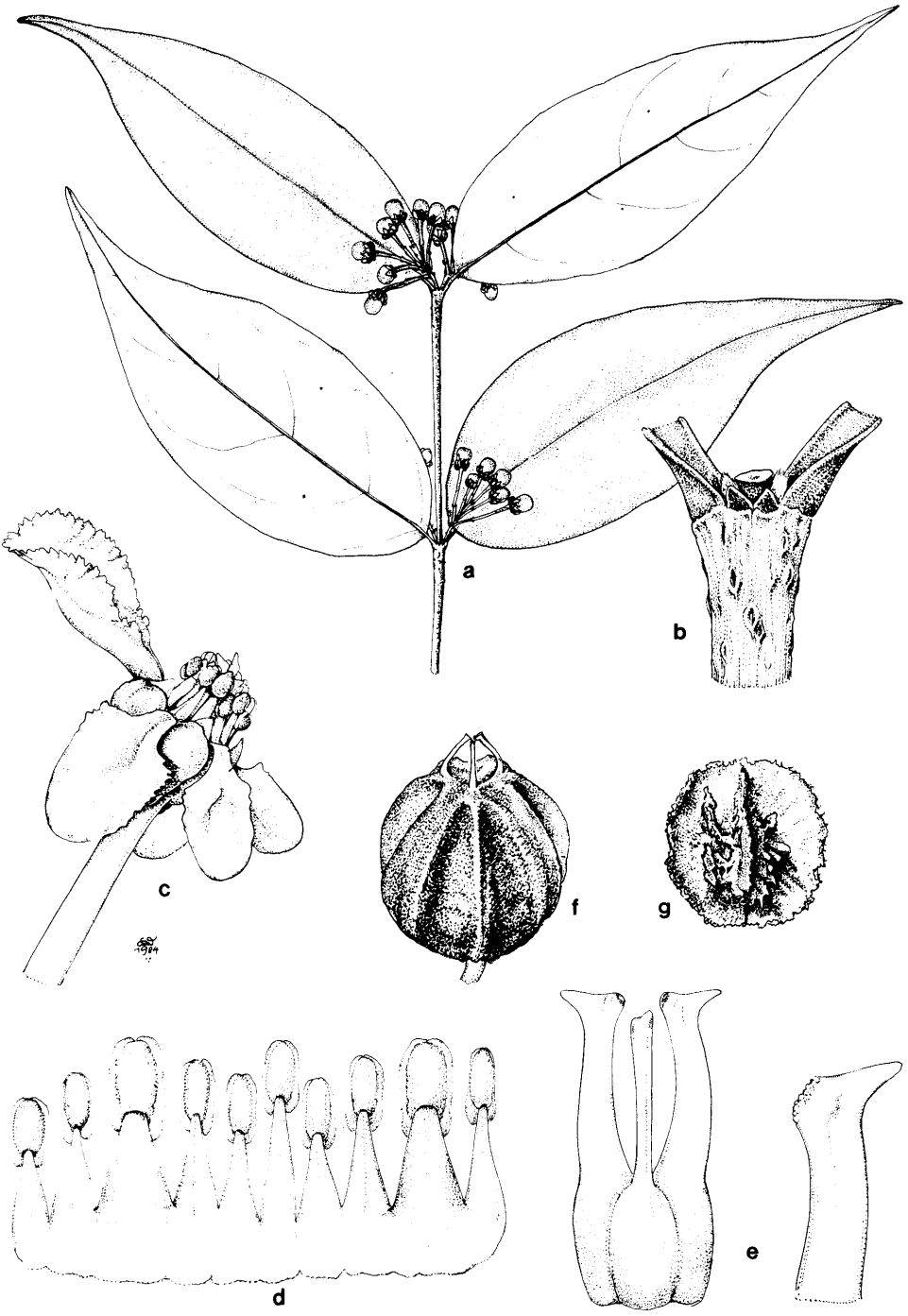

FIG. 16. *Malpighia wendtii.* a) flowering stem, ×0.7; b) node, showing stipules and lenticels, ×7; c) flower, side view, with posterior petal erect, ×5; d) androecium, laid out, abaxial view, the stamen at left opposite posterior petal, ×9; e) gynoecium, anterior style in middle, ×10.5, with apex of 1 lateral style to right, ×17.5; f) fruit, dried but intact, ×1.75; g) 1 pyrene of fruit with flesh removed, abaxial view, ×1.75. Drawn by Karin Douthit, a and c–e from *Wendt 2825,* b, f, g from *Contreras 7823.*

Shrub or tree 2–24 m tall; stems glabrous, soon marked by many raised elliptical lenticels. Leaves evenly spaced, successive pairs separated by internodes; lamina of larger leaves 7–10.5 cm long, 2.5–4.8 cm wide, elliptical or slightly ovate, cuneate or rounded at base, long-acuminate at apex, bearing 0–2 (–3) glands below on each side well above base, ⅓–½ of distance to apex, midway between margin and midrib, glabrous; petiole 3–6 mm long, glabrous; stipules 0.5–0.8 mm long, adjacent but distinct, often reflexed, persistent or deciduous. Inflorescence very sparsely sericeous to glabrate; umbel raised on a stalk 2–5 mm long, usually with a pair of sterile bracts at or below the middle, containing (4–) 6–8 (–10) flowers; bracts and bracteoles 0.5–1 mm long; peduncle 1.5–4.5 mm long; pedicel 6–7 mm long, –10 mm in fruit. Sepals 0.5–1.5 mm long beyond glands, rounded, glabrous, the lateral 4 bearing 6 glands 2.5–3.8 mm long. Petals white, abaxially smooth, glabrous; lateral petals with the claw 1.5–2 mm long, the limb 3–3.5 mm long and wide, entire or denticulate at base; posterior petal with the claw 1.5 mm long, the limb 4.5 mm long and wide, dentate all around margin. Stamens heteromorphic, those opposite posterior-lateral petals with thicker filaments and somewhat larger anthers than others; filaments 2–3 mm long, basally connate; anthers 1–1.5 mm long. Ovary glabrous, the carpels completely connate; styles with distinctly internal stigmas; anterior style 2 mm long, slenderer than posterior ones, straight and leaning forward between posterior styles, apiculate dorsally at apex; 2 posterior styles 2.2–2.3 mm long, initially only slightly bowed but becoming strongly so in old flowers and fruits, prominently hooked dorsally at apex. Fruit probably red at maturity, ca 16 mm wide, 11–13 mm high, the pyrenes held in a common flesh at maturity; pyrene with well-developed dorsal and lateral wings and several intermediate outgrowths, all obscured by the flesh.

TYPE: MEXICO. Veracruz: "Zona Uxpanapa," Mpio Minatitlán, 17°14′N, 94°18′W, orillas de arroyo estacional de agua mansa, lomas al S del Poblado 11 y al S de la brecha 105, ± 27 km al E de La Laguna, zona caliza con selva perennifolia, 300 m, 3 Oct 1980 fl, *Wendt, Villalobos, Lott & Navarrete 2825* (MICH, holotype; CHAPA, isotype).

PARATYPES: MEXICO. Chiapas: Mpio La Trinitaria, montane rain forest 10 km ENE of Dos Lagos above Santa Elena, 1170 m, Aug fr, *Breedlove 52307* (MICH).—GUATEMALA. Alta Verapaz: Chahal, low forest bordering Seamay River, Oct fr, *Contreras 7823* (MICH); Chahal, high forest, top of hill, Oct fr, *Contreras 7851* (MICH). Petén, La Cumbre: High forest on Cadenas Road, Jul fr, *Contreras 8788* (MICH); high forest on Pusila Road, 1.5 km E of Km 138 of Cadenas Road, Aug fr, *Contreras 8841* (MICH); high forest 1.5 km W of Km 136/137 of Cadenas Road, Aug fr, *Contreras 8871* (CHAPA); in *zapotal* on hillside, 1.5 km E of Km 138 of the road, Sep fr, *Contreras 20305* (MICH).

Malpighia wendtii is named in honor of Thomas L. Wendt, whose work in the Zona Uxpanapa has added many interesting plants to the known flora of Mexico. It is superficially similar to *M. glabra* L., which has pink petals, straight truncate styles, and a smaller fruit without well-developed lateral wings on the pyrenes. Its closest relatives are probably *M. albiflora* (Cuatr.) Cuatr., *M. romeroana* Cuatr., and *M. souzae* Miranda. *M. albiflora* has the carpels only basally coherent in flower and the pyrenes of the fruit separating at maturity. *M. romeroana* has the stipules connate in interpetiolar pairs, a many-flowered inflorescence raised on a stalk at least 12 mm long, and pink petals. In *M. souzae* the stem hairs are borne on persistent peglike bases, the inflorescence contains (2–) 4 flowers, the sepals are hairy, the petals are pink, and the pyrenes do not have such well-developed lateral wings. Although *M. wendtii* may be a shrub or small tree, most collections

have been described as trees 13–24 m tall, which is unusually large for the genus. The species is also notable for its truly glabrous stems and leaves; even *M. glabra* has the stems, and often the leaves, at least initially sparsely sericeous. Most species of *Malpighia* have the leaf glands borne near the base of the lamina, but here they are usually nearer the center, if any are present.

Malpighia wilburiorum W. Anderson, sp. nov. Fig. 17.

Arbor ca 10 m alta, pilis ramulorum juniorum stipitatis stipitibus persistentibus. Foliorum majorum lamina 7.5–9 cm longa, 2.4–3.2 cm lata, anguste elliptica, apice gradatim angustata vel acuminata, subtus margine pilis 0.7–1.7 mm longis, crassis, luteis instructa. Umbella 4 (–6)-flora, in pedunculo communi (10–) 15–21 mm longo elevata. Sepala abaxialiter sericea, 10-glandulifera. Petala alba vel rosea, abaxialiter paulo carinata sparsissime sericea. Styli ± recti, apice truncati vel dorsaliter apiculati.

Tree ca 10 m tall, the trunk 20 cm in diameter; young stems initially sericeous with the hairs borne on thickened peglike bases, the hairs soon deciduous, the bases elongating and persistent, eventually abraded from older stems. Leaves evenly spaced, successive pairs separated by internodes 2.5–5 cm long; lamina of larger leaves 7.5–9 cm long, 2.4–3.2 cm wide, narrowly elliptical, obtuse or rounded at base, gradually tapered or acuminate at apex, biglandular below near base, sparsely sericeous to glabrate above with the hairs thin and white, sparsely sericeous to glabrate below, the margin bearing a row of stout, stiff, needle-like, yellowish hairs 0.7–1.7 mm long, these eventually deciduous; petiole 2–2.5 mm long, sericeous to glabrate; stipules 0.8–1.5 mm long, distinct, sericeous to glabrate. Inflorescence sparsely sericeous to glabrate; umbel raised on a stalk (10–) 15–21 mm long, containing 4 (–6) flowers; bracts and bracteoles 0.8–1 mm long; peduncle 3.5–6 mm long; pedicel 6–9 mm long. Sepals 1–1.3 mm long beyond glands, abaxially sericeous, adaxially glabrous, bearing 10 greenish glands 0.8–1.9 mm long, longest on the posterior 3 sepals. Petals "white or pinkish," abaxially very slightly carinate with the low keel hardly measurable, very sparsely sericeous on keel; lateral petals with the claw 2 mm long, the limb 2.5–3.5 mm long, 2.5–4.5 mm wide, often asymmetrical, entire or erose to laciniate in proximal ½; posterior petal with the claw 4 mm long, the limb 4 mm long, 5 mm wide, laciniate. Filaments 2–2.5 mm long, straight, connate basally, those opposite posterior-lateral petals somewhat thicker than others; anthers 0.7–1 mm long, longest on thicker filaments. Ovary glabrous or bearing a few hairs at apex, the carpels completely connate; styles 1.8–2 mm long, ± straight, parallel or divergent distally, ± alike in thickness and length or the anterior slightly slenderer or shorter, truncate at apex or dorsally apiculate, the stigma internal or appearing nearly terminal. Fruit known only from very immature stages.

TYPE: MEXICO. Jalisco: Ca 22 km SSW of Autlán toward La Resolana, open oak woods dominating slopes, 12 Aug 1949 fl, *R. L. & C. R. Wilbur 2290* (MICH, holotype; MEXU, isotype).

This species, known only from the type, is named for the brothers Wilbur, who collected it when Robert L. Wilbur was a doctoral student at the University of Michigan. It bears a superficial resemblance to *M. novogaliciana,* because they have somewhat similar leaves, leaf hairs, and peg-based stem hairs. However, the umbel of *M. novogaliciana* is sessile or subsessile, and its posterior styles are strongly bowed, which indicates that the two species are not very closely related. The straight styles indicate a general relationship with *M. glabra* L., a shorter

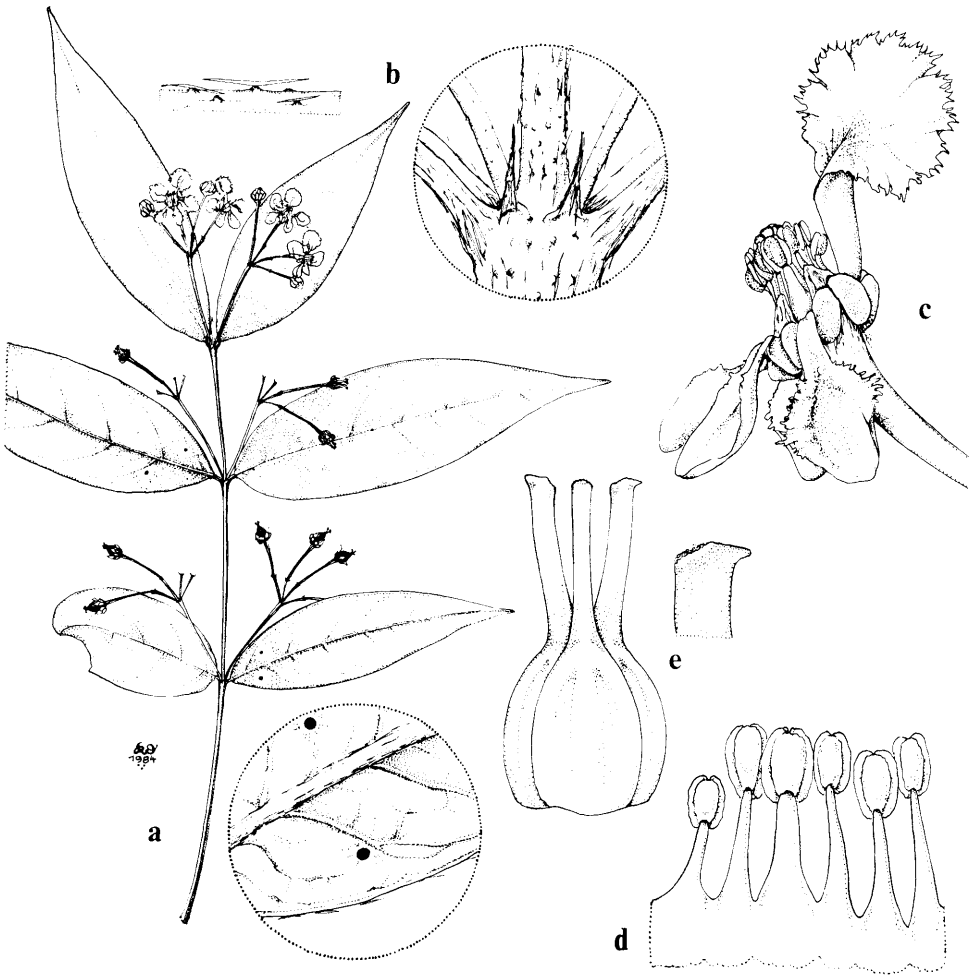

FIG. 17. *Malpighia wilburiorum.* a) habit, ×0.75, with enlargement of abaxial surface of lamina, ×10; b) node, showing stipules, ×7.5, and (to left) stem hairs borne on peglike bases, × ca 13; c) flower, side view with posterior petal erect, × ca 5; d) partial androecium, laid out, abaxial view, the stamen at left opposite posterior petal, ×10; e) gynoecium, anterior style in middle, ×10, with apex of 1 style to right, ×20. Drawn by Karin Douthit from the type.

species which has sessile stem hairs, lacks stout yellowish leaf hairs, bears only six glands on the nearly glabrous calyx, and has glabrous petals. It is not known on the Pacific slope of Mexico from west of Oaxaca. The species that is probably most closely related to *M. wilburiorum* is *M. galeottiana* Adr. Juss., which grows in the dry thorn-scrub of Puebla and Oaxaca, where it reaches a stature of 6 m but is usually smaller. The two species are similar in their pegged stems and stout leaf hairs, and in details of the flowers, but in *M. galeottiana* the leaves are much smaller, seldom over 4 cm long, ovate with the apex acute or obtuse, and separated by shorter internodes; also, its umbels are raised on stalks seldom over 5 mm long. *Malpighia galeottiana* and *M. wilburiorum* seem to constitute a species-pair somewhat analogous to *M. novogaliciana* and *M. souzae,* but in this case the species found in Nueva Galicia grows in a more mesic habitat and has larger vegetative parts than the eastern member of the pair.

Mascagnia mesoamericana W. Anderson, sp. nov.

Foliorum majorum lamina 6.5–13 cm longa, 2.5–5 cm lata, apice acuminata, chartacea, petiolo 4–8 mm longo. Bracteae bracteolaeque persistentes vel bracteae demum deciduae, 2.5–5 mm longae, late ovatae vel suborbiculares, multis glandulis marginalibus stipitatis instructae. Sepala adaxialiter glabra vel apice tomentosa, multis glandulis marginalibus stipitatis 0.5–0.9 mm longis instructa. Samara 22–42 mm lata, forma papilionis, nuce hispida pilis 1.5–2.5 mm longis, basifixis vel sub-basifixis, alis lateralibus usque ad nucem divisis.

Woody vine; stems sericeous to glabrate. Lamina of larger leaves 6.5–13 cm long, 2.5–5 cm wide, elliptical or narrowly elliptical, gradually narrowed to a cuneate or rounded base, acuminate at apex, chartaceous, initially sericeous but soon glabrate on both sides, eglandular or bearing several tiny sessile marginal glands on each side in proximal ½, the tertiary nerves hardly or not at all sclariform, the reticulum prominulous below or on both sides; petiole 4–8 mm long, sericeous to glabrate, bearing 0–6 small glands in 2 rows; stipules small, triangular, borne on base of petiole. Flowers borne in tomentose axillary and terminal pseudoracemes or panicles, the ultimate pseudoracemes 3–9 cm long and containing 8–20 flowers; bracts and bracteoles persistent or the bracts deciduous in fruit, 2.5–5 mm long, broadly ovate or suborbicular, abaxially densely appressed-tomentose, adaxially glabrous or tomentose at margin, bearing many long-stalked clavate marginal glands; peduncle 3–5 mm long (–9 mm in fruit), bearing the bracteoles at its apex; pedicel 3–5 mm long. Sepals separating to expose petals well before anthesis, 3–4.5 mm long, 1–1.5 mm wide, triangular, bearing many stalked capitate glands 0.5–0.9 mm long on margin, abaxially appressed-tomentose, adaxially glabrous or tomentose at apex, each of the lateral 4 bearing 2 large abaxial glands 1.5–2 mm long, distally free and often recurved, the anterior sepal without abaxial glands. Petals yellow (?), abaxially densely appressed-tomentose, flat, fimbriate all around margin with fimbriae sometimes glandular-thickened; lateral petals with the claw 1.5–1.8 mm long, the limb elliptical, 4–7.5 mm long, 2.5–4.7 mm wide; posterior petal with the claw 3 mm long, the limb ovate, 5.5 mm long, 4–4.5 mm wide. Filaments very unequal, 4 mm long opposite anterior sepal, 2.2–3 mm long opposite lateral sepals and petals, 1.5 mm long opposite posterior petal, much thickened opposite 2 posterior-lateral petals, glabrous, straight, connate at base; anthers 0.8–1.2 mm long, glabrous. Ovary densely hispid; styles 2.5–3 mm long, bowed at base and then erect, dorsally truncate or apiculate at apex. Samara 22–42 mm wide, butterfly-shaped, hispid on nut, dorsal wing, and proximally on lateral wings with the hairs 1.5–2.5 mm long, basifixed or sub-basifixed, erect, borne at glandular dots, sparsely sericeous distally on wings with the hairs medifixed and appressed; lateral wings 10–20 mm wide, 15–30 mm high, trapezoidal, divided to nut at base and apex, the angle between wings widely obtuse, undulate or coarsely dentate at margin; dorsal wing 4–5 mm wide, wavy (i.e., not lying in 1 plane), ± entire; intermediate winglets none; ventral areole ovate, 2–2.5 mm high, 1.3–1.8 mm wide.

TYPE: GUATEMALA. Retalhuleu: Mixed forest along road between Retalhuleu and Nueva Linda, 120–220 m, 16 Feb 1941 fr, *Standley 87301* (F, holotype; US, isotype).

PARATYPES: MEXICO. Chiapas: Libertad, Acacoyagua, 700 m, Jan fl, *Matuda 18577* (F).—GUATEMALA. Retalhuleu: Type locality, Feb fr, *Standley 87257* (F).—PANAMA. Darién: 10 km NE of Jaqué, slopes of Río Tabuelitas above Birogueirá, Indian village on Río Jaqué below mouth of Río Pavarandó, to 120 m, Jan fl, *Sytsma & D'Arcy 3278* (MICH, MO).

This species is similar to *Mascagnia glandulifera* Cuatr., which has a thicker, broader, more abruptly acuminate leaf blade with notably scalariform veins, a longer petiole, caducous bracts, the sepals tomentose on both sides, and a larger, orbicular samara with the lateral wings continuous at the base. The disjunct distribution of the known collections leads me to expect that *M. mesoamericana* will eventually be found in the Atlantic lowlands of Costa Rica and Nicaragua.

The label of *Sytsma & D'Arcy 3278* says of this plant: "Tree, to 4 m tall, flowers whitish tan." I doubt that either statement is correct. The plant is most likely a woody vine, and its petals are probably yellow.

Mascagnia paludicola W. Anderson, sp. nov.

Foliorum majorum lamina 17–21.5 cm longa, 8–12.5 cm lata, chartacea, primo sericea mox glabrata, petiolo 15–20 mm longo, 2 (–6) glandulis instructo. Bracteae bracteolaeque 2–3 mm longae, ovatae, eglandulosae vel aliquot glandulis minutis subsessilibus marginalibus instructae. Sepala multis glandulis marginalibus sessilibus vel brevistipitatis instructa. Samara sparsim sericea pilis medifixis vel glabrata, alis lateralibus 21–24 mm latis, 39–48 mm altis, basi apiceque usque ad nucem divisis.

Woody vine; stems sericeous to glabrate. Lamina of larger leaves 17–21.5 cm long, 8–12.5 cm wide, broadly elliptical, cuneate or rounded at base, acute or abruptly acuminate at apex, chartaceous, initially sericeous but soon nearly glabrate on both sides, bearing several sessile marginal glands on each side in proximal ½, the reticulum prominent on both sides; petiole of larger leaves 15–20 mm long, sericeous to glabrate, bearing 2 (–6) glands in 2 rows; stipules minute, triangular, borne on petiole just above its base. Flowers borne in loosely sericeous axillary and terminal pseudoracemes or panicles, the ultimate pseudoracemes 4–10 cm long and containing 8–24 flowers; bracts and bracteoles soon deciduous, 2–3 mm long, ovate, abaxially loosely sericeous, adaxially glabrous, eglandular or bearing several tiny subsessile marginal glands; peduncle 2–3.5 mm long, bearing the bracteoles at its apex; pedicel 4–5 mm long. Flower parts seen only as remnants in fruit. Sepals 3.5–4.5 mm long, 1–1.5 mm wide, narrowly elliptical, each bearing all around margin a row of small capitate sessile or subsessile glands (the stalks up to 0.2 mm long), densely appressed-tomentose abaxially, sparsely so adaxially, each of the lateral 4 bearing 2 large abaxial glands 2–2.7 mm long, the anterior with 0–1 abaxial gland. Petals apparently densely tomentose on both sides. Anthers ca 1 mm long, glabrous. Styles glabrous, apparently straight, short-hooked dorsally at apex. Samara 50–55 mm wide, suborbicular, sparsely sericeous to glabrate, the hairs medifixed, some borne at glandular dots; lateral wings 21–24 mm wide, 39–48 mm high, divided to nut at base and apex, undulate and denticulate at margin; central dorsal wing 6–8 mm wide, ± semicircular, coarsely toothed; intermediate winglets none; ventral areole ovate, 2.5–3 mm high, 2–2.5 mm wide.

TYPE: BRAZIL. Amazônas: Rio Purús, Rio Ituxi, Seringal Jurucua, 120 km S of Lábrea, várzea forest, 29 Jun 1971 fr, *Prance et al. 13918* (INPA, holotype; MICH, NY, isotypes).

The name of this species, which means swamp-dweller, is given because it was collected in várzea, a type of Amazonian forest seasonally inundated by white-water rivers. It is closely related to the preceding species, *M. mesoamericana* W. Anderson, and to *M. glandulifera* Cuatrecasas. Both of those species have smaller leaves, larger bracts and bracteoles that bear many stalked marginal glands, and

longer-stalked marginal glands on the sepals. In *M. glandulifera,* which is also a species of western Amazonia, the samara bears mostly basifixed hairs and its lateral wing is continuous at the base.

Tetrapterys cordifolia W. Anderson, sp. nov.

Frutex 1–3 m altus. Foliorum majorum lamina 2.4–4.3 cm longa, 2.4–4.1 cm lata, late ovata, oblata, vel orbicularis, basi cordata vel rotundata, apice late obtusa vel rotundata et apiculata, coriacea, subtus utrinque 5–11 glandulis marginalibus instructa, reticulo utrinque prominenti; petiolus 1–1.5 mm longus. Flores in pseudoracemo elongato terminali 10–20-floro portati; bracteolae 1–2 mm longae, 0.4–0.8 mm latae, plerumque una abaxialiter 1–2-glandulifera. Sepala omnia biglandulosa. Petala staminaque glabra. Stigma apicale.

Shrub 1–3 m tall, with slender, wiry, sericeous to glabrate branches. Leaves ascending-appressed (?); lamina of larger leaves 2.4–4.3 cm long, 2.4–4.1 cm wide, broadly ovate, oblate, or orbicular, cordate or rounded at base, broadly obtuse or rounded and mostly apiculate at apex, coriaceous, initially sericeous but very soon glabrate on both sides, bearing below a row of 5–11 tiny glands on each side at or just within margin, these mostly in distal ¾ of lamina, the lateral veins and reticulum prominent on both sides; petiole 1–1.5 mm long, soon glabrate, eglandular; stipules minute nubbins ca 0.1 mm long, borne on stem at base of petiole, lacking from most nodes. Inflorescence an unbranched elongated terminal pseudoraceme, thinly stramineous-sericeous to glabrate, comprising 10–20 or more flowers that are proximally decussate but distally inserted irregularly; bracts 1.5–2.5 (–3) mm long, 0.4–0.8 mm wide, narrowly triangular or ovate, eglandular or with 1–2 small marginal glandular spots, sparsely sericeous or nearly glabrous; peduncle 4.5–8 mm long; bracteoles 1–2 mm long, 0.4–0.8 mm wide, elliptical or ovate, spreading, sparsely sericeous or nearly glabrous, borne slightly to well below apex of peduncle, opposite or, more commonly, borne at different heights, the more proximal one, or occasionally both, bearing 1 or occasionally 2 large abaxial marginal glands; pedicel 6–8 mm long. Sepals 2 mm long beyond glands, 1.5 mm wide, triangular, obtuse or rounded at apex, appressed in anthesis, abaxially thinly sericeous, ciliate on margin, adaxially glabrous, all 5 biglandular, the glands 2–2.7 mm long, 0.8–1.1 mm wide, narrowly obovate or elliptical, compressed, decurrent. Petals yellow, glabrous; lateral petals with the claw 1 mm long, the limb ca 7 mm long, 5 mm wide, quadrate or obovate, cuneate at base, denticulate or erose at margin; posterior petal hardly different from laterals, the claw slightly longer (1.5 mm), the limb somewhat crumpled. Filaments white distally, red proximally, glabrous, connate just at base, straight, longer (2–2.4 mm) and narrower opposite sepals, shorter (1.5 mm) and wider opposite petals; anthers ca 1 mm long, glabrous, the connective somewhat swollen at apex, especially in anthers opposite petals. Ovary ca 1 mm high, sericeous, 3-carpellate, each carpel bearing 4 primordial lateral wings, 2 on each side, the lower pair larger than the upper pair; styles 3, green, glabrous except just at base, 1.9–2.2 mm long, the anterior slightly longer than the posterior 2, straight, erect, the stigmas apical and without any dorsal angle or extension. Fruit not seen.

TYPE: BRAZIL. Amazônas: Plateau of northern massif of Serra Aracá, 0°51–57′N, 63°21–22′W, south side of North Mountain, 1200 m, plateau savannah, 12 Feb 1984 fl, *Prance et al. 29005* (INPA, holotype; MICH, NY, isotypes).

PARATYPES: BRAZIL. Amazônas, same locality and probably same population as type, Feb fl, *Amaral 1550* (MICH), *Prance et al. 29002* (INPA, NY).

This distinctive species is very similar to *Tetrapterys cardiophylla* Nied., which differs in having only 1 pair of leaf glands, toward the base of the lamina and set in from the margin; a short, often corymbose pseudoraceme with up to 6 (–8?) strictly decussate flowers and loose white vesture; much larger and more leaflike bracteoles (3–4 mm × 1.4–2.5 mm in the specimens I have seen); 8 calyx glands, the anterior sepal being eglandular; and internal stigmas. *Tetrapterys cardiophylla* is a rare species endemic to the Serra do Sincorá in Bahia, Brazil, far from the Serra Aracá. A similar case is that of *Verrucularia piresii* W. Anderson, endemic to the Serra Aracá, and *V. glaucophylla* Adr. Juss., another species of the Serra do Sincorá in Bahia (Anderson 1981, pp 45–48). The upland flora of the Serra Aracá apparently contains relictual elements of a savannah flora that must have formerly been much more widespread, probably during the dry periods of the Pleistocene when the wet forest had withdrawn to refugia.

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