

NOTES ON NEOTROPICAL MALPIGHIACEAE—VI

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Like the preceding installments in this series, this is a miscellany. Many of the new species described here are needed for forthcoming floristic treatments. Others are included now, rather than later, just because they took my fancy as being somehow more interesting than the usual undescribed species, of which there are many more in the Malpighiaceae than I can treat in the limited time available to me. I have long assumed that, as my collaborators and I described novelties in the family, we would find fewer and fewer until they became unusual. I suppose that time must come eventually, but I now realize that it will not arrive any time soon. Collectors continue to find obviously new species, but the more important source is careful study of the specimens we already have, which never fails to reveal subtle new species lurking unrecognized in the piles of widespread, “well-known” species.

Bunchosia cauliflora W. R. Anderson, sp. nov.—TYPE: ECUADOR. Pastaza: Río Pastaza, between Destacamento Chiriboga and Apachi Entza, 2°20–32'S, 76°55'–77°08'W, 24 Jul 1980 fr. *B. Øllgaard, E. Asanza C., J. Brandbyge, S. Roth & C. Sperling 35203* (holotype: AAU!; isotype: MICH!).

Frutex (1–) 2–3 m longus vel arbor 3–10 m alta, ramis glabris. Lamina foliorum majorum 7–12 (–13) cm longa, (2.5–) 3–5 cm lata, elliptica vel ovata, apice acuminata acumine 8–20 mm longo, glabra, abaxialiter utrinque costae (2–) 3–5 (–7) glandulis seriatis munita; petiolus 4–7 (–9) mm longus; stipulae 0.5–1.3 mm longae. Inflorescentiae caulinae, 1–3 (–4) cm longae, ex 6–30 floribus decussatis constantes. Petala omnia limbo toto circuito glanduloso-dentato vel petalum extimum distaliter eglandulosum. Filamenta sepalis opposita 2–3 mm longa, petalis opposita 1.5–2.5 mm longa; antherae 0.7–1.3 mm longae. Gynoecium 3-carpellatum, glabrum; stylus ut videtur 1, ex 3 connatis constans. Fructus siccus 8–10 mm longus et diametro, glaber, granulatus.

Shrub (1–) 2–3 m tall or tree 3–10 m tall; stems mostly quite glabrous, very rarely sparsely sericeous at first, soon glabrate. Lamina of larger leaves 7–12 (–13) cm long, (2.5–) 3–5 cm wide, elliptical or somewhat ovate, cuneate to almost truncate at base, acuminate at apex with the acumen 8–20 mm long, glabrous, bearing abaxial glands in a row of (2–) 3–5 (–7) on each side of midrib, proximally near midrib but distally often diverging toward margin, the principal lateral veins few (4–7 pairs) and arching to fuse well within margin; petiole 4–7 (–9) mm long, glabrous or bearing a few appressed hairs and soon glabrate, narrowly winged for much of its length; stipules 0.5–1.3 mm long. Inflorescences borne on old stems after leaves have fallen, never axillary to current leaves, simple or occasionally basally ternate, without vegetative leaves, single at nodes or clustered with up to 6 or more in a cluster, slender and fragile in flower, becoming stouter in fruit; pseudoraceme

1–3 (–4) cm long, containing 6–30 crowded decussate flowers, \pm persistently sericeous on axis, peduncles, and pedicels; bracts mostly 0.7–1 mm long, triangular, up to 2.5 mm long and linear at lowest nodes; peduncle 1–2 (–3.5) mm long; bracteoles 0.5–1 mm long, triangular, one of each pair bearing 1 flat basal abaxial gland 0.5–0.8 mm in diameter, this half or more below free part of bracteole on peduncle; pedicel 5–8 mm long in flower, up to 12 mm long in fruit. Sepals ca 1–1.2 mm long beyond glands and 1–1.5 mm wide, broadly obtuse or rounded, abaxially thinly sericeous, ciliate on margin, adaxially glabrous, pressed against filaments in anthesis; glands 8 (actually 10, apparently 8 through connation of 4 in pairs), 1.7–4 mm long, the anterior 2 shortest and the posterior 2 longest, obovate, compressed, glabrous, decurrent onto the pedicel. Petals yellow, glabrous, all 5 with the limb glandular-dentate or glandular-fimbriate all around the margin or the outermost with the distal divisions not or hardly glandular; lateral petals with claw 1–1.7 mm long and limb 3.5–6 mm long, 3–7 mm wide, the outermost limb largest and cupshaped, the others nearly flat; posterior petal with the thick claw 1.5–3 mm long, the limb 3.5–4.5 mm long and wide. Stamens glabrous; filaments 2–3 mm long opposite sepals, 1.5–2.5 mm long opposite petals, ca 1/2 connate; anthers 0.7–1.3 mm long, pressed against styles, the connectives glandular-swollen. Gynoecium 3-carpellate, glabrous; ovary ca 1 mm high, cylindrical, 3-locular; style apparently 1, actually 3 completely connate, 2–3 mm long, reaching higher than the anthers; 3 stigmas distinct but held together in a tight triangle, each peltate with a ventral indentation and a moderate dorsal extension. Fruit yellow, 8–10 mm long and in diameter (dried), ovoid or globose or depressed-globose, 3-lobed, glabrous, granulate.

ADDITIONAL SPECIMENS EXAMINED. **Ecuador.** NAPO: Yasuní Forest Reserve, 10 km E of Pontificia Universidad Católica station, 0°41'S, 76°28'W, *Acevedo-Rodríguez & Cedeño* 7555 (US); Reserva Étnica Huaorani, S of Río Tivacuno, 0°50'S, 76°14'W, *Aulestia & Ima* 1583 (MICH) & between Río Tivacuno and Río Yasuní, 0°50'S, 76°18'W, *Aulestia & Gonti* 1735 (MICH); Parque Nacional Yasuní, S of Río Tiputini, 0°37'S, 76°29'W, *Aulestia* 1689 (MICH), 0°36'S, 76°29'W, *Pitman & Aulestia* 206 (MICH) & 0°34'S, 76°31'W, *Pitman & Dik* 369 (MICH).—PASTAZA: Río Papayacu at Río Curaray, 1°29'S, 76°42'W, *Holm-Nielsen et al.* 22567 (AAU).—SUCUMBLOS: Shushufindi (Nueva Loja), Coca (Puerto Francisco de Orellana)—Lago Agrio, 50 km NE of Coca, *Harling & Andersson* 12004 (MICH); Lago Agrio, *Lugo S.* 3152 (MICH); Río Aguarico, 5 km S of Lago Agrio, *Lugo S.* 3184 (MICH); Las Sachas, Coca—Lago Agrio, 30–40 km NE of Coca, *Lugo S.* 3390 (MICH); Guamanayacu, Coca—Lago Agrio, 40 km NE of Coca, *Lugo S.* 3423 (MICH).

Collected in moist tropical forests at elevations of 235–400 m, with flowers from November to March and with fruits in June and July.

Most species of *Bunchosia* bear their inflorescences axillary to leaves of the current year's growth, but in this one they appear only on leafless stems at least one year old; the epithet *cauliflora* refers to that peculiarity. In some specimens several pseudoracemes are clustered at swollen nodes on stems that must be several years old, which I take to mean that the stems produce these cauline inflorescences not just once at a given node, but several times, perhaps for many years. *Bunchosia cauliflora* is also notable for the glabrous stems, the small, glabrous, long-acuminate leaves with a row of 3–5 abaxial glands on each side of the midrib, the short slender pseudoracemes of crowded decussate flowers, the glandular-dentate petals, and the glabrous tricarpetate gynoecium with the styles completely connate. The species most like this one is *B. pseudonitida* Cuatrec., which

is known from western Colombia and western Ecuador (Los Ríos and Guayas). In *B. pseudonitida* the leaf glands are fewer (usually 1 or 2 per side) and the inflorescence is borne axillary to current leaves.

Bunchosia pernambucana W. R. Anderson, sp. nov. —TYPE: BRAZIL. Pernambuco: Floresta Inajá, Reserva Biológica de Serra Negra, ascent to the forest, 8 Mar 1995 fl, *E. Menezes, E. M. Villarouco, S. S. Lira & E. Rodrigues* 33 (holotype: MICH!).

Frutex 0.8–1 m longus, ramis sericeis mox vel demum glabratiss. Lamina foliorum majorum 6.5–9 cm longa, 2.3–3.6 cm lata, elliptica, mox glabrata, abaxialiter eglandulosa vel 2 glandulis basalibus munita; petiolus 4–6 mm longus; stipulae 1–1.8 mm longae. Inflorescentia 2.5–5 cm longa, ex 6–10 floribus decussatis constans. Petala lateralia limbo eroso eglanduloso, petalum posticum limbo proximaliter glanduloso-eroso distaliter eglanduloso. Filamenta sepalis opposita 3 mm longa, petalis opposita 2.3–2.5 mm longa; antherae 1–1.3 mm longae. Gynoecium 3-carpellatum, glabrum; styli 3, usque ad medium connati vel cohaerentes, distaliter liberi. Fructus siccus 8–10 mm longus, 7–8 mm diametro, glaber, laevis (i.e., non granulatus) reticulo prominenti.

Shrub 0.8–1 m tall; stems initially thinly to moderately densely sericeous, soon or eventually glabrescent to quite glabrate. Lamina of larger leaves 6.5–9 cm long, 2.3–3.6 cm wide, elliptical, cuneate and often somewhat decurrent at base, obtuse or abruptly short-acuminate at apex, initially thinly sericeous but nearly or quite glabrate at maturity, eglandular or bearing 2 abaxial glands, 1 on each side near base (up to 7 mm above base) and beside midrib or between midrib and margin, the very fine reticulum and 7–10 pairs of lateral veins usually prominent on both sides in dried leaves but more strongly so above than below; petiole 4–6 mm long, soon glabrate; stipules 1–1.8 mm long. Inflorescence axillary, simple, without vegetative leaves, loosely sericeous to glabrate, 2.5–5 cm long, containing 6–10 decussate flowers; bracts 1–2.5 mm long, ovate, often acuminate; peduncle 0.5–2 mm long; bracteoles 1–1.5 mm long, ovate, one of the pair (sometimes both) bearing 1 (sometimes 2) raised eccentric basal-abaxial glands 0.5–1 mm in diameter; pedicel 2.5–5 mm long, sericeous to glabrate. Sepals 1–1.8 mm long beyond glands, 1.5–1.8 mm wide, broadly obtuse or rounded, glabrous except for the ciliate margin; glands 8 (actually 10, apparently 8 through connation of 4 in pairs), 1.5–3 mm long, the anterior 2 shortest and the posterior 2 longest, elliptical or obovate, compressed, glabrous, the posterior 2 decurrent further on pedicel than the others. Petals yellow, glabrous; lateral petals reflexed, the posterior erect; outermost (anterior-lateral) petal with claw 3 mm long and limb cupshaped, 5 mm long, 6 mm wide, erose, eglandular; other 3 lateral petals with claw 2.5–3 mm long, limb 4–4.5 mm long and wide, \pm flat, erose and eglandular; posterior petal with the thick claw 3.5 mm long, the limb 4.5 mm long and wide, \pm flat, erose with the proximal divisions glandular. Stamens glabrous; filaments 3 mm long opposite sepals, 2.3–2.5 mm long opposite petals, ca 1/3–1/2 connate; anthers 1–1.3 mm long, pressed against styles, the connectives glandular-swollen. Gynoecium 3-carpellate, glabrous; ovary 2 mm high, ovoid, 3-locular; styles 3, 1/2 connate or coherent, distally distinct, 2 mm long, held erect and together, reaching to or just above tops of anthers; stigmas capitate with a ventral indentation and a dorsal extension. Fruit orange-red at maturity, 8–10 mm long and 7–8 mm in diameter (dried),

ovoid, 3-lobed, glabrous, smooth (i.e., not granulate) with the reticulum of veins prominent in dried fruit.

ADDITIONAL SPECIMENS EXAMINED. **Brazil.** PERNAMBUCO: Buíque, estrada Buíque-Catimbau, 8°37'S, 37°10'W, 790 m, shrubby vegetation on sandy soil, May fr, *Laurênio et al.* 40 (MICH); type locality, open area, Mar fl, *Tschá et al.* 12 (MICH) & inside the forest, Feb fr, *Tschá et al.* 15 (MICH).

Bunchosia pernambucana is a new, northern addition to the *Bunchosia maritima* complex, whose other members (*B. acuminata* Dobson, *B. macilenta* Dobson, and *B. maritima* (Vell.) J. F. Macbr.) occur well south of Pernambuco (see Fig. 1). The new species has the small leaves, short inflorescences, glabrous ovary, and small fruit of *B. macilenta*, but the paired leaf glands, alternating long and short filaments, short styles, and smooth fruit of *B. acuminata*. Its petals are nearly eglandular, unlike those of both *B. acuminata* and *B. macilenta*.

Bunchosia petraea W. R. Anderson, sp. nov.—TYPE: VENEZUELA. Amazonas: Dept. Atures, 56 km NE of Puerto Ayacucho on road to El Burro, extensive granitic outcrop ("laja") west of road, 28 Apr 1984 fl, *T. Plowman & F. Guánchez* 13762 (holotype: MICH!; isotypes: F! VEN!). Fig. 2e-g.

Frutex fragilis 1.5 m longus, ramis primo hispidis demum glabratis, pilis plerumque V-formibus sessilibus vel subsessilibus basi interdum calcaratis. Lamina foliorum majorum 3–4 cm longa, 1.6–2 cm lata, margine costaque hispida; petiolus 2–4 mm longus, hispido-tomentosus; stipulae 0.4–0.7 mm longae. Inflorescentia 2–3 cm longa, ramum bifoliatum terminans, ex 8–12 floribus decussatis constans. Petalum posticum limbo toto circuitu glanduloso-dentato. Antherae connectivis tumidis. Ovarium 2- vel 3-carpellatum, glabrum; styli 2 vel 3, liberi, 3 mm longi.

"Open fragile shrub" 1.5 m tall; vegetative internodes initially densely hispid but many hairs deciduous as maturation occurs, the stems moderately to sparsely hispid by the end of the first year, quite glabrate in later years; hairs colorless, mostly V-shaped with \pm straight ascending arms 0.5–1 mm long, sessile or subsessile, the very short stalk apparently smooth in some hairs, bearing 1–several sharp basal spurs in others. Leaves deciduous promptly at end of each growing season, the new leaves emerging as flowers develop. Lamina of larger leaves (not fully expanded?) 3–4 cm long, 1.6–2 cm wide, elliptical, cuneate at base, obtuse or acute or slightly acuminate and usually bearing a convex gland at apex, bearing 2 large, raised, button-like glands abaxially near base beside midrib and often a distal row of smaller glands on each side between margin and midrib but closer to margin, with the 6–9 pairs of lateral veins unusually prominent below, densely hispid on the margin and moderately hispid on both sides of midrib, with only scattered hairs elsewhere on lamina, the hairs like stem hairs but with arms more widely diverging, to horizontal; petiole 2–4 mm long, eglandular, hispid-tomentose with a mixture of hairs like stem hairs and short, fat, \pm appressed, wormlike hairs, the latter occurring also on node between petioles and on abaxial midrib; stipules 0.4–0.7 mm long, narrowly triangular, perhaps distally fleshy or glandular, borne on inner face of petiole slightly above base. Inflorescence a pseudoraceme terminating a lateral shoot 1.5–3 cm long and bearing a single pair of full-sized vegetative leaves, or rarely terminating a principal shoot with several nodes; inflorescence axis 2–3 cm long, hispid like stems but with hairs shorter and less dense, the 8–12 flowers decussate from base to apex; bracts 1.5–2 mm long, ovate, abaxially

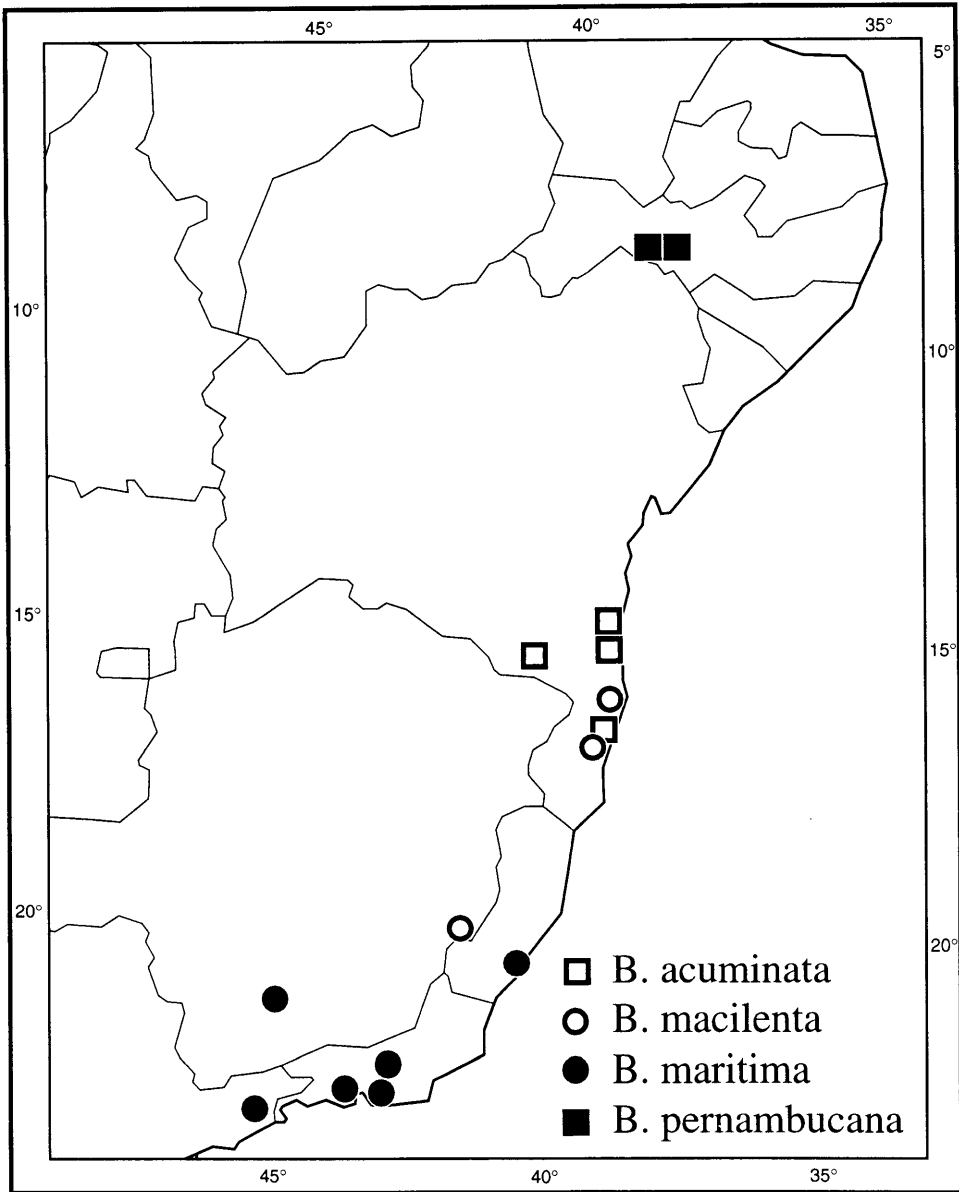


FIG. 1. Distribution of the *Bunchosia maritima* complex.

densely sericeous, adaxially glabrous; peduncle 1.5–2.5 mm long, thinly hispid like inflorescence axis; bracteoles apical or slightly subapical, 1–1.2 mm long, triangular, abaxially sericeous, adaxially glabrous, one of each pair bearing an eccentric abaxial gland 1.2–1.5 mm in diameter, the gland actually developing mostly below bracteole on peduncle; pedicel 4.5–5.5 mm long, thinly hispid especially on adaxial side. Sepals 1.7–2 mm long beyond glands, 1.7–2 mm wide, rounded, glabrous or bearing a few hairs abaxially or on margin, appressed in anthesis, the glands 10 (but appearing fewer due to fusion of adjacent glands on anterior sepals), 2.2–3.5 mm long, elliptical or obovate, the posterior glands longer and more decurrent

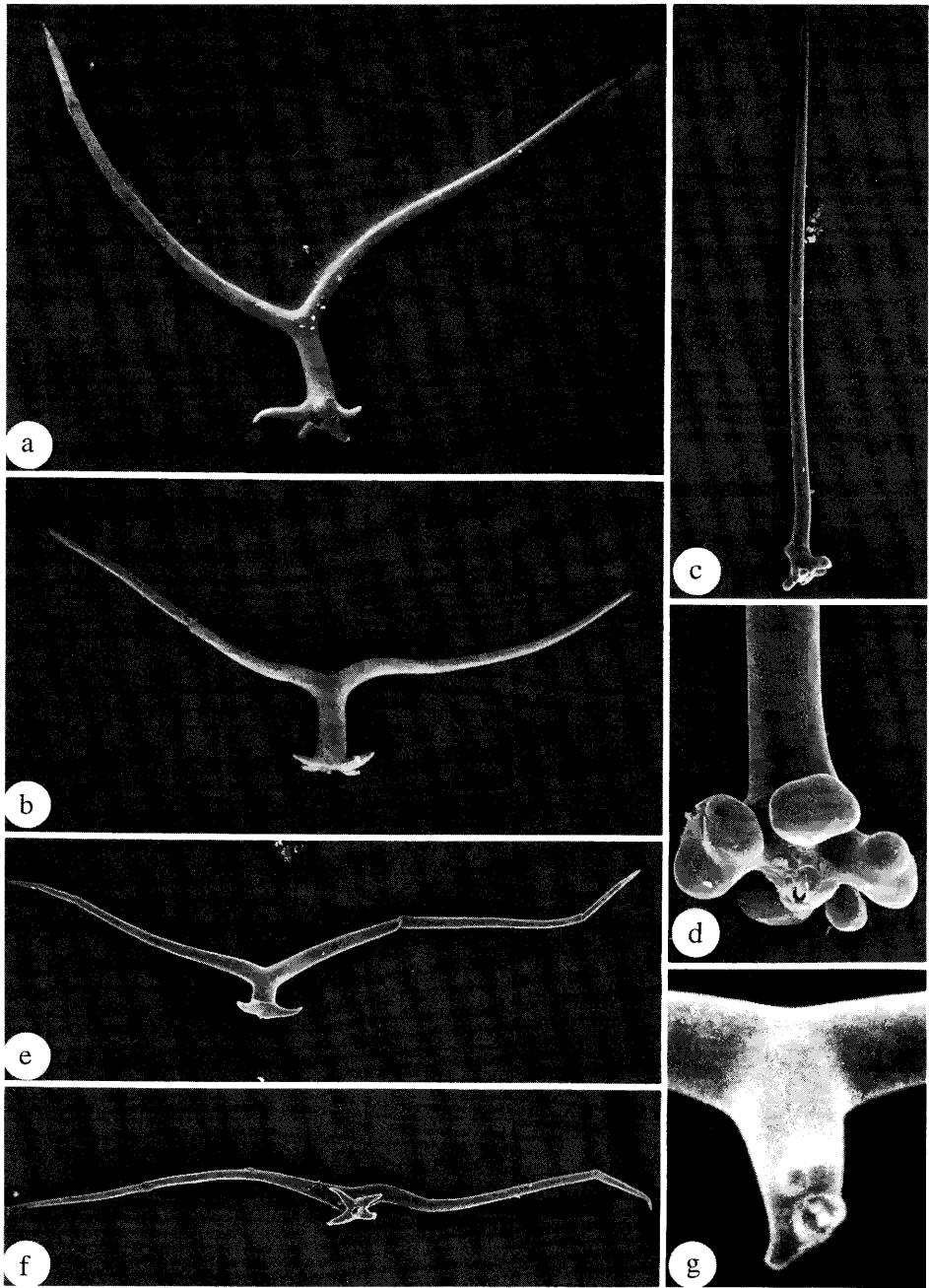


FIG. 2. Leaf hairs of the *Bunchosia mollis* complex. a, b, *B. mollis* (Gentry & Berry 14926): whole hairs, a $\times 120$, b $\times 96$. c, d, *B. thaumatothrix* (Morillo & Manara 1172): c, whole hair (note rudiment of missing branch above base), $\times 72$; d, base of a hair enlarged to show rounded basal projections, $\times 320$. e-g, *B. petraea* (Plowman & Guánchez 13762): e & f, whole hairs, $\times 72$; g, base of a hair enlarged to show rudimentary basal projections, $\times 320$. All vouchers at MICH; SEM photos by Beverly Walters.

than anterior ones, some detached at apex, glabrous. Petals yellow, glabrous; lateral petals reflexed, with the claw 3.5 mm long, the limb 6.5–8.5 mm long and wide, concave (especially the outermost), nearly orbicular, denticulate or bearing a few small glands near base; posterior petal with the claw erect, 5 mm long, very thick, constricted at apex, the limb erect or distally reflexed, 7 mm long and wide, flat, suborbicular, glandular-dentate all around the margin with the glands much larger proximally than distally. Stamens glabrous; filaments 2.5–4 mm long, longer opposite sepals than opposite petals, connate in the proximal 0.5–1 mm; anthers (1.3–) 1.6–1.8 mm long, pressed against styles in anthesis, the connective yellow or light brown, swollen and extended at right angles to anther to produce an abaxial gland 0.5–1 mm long, this much larger on anthers opposite sepals than opposite petals. Gynoecium glabrous; ovary 2 mm high, ovoid, 2- or 3-carpellate; styles as many as carpels, distinct, 3 mm long, reaching about as high as tops of anthers or slightly higher, very slender, straight and erect, the stigmas small, capitate with a very short abaxial extension. Fruit unknown.

This species is known only from the type, which was collected on top of a large boulder in the shade of trees. Its name means “rock-dweller” and refers to the fact that this seems to be another of the many species endemic to the granitic outcrops along the Río Orinoco that are known locally as “lajas.”

Bunchosia petraea is closely related to *B. mollis* Benth., which is widespread in Venezuela. *Bunchosia mollis* is a variable species, and for a long time I tried to avoid the problem presented by *Plowman & Guánchez 13762* by treating it as an aberrant representative of that species, but I have reluctantly concluded that it probably represents a species that merits recognition. In *B. mollis* the larger leaves are usually 6–18 cm long and 3–12 cm wide. Perhaps more significantly, the hairs on those leaves are abundant and evenly distributed over the whole abaxial surface, and the individual hair usually has a well-developed stalk longer than the stalk (if any) in a hair of *B. petraea* (Fig. 2). The inflorescence in *B. mollis* is also somewhat to much larger, 4–12 cm long and containing 10–30 flowers.

Bunchosia petraea bears a superficial resemblance to *B. postuma* Nied., a species of dry habitats on the north coast of Venezuela, but that has straight, sessile, appressed hairs. The spurs at the base of the hairs in *B. mollis*, *B. petraea*, and *B. thaumatothrix* constitute a synapomorphy that marks those species as a clade.

Bunchosia thaumatothrix W. R. Anderson, sp. nov.—TYPE: VENEZUELA. Distrito Federal: Camino El Rincón–Las Tunitas, SE de Maiquetía, vertiente norte de la Cordillera de La Costa, bosque tropófilo, 200–600 m, 4 Jun 1971 fl, *G. Morillo & B. Manara 1172* (holotype: MICH!). Fig. 2c–d.

Frutex 2–3 m longus, ramis primo hispidis demum glabratiss, pilis ut videtur simplicibus basi tuberculis rotundatis instructis. Lamina foliorum majorum 5–6.3 cm longa, 2.2–2.6 cm lata, supra hispida demum glabrescens, subtus pertinaciter hispida; petiolus 3–4 mm longus, hispidus; stipulae non visae. Inflorescentia 2–3.5 cm longa, ramum bifoliatum terminans, ex 6–10 floribus decussatis constans. Petala limbo toto circuitu glanduloso-dentato. Antherae connectivis non tumidis. Ovarium 3-carpellatum, glabrum; styli 3, liberi, 4–4.5 mm longi.

Shrub 2–3 m tall; stems initially densely hispid, the stiff spreading hairs golden fading to whitish, persistent during first year, deciduous in later years. Lamina of larger leaves 5–6.3 cm long, 2.2–2.6 cm wide, elliptical, cuneate at base, acute to obtuse and eglandular at apex, bearing an abaxial row on each side of 2–4 glands

between midrib and margin, with the 7–9 pairs of lateral veins prominent below but not above, initially hispid on both sides with stiff erect hairs ca 1 mm long, those of the abaxial surface whitish, very dense, persistent, those of the adaxial surface golden, less dense, eventually deciduous except from midrib and margins, the hairs mostly “basifixed,” i.e., 1-branched, occasionally with a second very short branch from the base, and subtended at very base by several (ca 4–5) short bulbous tubercles; petiole 3–4 mm long, eglandular, densely and persistently golden-hispid; stipules not found. Inflorescence a pseudoraceme terminating a lateral shoot 0.6–1 cm long and bearing a single pair of full-sized vegetative leaves; inflorescence axis 2–3.5 cm long, hispid like stems but with hairs often somewhat shorter and less dense, the 6–10 flowers decussate from base to apex; bracts 1.5–2.2 mm long, ovate, abaxially densely sericeous, adaxially glabrous; peduncle 2–4 mm long, thinly hispid, the hairs much less dense than on axis; bracteoles apical or slightly subapical, 0.8–1 mm long, ovate, abaxially sericeous, adaxially glabrous, one or both bearing an eccentric abaxial gland 1–1.5 mm in diameter, the gland actually developing mostly below bracteole on peduncle; pedicel 2.5–4 mm long, thinly hispid with the hairs mostly on the adaxial side. Sepals 1–2.2 mm long beyond glands, 2–2.5 mm wide, rounded, minutely denticulate and sometimes bearing tiny hairs on margin, otherwise glabrous or bearing a few scattered abaxial hairs, appressed in anthesis, the glands 10, 3–4 mm long, obovate and somewhat decurrent onto pedicel, sometimes detached at apex, mostly connate in pairs, glabrous. Petals yellow, glabrous; lateral petals reflexed, with the claw 2.5–3 mm long, the limb 5.5–7 mm long, 4–7 mm wide, concave, obovate, glandular-dentate or glandular-fimbriate all around the margin but with the glands larger on posterior-lateral petals than on anterior-lateral petals; posterior petal erect, the claw 3.5–4 mm long, very thick, constricted at apex, the limb 5.5 mm long, 4 mm wide, flat, elliptical, glandular-dentate all around the margin with the glands much larger proximally than distally. Stamens glabrous; filaments 3–4 mm long, longer opposite sepals than opposite petals, 1/2–2/3 connate; anthers 0.9–1.2 mm long, pressed against styles in anthesis or somewhat spreading, the connective light brown, not or only slightly swollen at apex. Gynoecium glabrous; ovary 2–2.5 mm high, ovoid, 3-carpellate; styles 3, distinct, 4–4.5 mm long, exceeding the anthers by ca 1.5 mm, very slender, straight and erect or slightly spreading, the stigmas capitate with a short abaxial extension. Fruit unknown.

This species is known only from the holotype; attempts to locate additional sheets of that number at VEN have failed. The epithet means “wonderful hair” and refers to the very peculiar hairs that distinguish the species from its closest relative, *Bunchosia mollis* Benth. In *B. mollis* the leaf hairs have both branches well developed and borne horizontally or at a wide angle from a vertical stalk, which may be rather short; the result is a hair that is T-shaped or widely V- or Y-shaped (Fig. 2a–b). In *B. thaumatohrix* there is no stalk at all and one of the two branches has been lost completely or reduced to a very short branch from the base, while the main branch is nearly or quite erect, giving the impression of a simple basifixed hair. Moreover, in *B. mollis* each hair has a basal ring of several pointed outgrowths; very short basal outgrowths are present on the hairs of *B. thaumatohrix* too, but they are rounded, not pointed (Fig. 2c–d). *Bunchosia mollis* also differs from *B. thaumatohrix* in the following ways: the leaves are mostly larger, the stipules are well developed, the inflorescence is usually longer and contains more flowers, the lateral petals are eglandular or bear only a few small glands proximally on the posterior-lateral pair, the anther connectives are notably

swollen at the apex, and the styles are shorter, up to 3 mm long, barely exceeding the anthers. *Bunchosia mollis* is not known from the Distrito Federal, but it has been collected in the adjacent state of Miranda.

Byrsonima basiliana W. R. Anderson, sp. nov.—TYPE: VENEZUELA. Amazonas: Selvas pluviales cerca y en las orillas del Río Casiquiare, entre Curimacare y Buena Vista, 2°0'N, 66°30'W, 150 m, 20–30 Oct 1986 fl. *B. Stergios*, *H. Martínez* & *O. Martínez* 9654 (holotype: MICH!; isotypes: MO! PORT! VEN!).

“Suffrutex” vel “arbor parva,” ramis vegetativis primo tomentosis vel laxe sericeis demum glabris. Lamina foliorum majorum 9.5–13.5 cm longa, 3.5–5.7 cm lata, abaxialiter pertinaciter tomentosa vel laxe subsericea vel demum glabrescens; petiolus 8–12 mm longus, primo tomentosus vel subsericeus; stipulae 1.5–2.5 mm longae, omnino connatae. Inflorescentia floribus 1 in axilla cujusque bracteae portatis; bracteae 1.2–1.5 (–2) mm longae, in fructu persistentes vel deciduae; pedunculus (0–) 0.5–2 (–3) mm longus; pedicellus 6.5–9 mm longus, circinatus in alabastro, decurvatus vel tortus in fructu. Petala rosea et alba. Antherae sericeae, loculis apice extensionibus sterilibus 0.5–1 mm longis ornatis, connectivo partem fertile loculorum ca 0.5 mm superanti. Ovarium 2 carpellis fertilibus. Fructus rubescens, ovoideus apice rostratus, 8–9.5 mm longus, 6–7 mm diametro (siccus).

“Subshrub” or “small tree”; vegetative internodes loosely sericeous or appressed-tomentose, glabrescent during the first year with the simultaneous peeling and eventually complete loss of the cuticle. Lamina of larger leaves 9.5–13.5 cm long, 3.5–5.7 cm wide, elliptical, cuneate and sometimes somewhat decurrent at base, flat at margin, mostly rounded-acute or narrowly obtuse at apex, appressed-tomentose to glabrate above with some hairs persistent on the midrib, persistently appressed-tomentose or loosely subsericeous below or eventually patchily glabrescent, the hairs sinuous to twisted, appressed to erect, the principal lateral veins 8–10 pairs, the lateral veins and reticulum prominulous above, prominent below; petiole 8–12 mm long, appressed-tomentose or subsericeous to eventually glabrescent; stipules 1.5–2.5 mm long, completely and smoothly connate, the pair rounded at apex, abaxially sericeous, adaxially glabrous. Inflorescence 10–15 cm long, densely tomentose or subsericeous to incompletely glabrescent in age, the flowers borne 1 per bract; bracts 1.2–1.5 (–2) mm long, ovate and rounded at apex, abaxially appressed-tomentose, adaxially glabrous, appressed or spreading but not revolute, persistent or deciduous in fruit; peduncle (0–) 0.5–2 (–3) mm long, variable in the same inflorescence; bracteoles like bracts but smaller, 0.7–1 mm long, persistent or deciduous in fruit; pedicel 6.5–9 mm long, densely tomentose to belatedly glabrescent, circinate in bud, decurved to twisted in fruit. Flowers ca 16 mm in diameter. Sepals all biglandular, ca 2–2.3 mm long beyond glands, ca 1.5 mm wide, triangular and obtuse or rounded at apex, abaxially densely tomentose, adaxially glabrous, strongly revolute in the distal half in anthesis, accrescent to ca 3.5 mm long and wide in fruit; glands 1.6–2.2 mm long. Petals pink and white, glabrous; lateral petals strongly recurved in anthesis, the claw ca 3 mm long, the limb 4.5–5 mm long and wide; posterior petal with the thick claw erect, 3.5 mm long, the limb ca 4 mm long, 5 mm wide. Filaments ca 2–2.5 mm long, straight, distinct, abaxially glabrous, adaxially tomentose at base; anthers 2.5–3 mm long, caducous; locules linear, densely sericeous, with the fertile part 1.7–2 mm long, drawn out at apex into slender, sterile extensions 0.5–1 mm long; connective

extended beyond fertile part of locules ca 0.5 mm, tapering distally, straight or recurved. Ovary ca 1.2 mm high, conical, glabrous or tomentose, only 2 of the locules fertile; styles 3.5–4 mm long, bent at the apex in bud, partially straightening in anthesis. Fruit reddish, ovoid with a notable apical beak, 8–9.5 mm long and 6–7 mm in diameter (dried), glabrous or tomentose to glabrate with the hairs persisting longest on the apical beak.

ADDITIONAL SPECIMENS EXAMINED: **Venezuela.** AMAZONAS: Selvas pluviales del Medio Río Emoni, 1/2 día en bongo abajo del Caño Bocón, 2°10'N, 66°17'W, 150 m, Jan fr. *Stergios et al.* 9955 (MICH, MO, PORT, VEN).

This species is named in honor of Dr. Basil G. Stergios (b. 1940), who, with the help of his collaborators from the “Universidad Nacional Experimental de los Llanos Ezequiel Zamora” in Portuguesa, has made a very significant contribution to our knowledge of the flora of Amazonian Venezuela, especially in the lowlands where life is often uncomfortable and collecting plants is far from easy. There can be little doubt that *Byrsonima basiliiana* is most closely related to *B. japurensis* Adr. Juss., whose extensive range includes the area in Amazonian Venezuela where *B. basiliiana* has been collected. The two species are linked by the connate stipules, the pink and white petals, the sericeous anthers whose locules are drawn out into long slender apical extensions and whose connective exceeds the fertile part of the locules, and the reddish fruit with an apical beak and only two fertile locules. *Byrsonima japurensis* has short, straight, strongly appressed, soon deciduous hairs on its leaves and stems; its pedicel is sessile or raised on a peduncle that is at most 0.5 mm long; and its bracts are very short, rarely exceeding 1 mm.

Byrsonima formosa W. R. Anderson, sp. nov.—TYPE: GUYANA. Kamo River, 1°32'N, 58°50'W, swamp between camp and Toucan Mountain, 260 m, 19 Sep 1989 fl. *M. J. Jansen-Jacobs 1701* (holotype: MICH!).

Arbor 5–15 m alta, ramis vegetativis glabris. Lamina foliorum majorum 4.5–10 cm longa, 2.5–5.6 cm lata, elliptica, basi cuneata, apice acuta vel breviter acuminate, glabra; petiolus 7–10 mm longus, glaber; stipulae 1–2 (–2.5) mm longae, liberae. Inflorescentia 4.2–8 cm longa, glabra, floribus in dimidio distali congestis; bracteae bracteolaeque 0.5–1.2 mm longae lataeque, persistentes; pedicellus (12–) 15–17 mm longus, circinatus in alabastro, rectus et rubescens in fructu. Sepala in fructu accrescentia usque ad 5.5 mm longa, rubescentia. Petala alba vel limbo albo et ungue roseo. Antherae 1.6–2.2 mm longae, glabrae, loculis 0.9–1.3 mm longis, dorsiventraliter complanatis, non vel vix alatis, connectivo globoso, loculos 0.7–1 mm superanti. Ovarium glabrum, loculis omnibus fertilibus. Fructus 4 mm longus, 4.5–5 mm diametro, nuce laevi debiliq.

Tree 5–15 m tall; vegetative internodes glabrous except hispid in axils of stipules. Lamina of larger leaves 4.5–10 cm long, 2.5–5.6 cm wide, elliptical, cuneate and sometimes somewhat decurrent at base, nearly or quite flat at margin, acute or abruptly short-acuminate at apex, glabrous, the principal lateral veins 8–10 pairs, prominent on both sides, poorly differentiated from parallel lesser veins and reticulum; petiole 7–10 mm long, glabrous; stipules 1–2 (–2.5) mm long, free, ovate, broadly obtuse or rounded, abaxially glabrous, adaxially densely appressed-hispid. Inflorescence 4.2–8 cm long, all or most of the flowers crowded in the distal 2–5 cm and the proximal 2–4 cm consisting of a naked stalk, the axis glabrous (except for hairs associated with bracts and bracteoles), the flowers borne

1 per bract; bracts 0.5–1.2 mm long and wide, broadly ovate to rotund, abaxially glabrous or bearing a few hairs, ciliate on the margin, adaxially glabrous except for a ring of hairs at base and between bract or bracteole and pedicel, appressed or spreading but not reflexed or revolute, persistent; peduncle none; bracteoles like bracts or smaller, especially narrower; pedicel (12–) 15–17 mm long, bearing a few scattered hairs to glabrate, pink in flower and turning red in fruit, circinate in bud, straight in fruit. Flowers ca 10–12 mm in diameter. Sepals all biglandular, 1–2 mm long beyond glands, 1.2–2 mm wide, broadly rounded, glabrous except for the ciliate margin, usually revolute in anthesis, accrescent to 3.5–5.5 mm long and 3–4.5 mm wide in fruit and turning red; glands 1.5–2.5 mm long, pink, sometimes slightly decurrent. Petals white or white with pink claws, glabrous; lateral petals strongly recurved in anthesis, the claw 2.5–3 mm long, the limb oblate, 3–3.5 mm long, 4–5.3 mm wide; posterior petal with the thick claw erect, 3–4 mm long, the limb reflexed, 3–4 mm long, ca 5 mm wide, crumpled. Filaments 1.7–2.5 mm long opposite sepals, 2.2–3 mm long opposite petals, straight, basally connate with some usually connate for ca 1 mm, abaxially glabrous, adaxially tomentose in proximal half; anthers 1.6–2.2 mm long, glabrous; locules 0.9–1.3 mm long, rounded at apex, the outer locules flattened but unwinged or bearing a barely perceptible wing less than 0.1 mm wide; connective globose, exceeding locules by 0.7–1 mm. Ovary 1–1.2 mm high, glabrous, all 3 locules fertile; styles 3–3.6 mm long, bent at the apex in bud, straightening or not in anthesis. Fruit depressed-globose, 4 mm long, 4.5–5 mm in diameter when dried (said by collector to be 7 mm in diameter), green (submature?), glabrous, the stone nearly smooth and (at least in submature fruit) relatively thin-walled and easily broken open.

ADDITIONAL SPECIMENS EXAMINED: **Guyana.** Gunn's, Essequibo River, 1°39'N, 58°38'W, savanna, 240–260 m, Sep fr, *Jansen-Jacobs et al.* 1890 (MICH). **Brazil.** AMAZONAS: Mun. Presidente Figueiredo, Rio Uatumã, canteiro de obras da Usina Hidrelétrica de Balbina, 1°30'–2°00'S, 59°30'–60°00'W, campina aberta, solo arenoso branco, Jul fl/imm fr, *Cid Ferreira* 7559 (MICH) & Sep fl/imm fr, *Cid Ferreira et al.* 8189 (MICH); Rio Negro, Preto, Matupiry, t.f. high land, caatinga, Piassabal, Nov fl, *Fróes* 22804 (IAN, UB).

The distribution of this species is shown in Fig. 3, except for the collection by Fróes, for which I have been unable to discover the exact provenance on the Rio Negro. The epithet *formosa* [handsome, beautiful] refers to the display of white petals contrasting with reddish sepals and pedicels; this must be a very attractive tree. *Byrsonima formosa* is assignable to Niedenzu's series *Platylepis*. Within that series *Byrsonima formosa* can be compared to *B. umbellata* Adr. Juss. and *B. densa* (Poir.) DC. In most characters of its inflorescence and flowers it resembles *B. umbellata*, a species with a much more southern range (see Fig. 3); even the glabrous inflorescence axis, while atypical for *B. umbellata*, is found in some populations of that species. However, *B. umbellata* has the leaves very broadly obtuse or rounded at the apex, with the petiole only 2–3.5 mm long and the stipules 2–4 mm long; the lamina is occasionally broadly cuneate at the base, but usually it is rounded to cordate. *Byrsonima umbellata* is generally a smaller plant than *B. formosa*, a shrub or small tree seldom exceeding 5 m. In its habit, leaves, and stipules *B. formosa* resembles *B. densa*, a species of northeastern Amazonia (see Fig. 3), except that the vegetative parts are quite glabrous from the beginning in *B. formosa*, while in *B. densa* they usually bear some hairs when first formed, which are soon lost. The following couplet summarizes the most consistent differences between the two species in their reproductive structures:

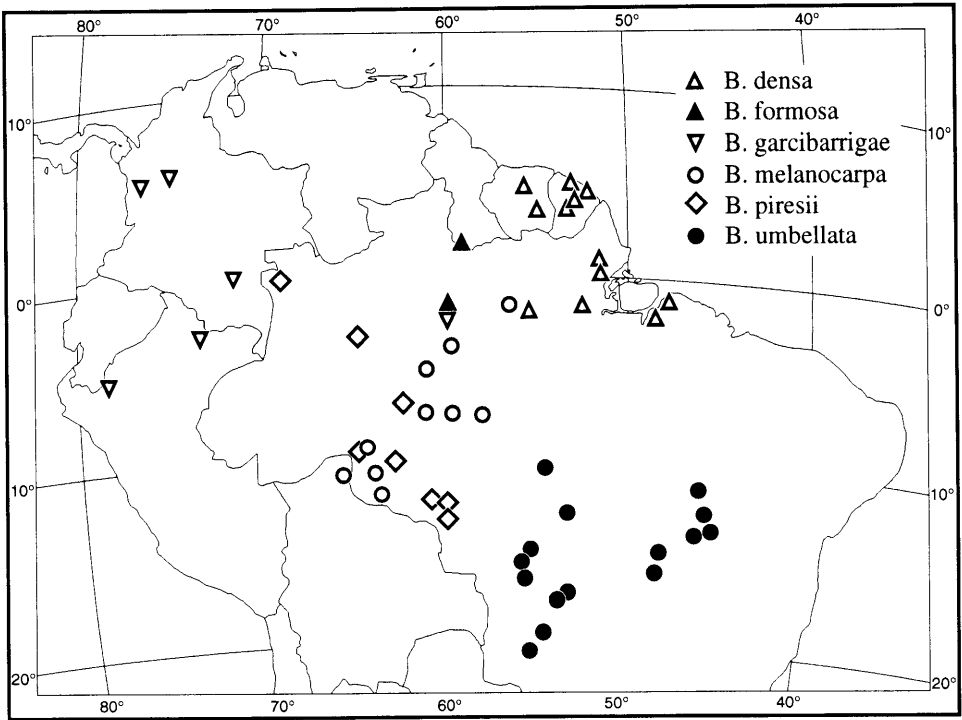


FIG. 3. Distribution of selected species of *Byrsonima* series *Platylepis*.

1. Inflorescence axis hairy, bearing flowers for about 3/4 of its length, to within 1–2 cm of the base; pedicels up to 11 mm long; petals usually reported as pink; filaments nearly or quite distinct; stone of fruit bearing prominent ribs, extremely hard. *B. densa*.
1. Inflorescence axis glabrous, with flowers mostly restricted to the distal 1/2; pedicels (12–) 15–17 mm long; petals white or white with pink claws; some or all filaments usually connate in the basal 0.5–1 mm; stone of fruit smooth, easily broken open. *B. formosa*.

It also seems likely that the sepals are much more accrescent and redder in fruit in *B. formosa* than in *B. densa*, but better field notes are needed to enable one to assess the consistency of that difference.

Byrsonima huberi W. R. Anderson, sp. nov.—TYPE: VENEZUELA. Amazonas: Departamento Atures; Sierra Maigualida, NW sector, 5°30'N, 65°15'W, small valley along an upper tributary of Caño Iguana, 2000 m, 28 Feb–3 Mar 1991 imm fl, P. E. Berry, O. Huber & J. Rosales 4829 (holotype: MICH!; isotypes: MO! MYF!).

Arbor 3 m alta, ramis pertinaciter tomentosis. Lamina foliorum majorum 5–6.8 cm longa, 2.6–3.8 cm lata, elliptica vel paulo ovata, basi cuneata vel rotundata, apice late obtusa vel rotundata, coriacea, abaxialiter dense et pertinaciter tomentosa; petiolus 8–12 mm longus, pertinaciter tomentosus; stipulae 3–4 mm longae, connatae, abaxialiter tomentosae, adaxialiter glabrae. Bracteae bracteolaeque persistentes; pedicellus 8 mm longus in fructu. Sepalorum glandulae roseae. Antherae glabrae, connectivo loculos non superanti. Ovarium glabrum. Fructus siccus 10 mm diametro.

Tree 3 m tall; stems densely and persistently tomentose, the hairs turning from ferrugineous or reddish brown to dark brown and eventually fading to gray or white. Lamina of larger leaves 5–6.8 cm long, 2.6–3.8 cm wide, elliptical or slightly ovate, cuneate to rounded at base, somewhat revolute in age, broadly obtuse to rounded at apex, coriaceous, adaxially initially ferrugineous-tomentose but the hairs fading and gradually deciduous in age, with some gray hairs usually persistent at least on midrib, abaxially densely and persistently tomentose with the hairs so dense as to completely hide the epidermis, the hairs turning from reddish brown to dark brown to gray, most hairs strongly twisted and tightly held but the midrib bearing also an admixture of straight spreading hairs 0.8–1.4 mm long; lateral veins 7–9 pairs, the lateral veins and reticulum sunken adaxially to produce a rugose effect, prominent abaxially; petiole 8–12 mm long, densely and persistently tomentose with the same mixture of hair types as the abaxial midrib, fading from brown to gray; stipules 3–4 mm long, completely and smoothly connate with the pair rounded or slightly emarginate at apex, abaxially densely and persistently appressed-tomentose, adaxially glabrous. Inflorescence up to 8 cm long, densely and persistently brown- to gray-tomentose with a mixture of twisted appressed hairs and straight spreading hairs, the flowers restricted to the distal 1/2–2/3 of the axis and borne 1 per bract; bracts 2.5–3 (–3.5) mm long, 1.5–2 mm wide, triangular or ovate, abaxially densely tomentose, adaxially glabrous, spreading to revolute, persistent; peduncle none; bracteoles like the bracts but smaller; pedicel 8 mm long (1 seen, on a detached fruit), densely and persistently tomentose, straight or slightly nodding (?) in fruit. Sepals all biglandular, 3.5–5 mm long and 3–4 mm wide in fruit, abaxially densely and persistently tomentose, adaxially glabrous, the glands pink, 1.5–2 mm long in fruit. Petals glabrous. Filaments abaxially glabrous, adaxially hirsute at base; anthers glabrous, the locules cylindrical, the connective not or hardly exceeding the locules. Ovary glabrous. Fruit “dull orange,” 10 mm in diameter (dried), globose or slightly ovoid, glabrous.

This most interesting species is named in honor of my friend Dr. Otto Huber (b. 1944), in recognition of his contributions to the botany of the Venezuelan Guayana. The type is the only known collection, and it is grossly inadequate, as it bears only extremely immature flower buds (so young that the pedicel is not at all elongated and the petals are not yet visible), one old inflorescence axis, and one detached fruit. I am therefore uncertain about many of the characters necessary for the placement of the species in the genus *Byrsonima*. The buds are so young that it is impossible to say whether or not the pedicel becomes circinate as it elongates. The pink calyx glands, noted by the collectors, tell us that the petals are almost certainly white or pink, most likely white turning pink in age. The anthers are so immature that it is possible, but not very probable, that the connective enlarges and exceeds the locules at maturity. The pedicel of the single detached fruit is straight, not curved or twisted, but the fruit itself seems to face somewhat downward, so I suspect this will prove to be one of those species in which the pedicels are not strongly decurved but the fruits are not held erect. Future collections of *B. huberi* will certainly correct and complement my very tentative description.

No species known to me from northern South America could be mistaken for *Byrsonima huberi*, which is distinguished by the following combination of characters: Lamina densely and persistently tomentose below, stipules connate, white/pink petals, glabrous anthers with cylindrical locules and the connective not or hardly exceeding the locules, and a glabrous ovary. To find other species with that

suite of characteristics, one must cross the Amazon basin and go to Minas Gerais in the Planalto of Brazil. There *Byrsonima macrophylla* (Pers.) W. R. Anderson [= *B. nervosa* DC.] and *B. variabilis* Adr. Juss. share all of the above features with *B. huberi*, except that in the same flower of *B. macrophylla* there is a series of anthers from some with the connective equalling the locules to others with the connective distinctly exceeding the locules. Both *B. macrophylla* and *B. variabilis* differ from *B. huberi* in having the bracts and bracteoles mostly deciduous during anthesis or at least before maturation of the fruit, and in both species the pedicel is strongly decurved in fruit, becoming twisted in *B. variabilis*. *Byrsonima macrophylla* strongly resembles *B. huberi* in its rugose coriaceous leaves, whose tomentum undergoes the same aging from dark brown to gray. However, the leaves of *B. macrophylla* are much larger (laminae $10\text{--}23 \times 4.5\text{--}12$ cm), the inflorescence is longer (10–27 cm), the flowers are often borne 2 (–3) per bract, and the fruit is much larger, 15–20 mm in diameter when dried, up to 25 mm in diameter when fresh. In *B. variabilis* the lamina is comparable in size to that of *B. huberi*, the inflorescence is about the same length, and the flowers seem to be borne 1 per bract. However, *B. variabilis* has a very short petiole, usually 1–4 mm long, shorter than the stipules to slightly longer, never twice as long. The bracts are long (3–5 mm) and narrow, and the fruit is smaller, 5–6 mm in diameter when dried.

Given their deciduous bracts and bracteoles and decurved pedicels, I hesitate to claim too much for *B. macrophylla* and *B. variabilis* as putatively closest relatives of *B. huberi*. However, the three species do share a number of significant character-states, and all three grow in rather similar habitats, open vegetation on nutrient-poor soils among rock outcrops at elevations of 1000–2000 m, so they may really be sister species. If so, that raises the intriguing question of how their disjunct distribution came about.

Byrsonima melanocarpa Ducke, Arch. Jard. Bot. Rio de Janeiro 3: 180. 1922.—

TYPE: BRAZIL. Pará: Campinas do Achipicá, Baixo [Rio] Trombetas, 20 Sep 1910 fl/fr, A. Ducke s.n. [Museu Goeldi 10948] (lectotype, here designated: MG! F neg. 45549).

When Ducke described this species he correctly placed it in Niedenzu's series *Platylepis* but did not explicitly compare it to any of the other species in the series. He simply stated that one could recognize the species by the fact that the petals are white throughout anthesis, the inflorescence turns red in fruit, and the very small fruit is black at maturity. Unfortunately, all of those character-states are found also in *Byrsonima umbellata* Adr. Juss., 1840, and for some years I have been unsure that *B. melanocarpa* would survive careful comparison with *B. umbellata*. Both species are shrubs or small trees, usually growing in periodically inundated sandy *campos* or near water, especially at the margin of woods or gallery forests. In both the glabrous lamina is very broadly obtuse or rounded at the apex, and the lamina is often glaucous abaxially when young. The lamina in *B. melanocarpa* is cuneate to rounded or rarely subcordate at the base, while that of *B. umbellata* is typically subcordate or cordate at the base, but in some populations it is merely truncate or even cuneate. Similarly, the lamina is mostly narrower in *B. melanocarpa* than in *B. umbellata*, but the two overlap considerably in this character. One easy course would be to sink *B. melanocarpa* into synonymy under *B. umbellata*, but study of the collections at MICH suggests that there do exist two similar but separable taxa, and that they are geographically disjunct. Therefore, I

shall continue to recognize *B. melanocarpa*, at least for now. The couplet below summarizes the differences that most reliably distinguish these two species, and their distributions are shown in Fig. 3.

1. Stipules 2–4 mm long, the petiole 0.5–1.2 (–1.4) times as long as stipules; most inflorescences with all or most flowers borne well above middle of inflorescence axis, occasionally with an isolated pair of flowers near or below the midpoint; bracts and bracteoles mostly appressed or spreading, occasionally revolute at the apex; claw of lateral petals 3.3–4 mm long; claw of posterior (flag) petal 3–4.5 mm long; styles 3.3–4.2 mm long. *B. umbellata*.
1. Stipules 1–2 (–2.4) mm long, the petiole (1.5–) 2–3 times as long as stipules; flowers usually borne down to or below the midpoint of the inflorescence axis; bracts and bracteoles mostly strongly revolute; claw of lateral petals 1.7–3 mm long; claw of posterior (flag) petal 1.7–2.5 mm long; styles 2.2–3.2 mm long. *B. melanocarpa*.

For those using Niedenzu's 1928 treatment of *Byrsonima*, a note of clarification is in order. He listed *B. melanocarpa* as a synonym of *B. coniophylla* Adr. Juss., which he included in his series *Platylepis*. He did this because the two specimens to which he assigned the name *B. coniophylla* represented *B. melanocarpa* (indeed, one was a syntype), and he never saw the type of *B. coniophylla*. In fact *B. coniophylla* is superficially similar to *B. melanocarpa* but has very different anthers and leaf venation, and while I am not certain where it belongs in *Byrsonima*, I can say that it is not a good candidate for inclusion in series *Platylepis* because its stipules are often partly to fully connate; see my treatment for the Guayana Highland (1981).

Niedenzu's name *Byrsonima* series *Platylepis* (Arbeiten Bot. Inst. Königl. Lyceums Hosianum Braunsberg 1: 33. 1901) was described with several syntypes, not all of which I would include in the group. I here select *Byrsonima densa* (Poir.) DC. as the lectotype of that name.

Byrsonima pedunculata W. R. Anderson, sp. nov.—TYPE: BRAZIL. Pernambuco: Brejo da Madre de Deus, Bituri, roadside, 4 Feb 1995 fl. *M. J. N. Rodal & M. F. Sales 459* (holotype: MICH!; isotype: NY!).

Arbor 7 m alta. Lamina foliorum majorum 9.5–12.5 cm longa, 3.5–5.4 cm lata, costa tomentosa; petiolus 9–11 mm longus; stipulae 3–4 mm longae, omnino connatae vel distaliter liberae. Inflorescentiae bractee 4–5 mm longae, 1–1.5 mm latae, caducae; pedunculus (2–) 3–7 mm longus, 1–2-florus; bracteolae 1.5–2.5 mm longae lataeque, caducae; pedicellus 9–10 mm longus. Calycis glandulae 2.6–3.1 mm longae. Petala alba. Filamenta 2–2.2 mm longa; antherae 2.5–3.1 mm longae, sericeae inter loculos, connectivo loculos aequanti. Ovarium conicum, sulcatum, sparsim sericeum, 3 loculis omnibus fertilibus.

Tree 7 m tall; stems persistently sericeous in the first year and glabrate in subsequent years, the hairs brown, straight and appressed or somewhat spreading. Lamina of larger leaves 9.5–12.5 cm long, 3.5–5.4 cm wide, elliptical or somewhat ovate, cuneate at base, bluntly acute or slightly acuminate at apex, nearly glabrate on both sides at maturity except for the \pm persistently tomentose midrib, the principal lateral veins 8–9 pairs, prominent below; petiole 9–11 mm long, persistently tomentose or eventually glabrescent; stipules 3–4 mm long, completely connate or distinct just at apex, the pair smooth or sometimes somewhat sulcate abaxially, abaxially densely and persistently sericeous, adaxially glabrous. Inflorescence up to 14 cm long with flowers absent from the proximal 3 cm of the axis,

proximally sericeous and somewhat glabrescent, distally (among flowers and on peduncles and pedicels) persistently tomentose; bracts 4–5 mm long, 1–1.5 mm wide, linear or very narrowly triangular, somewhat to strongly revolute or reflexed, abaxially loosely sericeous, adaxially glabrous or bearing a few hairs, caducous; peduncle (2–) 3–7 mm long, bearing 1–2 flowers; bracteoles 1.5–2.5 mm long and wide, triangular, mostly revolute at apex, abaxially loosely sericeous to tomentose, adaxially nearly glabrous, caducous; pedicel 9–10 mm long, straight in bud (or slightly circinate?). Flowers 15 mm in diameter. Sepals all biglandular, 2–2.2 mm long beyond glands, 1.7–2.5 mm wide, triangular and rounded at apex, appressed in anthesis but revolute at apex, abaxially sericeous, adaxially glabrous; glands 2.6–3.1 mm long, obovate. Petals white, glabrous; lateral petals reflexed, with the claw 2.5–3 mm long, the limb 6–7 mm long, 6–8 mm wide, cupshaped, entire or erose; posterior petal erect, the claw 3.2 mm long, stout, eglandular, the limb 3.5 mm long, 4.5 mm wide, corrugated, erose. Filaments 2–2.2 mm long, nearly distinct, abaxially glabrous or sparsely hirsute at base, adaxially hirsute on proximal half with the hairs reaching to base of anther; anthers 2.5–3.1 mm long, the locules linear, unwinged, seemingly glabrous or bearing a few straight appressed hairs but densely sericeous between locules, the connective equalling the locules. Ovary 1.5 mm high, conical, sulcate, sparsely sericeous, all 3 locules fertile; styles 3.2–3.6 mm long, bent over at apex in bud and retaining some curvature in anthesis. Fruit unknown.

This species is named for its well-developed peduncles, which are rare in *Byrsonima*. It is probably most closely related to *B. cacaophila* W. R. Anderson, which resembles it not only in having long peduncles often bearing more than one flower, but also in its similarly shaped bracts and bracteoles, its white petals, and the sericeous anthers with connectives that do not exceed the locules. *Byrsonima cacaophila* has substantially larger leaves than *B. pedunculata* (13–24 × 5.5–10 cm) with straight, more or less appressed hairs, and its petiole is longer (12–32 mm). Its bracts and bracteoles persist past maturity of the fruit, its pedicels are only 5–7 mm long, and its calyx glands are longer (3–4 mm), as are its filaments (2.5–3 mm).

Byrsonima piresii W. R. Anderson, sp. nov.—TYPE: BRAZIL. Rondônia (“Mato Grosso”): 66 km W of Vilhena, Brasília–Acre Highway, forest along igarapé, 3 Sep 1963 fl, B. Maguire, J. Murça Pires, C. K. Maguire & N. T. Silva 56531 (holotype: MICH!; isotype: NY!).

Arbor 8–25 m alta, ramis vegetativis glabris. Lamina foliorum majorum 6–12.3 cm longa, 3–5.7 cm lata, elliptica vel obovata, apice late obtusa vel rotundata, glabra; petiolus 13–24 mm longus, glaber; stipulae 2.3–5 mm longae, liberae. Inflorescentia 8–16 cm longa, sericea vel subvelutina; bracteae bracteolaeque minimae, 0.5–0.7 mm longae, rotundatae, erectae, persistentes; flores singuli in axilla cujusque bracteae; pedicellus 5–7 mm longus, circinatus in alabastro, rectus in fructu. Sepala per anthesin appressa, in fructu vix accrescentia. Petala alba. Filamenta liberae; antherae 1.3–1.6 mm longae, glabrae, loculis 0.7–1 mm longis, dorsiventraliter complanatis alatis ala 0.2–0.4 mm lata, connectivo globoso, loculos 0.4–0.6 mm superanti. Ovarium glabrum, 3 loculis omnibus fertilibus. Fructus usque ad 6 mm longus et diametro, nuce tuberculata.

Tree 8–25 m tall; vegetative internodes glabrous except hispid in axils of stipules. Lamina of larger leaves 6–12.3 cm long, 3–5.7 cm wide, elliptical or somewhat obovate, cuneate and often somewhat decurrent at base, flat at margin,

broadly obtuse to rounded and sometimes slightly apiculate at apex, glabrous, the principal lateral veins 9–12 pairs, prominulous above, prominent below, well differentiated from lesser veins and reticulum; petiole 13–24 mm long, glabrous; stipules 2.3–5 mm long, free, ovate, broadly obtuse, abaxially glabrous, adaxially appressed-hispid. Inflorescence 8–16 cm long with the proximal 2–3 (–4) cm of the stalk lacking flowers, the axis persistently sericeous or subvelutinous and turning red in fruit, the flowers borne 1 per bract; bracts 0.5–0.7 mm long, 0.7–1 mm wide, broadly ovate to rounded, glabrous abaxially and on margin or bearing a few hairs, adaxially glabrous except for a ring of hairs at base and between bract and pedicel, erect, persistent; peduncle none; bracteoles like bracts or smaller, especially narrower; pedicel 5–7 mm long in flower, up to 9 mm in fruit, persistently tomentose, circinate in bud, straight in fruit. Flowers ca 9–10 mm in diameter. Sepals all biglandular, 0.7–1.5 mm long beyond glands, 1.3–1.5 mm wide, broadly rounded, sparsely sericeous abaxially just above glands, short-ciliate on margin, otherwise glabrous, not or only slightly accrescent in fruit and probably turning red; glands white turning red, 1.2–1.9 mm long, the posterior pair longer than others and often decurrent. Petals white turning pink or red in age, glabrous; lateral petals spreading to strongly recurved in anthesis, the claw 1.5–2 mm long, the limb concave-oblato, 2.5–3 mm long, 4–4.5 mm wide; posterior petal with the thick claw erect, 2–2.5 mm long, the limb reflexed, 2.5–3.5 mm long, 3.5–4 mm wide, crumpled. Filaments 1.3–1.5 mm long opposite sepals, 1.7–2 mm long opposite petals, straight, distinct, abaxially glabrous, adaxially sericeous proximally; anthers 1.3–1.6 mm long, glabrous; locules 0.7–1 mm long, rounded or short-apiculate at apex, the outer locules flattened and bearing a dark, well-developed wing 0.2–0.4 mm wide; connective globose, exceeding locules by 0.4–0.6 mm. Ovary 0.8–1.2 mm high, glabrous, all 3 locules fertile; styles 2–2.7 mm long, bent at the apex in bud, straightening or not in anthesis. Immature fruit ovoid and notably beaked, ca 5 mm long and 3.5 mm in diameter (dried), becoming 5–6 mm long and in diameter and nearly globose at maturity, glabrous, the stone bearing prominent horizontally oriented protuberances, very hard.

ADDITIONAL SPECIMENS EXAMINED. **Brazil.** AMAZÔNAS: Mpio Alvarães, Rio Solimões, Lago de Alvarães, 3°13'S, 64°50'W, *Amaral et al.* 668 (MICH); Rio Negro, Santa Izabel, *Black* 48-2849 (IAN); Mpio Humaitá, near Livramento on Rio Livramento, *Krukoff* 6934 (G, MICH, NY); Mpio Humaitá, estrada Humaitá–Pôrto Velho km 38, 8°S, 63°W, *Teixeira et al.* 277 (MICH).—MATO GROSSO: Mpio Vila Bela da Santíssima Trindade, 58 km S of Rondônia state line on BR364 from Vilhena to Cáceres, 13°22'S, 59°56'W, *Thomas et al.* 4769 (MICH).—RONDÔNIA: 2–4 km E of Mutumparaná on road to Pôrto Velho, *Prance et al.* 8799 (MICH, NY); 4 km de Vilhena, 12°45'S, 60°10'W, *Vieira et al.* 810 (INPA, MICH).

Forests on *terra firme*, collected with flowers from September to November, and with fruits in October, November, and May.

I am happy to name this beautiful plant in honor of João Murça Pires (1917–1994), a fine botanist who was very kind to me when I started working in Brazil some 25 years ago. *Byrsonima piresii* is a species of Niedenzu's series *Platylepis*. Among the other species of that difficult group, it is notable for its relatively large stipules, obtuse to rounded leaf tips, long and very dense inflorescence with a hairy axis, extremely short bracts and bracteoles, and anther locules bearing wide longitudinal wings. As Fig. 3 shows, *Byrsonima piresii* is a species of western Amazonia, where it is to be distinguished from *B. garcibarrigae* Cuatrec. and *B. melanocarpa* Ducke. The following key should facilitate their separation:

1. Shrubs or small trees 1.5–5 (–7) m tall; petioles 2–5 mm long. *B. melanocarpa*.
1. Trees (4–) 8–25 m tall; petioles 12–25 mm long.
 2. Lamina mostly acuminate at apex, occasionally acute; stipules 1–1.5 mm long; bracts 1–1.5 mm long, triangular, often revolute; flowers 1–2 per bract; sepals revolute in anthesis, accrescent in fruit, to 2.5–3 mm long; anther locules not or hardly winged, the wing up to 0.1 mm wide. *B. garcibarrigae*.
 2. Lamina broadly obtuse to rounded at apex; stipules 2.3–5 mm long; bracts 0.5–0.7 mm long, broadly obtuse or rounded, erect; flowers never more than 1 per bract; sepals appressed in anthesis, not or hardly accrescent in fruit, to 1.5 mm long; anther locules bearing a well-developed wing 0.2–0.4 mm wide. *B. piresii*.

Dicella aciculifera W. R. Anderson, sp. nov.—TYPE: COSTA RICA. Puntarenas: Cantón de Osa, Península de Osa, Río Termo 2 km arriba de la Estación Cerro de Oro, 8°32'50"N, 83°30'45"W, 220 m, primary forest, 14 Apr 1996 fr, *L. Angulo 594* (holotype: MICH!; isotype: INB!). Fig. 4.

Dicellae julianii similis, sed petalis lateralibus limbo 9–13 mm longo et 7.5–10 mm lato, petalo postico limbo 7.5–8 mm longo et 6–7 mm lato, stylis divergentibus teretibus dorsaliter apiculatis, et nuce pilis aciculiformibus dense vestita differt.

Woody vine; stems tightly sericeous to glabrate. Lamina of larger leaves 11–15 cm long, 4.5–8 cm wide, ovate or elliptical, broadly cuneate or rounded at base, abruptly acuminate at apex, bearing several small impressed glands on margin, sericeous to glabrate at maturity with the midrib and sometimes the lateral veins ± persistently sericeous and sometimes with scattered hairs persistent elsewhere on the abaxial surface, the principal lateral veins 4–6 pairs, prominent below but not above, the intricate reticulum visible and ± prominent on both sides in dried leaves; petiole 11–13 mm long, persistently sericeous, eglandular; stipules interpetiolar, triangular, minute (0.2–0.3 mm long), difficult to find and perhaps not always present. Inflorescence terminal and axillary, densely and persistently sericeous, a compound panicle composed of strictly decussate pseudoracemes, each pseudoraceme 0.5–1.5 cm long and containing 2–8 flowers; bracts 3–3.5 mm long, 2.4–2.8 mm wide, boatshaped, abaxially sericeous, adaxially glabrous except tomentose near apex, deciduous before or during anthesis; peduncle 5–6 mm long, persistently sericeous; bracteoles apical, 2.5–3 mm long, 1.5–2 mm wide, obovate and rounded at apex, concave, abaxially sericeous, adaxially glabrous, eglandular, persistent during anthesis, mostly deciduous in fruit; pedicel 9–10 mm long in flower, 16–18 mm long in fruit, persistently sericeous. Sepals 2–2.2 mm long beyond glands, 2–2.5 mm wide, broadly rounded at apex, abaxially densely and evenly golden-sericeous, adaxially glabrous, pressed against stamens in anthesis, the anterior sepal eglandular or rarely bearing 1 small gland, the lateral 4 biglandular with the glands 1.8–2.5 mm long, elliptical or obovate, detached at apex. Petals yellow, flat or nearly so, obovate or orbicular, cuneate or truncate at base, broadly rounded at apex, erose or denticulate at margin with the proximal teeth sometimes glandular especially in posterior petal; 4 lateral petals probably spreading to reflexed, abaxially densely golden- or silvery-sericeous with the hairs completely covering claw and limb to margin or nearly to margin in posterior-lateral pair, the claw 2.5 mm long, the limb 9–13 mm long, 7.5–10 mm wide, larger in anterior pair than in posterior pair; posterior petal probably erect, abaxially densely appressed-tomentose on claw and in center of limb and glabrous toward margin, the claw 3 mm long, the limb 7.5–8 mm long, 6–7 mm wide. Stamens with the filaments 2.5–2.7 mm long, connate for ca 2 mm, abaxially sericeous, adaxially

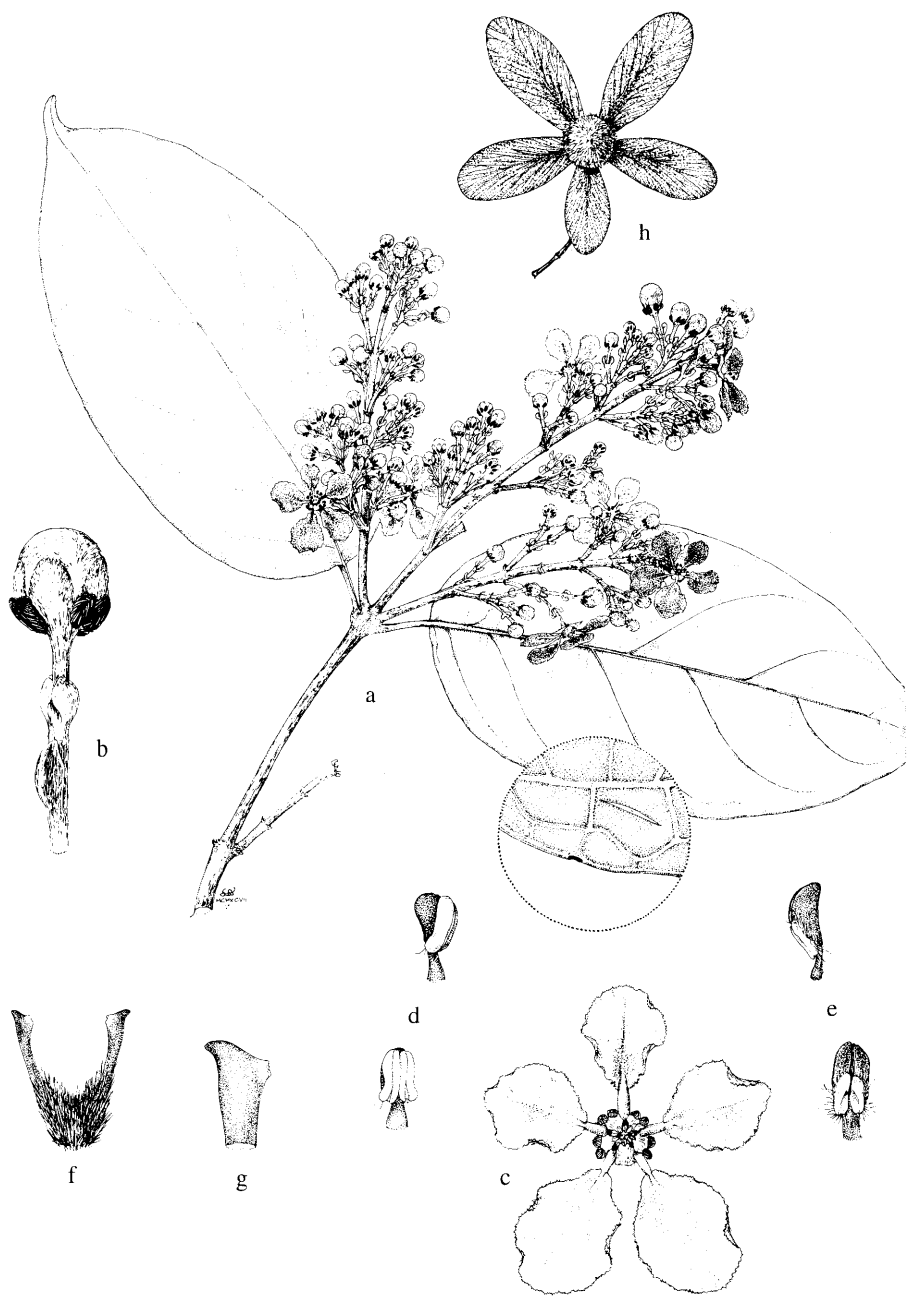


FIG. 4. *Dicella aciculifera*. a) flowering branch, $\times 0.5$, with enlargement of edge of abaxial surface of lamina, $\times 10$; b) flower bud with pedicel, bracteoles, peduncle, and subtending bract, $\times 2.5$; c) flower from above, with posterior (flag) petal uppermost, $\times 1.5$; d) side and adaxial views of anthers opposite petals, $\times 5$; e) side and adaxial views of anthers opposite sepals, $\times 5$; f) gynoecium, $\times 5$; g) style-apex, $\times 15$; h) fruit from above, with anterior sepal pointing downward, $\times 0.5$. Drawn by Karin Douthit, a–g from *Angulo 116*, h from *Angulo 594*.

glabrous; anthers strongly reflexed in anthesis, all fertile; locules 0.8–1.3 mm long, pilose on anthers opposite sepals, glabrous or bearing a few hairs on anthers opposite petals; connective red, ventrally sulcate from locules to apex, exceeding locules by 0.9–1.1 mm in anthers opposite sepals, 0.1–0.6 mm in anthers opposite petals. Ovary ca 1 mm high, very densely hispid, only the 2 posterior locules fertile; 2 posterior styles well developed, 2.3 mm long, strongly divergent from base, proximally sericeous, distally glabrous, nearly straight, and nearly terete with an internal stigma and extended at the apex into an acute dorsal projection ca 0.1–0.2 mm long; slender rudimentary style 0.7–1 mm long present on sterile anterior carpel, hidden among hairs. Fruit with the nut spherical, 11–14 mm in diameter, completely enclosed in a dense layer of sub-basifixed, stiff, somewhat spreading, needle-like hairs 1.5–2.2 mm long, and beneath the needle-like hairs densely sericeous with soft, appressed, \pm medifixed hairs only 0.5–0.7 mm long; wings formed by enlargement of the sepals elliptical or obovate, abaxially thinly sericeous to glabrate, with the veins and reticulum prominent on both sides, the anterior smallest (2.4–2.5 cm long, 1.3–1.6 cm wide), the anterior-lateral pair 3–3.2 cm long and 1.3–1.6 cm wide, the posterior-lateral pair 3.4–4 cm long and 1.6–2 cm wide.

ADDITIONAL SPECIMEN EXAMINED. **Costa Rica.** PUNTARENAS: Cantón de Osa, Península de Osa, R. F. Golfo Dulce, Cerro de Oro, alrededor del Albergue "Unioro," Sendero Termo, 8°39'20"N, 83°26'30"W, 270 m, ripario, Mar fl, *Angulo 116* (MICH).

Dicella aciculifera is assignable to sect. *Macropterys* Chase (Chase, 1981), and resembles, in both leaves and fruits, its geographically closest neighbor, *D. julianii* (J. F. Macbr.) W. R. Anderson. *Dicella julianii* differs from *D. aciculifera* in several details, such as its longer pseudoracemes and its larger bracts that persist during anthesis, but the two differ most dramatically in their fruit hairs, styles, and petals. *Dicella aciculifera* is immediately distinguished by the dense covering of stiff needle-like hairs that completely conceal the nut. Nothing like them is found in any other species of *Dicella*; indeed, the underlayer of soft appressed hairs found on *D. aciculifera* fruits resembles the vesture found on the ovary and young fruits of its congeners, so it seems likely that the ancestor of *D. aciculifera* started with a sericeous fruit and added the dense coat of formidable needles. The epithet *aciculifera* (bearing little needles) refers to those hairs. The collector of the type noted them, describing them in Spanish as "urticantes." Many descriptions of Malpighiaceae accuse members of the family of having "stinging" or "urticating" hairs, but they do not. The ability of those hairs to irritate is entirely mechanical—they inject no chemical substance like the truly stinging hairs of some Urticaceae and Euphorbiaceae. Of course, when the hairs are pointed on both ends, as in *Dicella aciculifera*, they have a doubled potential for inflicting pain—they get you coming and going, so to speak.

Dicella aciculifera is also remarkable for its styles. In other species of the genus the style is laterally flattened and longitudinally rolled, such that the stigma faces toward the posterior petal and the dorsal sterile portion looks like a rounded or angled shoulder or rostrum; see Chase, 1981, Fig. 2, and Anderson, 1981, Fig. 58. Nothing of the sort occurs in *D. aciculifera*. The style is terete or only very slightly flattened. The stigma is internal, and there is a short, acute, apical-dorsal extension; the style looks just like that found in many species of wing-fruited Malpighiaceae, in genera such as *Heteropterys* and *Hiraea*. Moreover, in *D. aciculifera* the two styles are strongly divergent from the base, then ascending; in other

species of the genus, as shown in the figures cited above, the styles are erect and parallel, not at all divergent. The new species has unusually large petals for a *Dicella*; in *D. julianii*, the limb of the lateral petals is only $7-9 \times 5-6.5$ mm, and that of the posterior petal only $4-6 \times 3-5$ mm.

This species is known only from the type and paratype, which are the first collections of *Dicella* from Central America; the six species treated by Chase (1981) are all South American.

Heteropterys cotinifolia Adr. Juss., Ann. Sci. Nat. Bot., Sér. 2, 13: 274. 1840.

Banisteria cotinifolia (Adr. Juss.) C. B. Rob. ex Small, N. Amer. Fl. 25: 134. 1910.—TYPE: MEXICO. Oaxaca: Totolapa, Aug 1834 fl, *G. Andrieux* 492 (holotype: P!; isotypes: G! K! P! P-JU!).

Heteropterys gayana Adr. Juss., Ann. Sci. Nat. Bot., Sér. 2, 13: 274. 1840.

Banisteria gayana (Adr. Juss.) C. B. Rob. ex Small, N. Amer. Fl. 25: 135. 1910.—TYPE: MEXICO. Oaxaca: Guichilona inter Tehuantepec et Guazacualcos, Sep 1834 fr, *G. Andrieux* 494 (holotype: P!; isotypes: F! G! K! P! US!).

Heteropterys portillana S. Watson, Proc. Amer. Acad. Arts 22: 402. 1887.

Banisteria portillana (S. Watson) C. B. Rob. ex Small, N. Amer. Fl. 25: 135. 1910.—TYPE: MEXICO. Jalisco: Barranca near Guadalajara, *E. Palmer* 112 in Jun 1886 fl (holotype: GH!; isotypes: NY! US!).

Heteropterys arborescens Brandegee, Zoe 5: 203. 1905. *Banisteria arborescens*

(Brandegee) Small, N. Amer. Fl. 25: 135. 1910.—TYPE: MEXICO. Sinaloa: Cerro Colorado, vicinity of Culiacán, *T. S. Brandegee s.n.*, 28 Oct 1904 fr (holotype: UC!; isotypes: GH! NY! US!).

Heteropterys pallida Brandegee, Univ. Calif. Publ. Bot. 6: 182. 1915. *Banisteria*

pallida (Brandegee) Standl., Contr. U.S. Natl. Herb. 23: 577. 1923.—TYPE: MEXICO. Oaxaca: San Geronimo, Jul 1914 fl/fr, *C. A. Purpus* 7262 (holotype: UC!; isotypes: A! F! GH! NY! MO! US!).

Banisteria nemorum Brandegee, Univ. Calif. Publ. Bot. 10: 410. 1924.—TYPE:

MEXICO. Chiapas: Jalisco, Aug 1923 fr, *C. A. Purpus* 9185 (holotype: UC!; isotypes: A! F! GH! MEXU! MO! NY! UC! US!).

This species is widespread in Mexico, but seems not to occur outside that country's borders. Within Mexico it is variable, which probably explains why it has been described so many times. My reason for giving its synonymy here is to establish that, when they are treated as the same species, Jussieu's name *Heteropterys gayana* is to be considered a synonym for his *H. cotinifolia*.

Heteropterys hoffmanii W. R. Anderson, sp. nov.—TYPE: GUYANA. Upper Takutu-

Upper Essequibo Region: southern Pakaraima Mountains, 5 km E of Tipuru village, Ureisha Mt. summit, $4^{\circ}11'N$, $59^{\circ}31'W$, 994 m, low forest, 4 Mar 1992 fl, *B. Hoffman* 1194 (holotype: BRG!; isotypes: MICH! US!).

Liana ramis tomentosis demum glabrescentibus. Lamina foliorum majorum 6–9 cm longa, 4.5–6 cm lata, ovata, basi cordata, margine ciliata vel glandulis sessilibus instructa, utrinque tomentosa pilis tortuosis demum glabrata vel costa pertinaciter tomentosa; petiolus 3–5.5 mm longus, basi glandulifer; stipulae non visae. Inflorescentia floribus in umbellis 4-floris sessilibus vel subsessilibus dispositis; pedunculus nullus; bractae bracteolaeque 0.5–1 mm longae, eglandulosae

vel bracteae (1–) 2 glandulis abaxialibus instructae; pedicellus 6–8 mm longus. Sepala per anthesin appressa. Petala lutea, glabra, in alabastro exposita. Stamina glabra, petalis posticolateralibus opposita maxima. Styli apice pedaliformes dorsaliter truncati vel brevissime apiculati.

Woody vine in upper canopy; stems initially densely tomentose with strongly twisted, dark brown hairs, eventually glabrescent. Lamina of larger leaves 6–9 cm long, 4.5–6 cm wide, ovate, cordate at base, mostly obtuse or rounded and sometimes apiculate at apex, bearing all around the margin many sessile glands or, especially on smaller leaves in inflorescence, vascularized cilia up to 2.5 mm long, initially densely brown-tomentose on both sides but glabrate in age or persistently tomentose on midrib, especially below, the hairs with a short to long stalk and a long, twisted crosspiece, the 8–10 pairs of lateral veins sunken above and prominent below and connected by prominent \pm scalariform tertiary veins; petiole 3–5.5 mm long, densely tomentose to eventually glabrescent, bearing 2 swollen glands 1.3–1.8 mm in diameter at very base; stipules not found. Inflorescence densely brown-tomentose, paniculate *sensu lato* with the ultimate units 4-flowered umbels, each umbel sessile or subsessile in the axil of a much-reduced bract bearing 2 large abaxial glands; peduncle absent, each pedicel subtended by a cluster of 1 bract and 2 bracteoles, these appressed around base of pedicel, 0.5–1 mm long, broadly ovate, abaxially tomentose, adaxially glabrous, eglandular or the bracts (especially those subtending the lower pair of flowers in each umbel) bearing (1–) 2 abaxial glands, persistent; pedicel 6–8 mm long, tomentose, somewhat thicker distally. Sepals 2.5 mm long, 1.2–1.5 mm long beyond glands, 1.7–2 mm wide, ovate and rounded at apex, pressed in against filaments in anthesis, abaxially densely and uniformly appressed-tomentose, adaxially glabrous, the anterior eglandular, the lateral 4 biglandular, the glands 1.6–1.8 mm long, elliptical or slightly obovate, separated on sepal, attached or slightly detached at apex, glabrous. Petals exposed in the enlarging bud, yellow, glabrous, abaxially keeled but not winged, spreading to reflexed; lateral petals with claw 1–1.5 mm long, limb 3–3.5 mm long and wide, orbicular or obovate, sometimes slightly lobed at base, decurrent onto claw, entire or minutely denticulate or erose, eglandular or with a small glandular area on margin at base; posterior petal similar to lateral 4 but with the claw longer (ca 2 mm) and the limb distinctly lobed at base with the lobes glandular at tip. Stamens glabrous; filaments connate for ca 0.5 mm, 1.8–2.5 mm long, longest opposite sepals and posterior-lateral petals, very stout opposite posterior-lateral petals, otherwise slender, especially opposite lateral sepals; anthers 1.3–1.7 mm long, largest opposite posterior-lateral petals, the connective dark red, equalling but not exceeding the locules. Ovary ca 1.5 mm high, densely brown-sericeous; styles 2.1–2.5 mm long, the anterior shorter, slenderer, and straight or slightly reflexed, the posterior 2 longer, stouter, somewhat sigmoid and distally reflexed, all 3 laterally flattened distally, with a distinctly internal stigma and apically “pedaliform,” i.e., with a flattened elliptical top, this dorsally truncate or slightly apiculate. Fruit unknown.

The epithet of this species honors Bruce Hoffman (b. 1962), collector (with H. Jacobs and C. Capellaro) of the type and only known collection.

Heteropterys hoffmanii is assignable to series *Holopetalon* (Griseb.) Nied., even when that group is defined narrowly as was done by Niedenzu in *Das Pflanzenreich* (1928). This is the first collection I have seen of the series from the Guianas, nor has any previous author reported such a distribution. The species most like *H. hoffmanii* are *H. ciliata* Nied. and *H. thyrsoides* (Griseb.) Adr. Juss.

(including *H. cordifolia* Moric. ex Adr. Juss.). That complex, whose taxonomy is not well resolved, is known from São Paulo, Rio de Janeiro, Bahia, and near Manaus. Those plants always have the hairs on the abaxial side of the lamina stiffly erect, Y- or T-shaped with quite straight stalks and arms, and the hairs are persistent. The twisted, deciduous leaf hairs of *H. hoffmanii* would distinguish it at once from its sister species, even if it were not geographically disjunct.

Heteropterys molesta W. R. Anderson, sp. nov.—TYPE: VENEZUELA. Bolívar: Campamento “La Yagua” aproximadamente a 24 km NE del caserío Los Rosos, este último a 17 km de Upata (sobre la carretera nueva Upata–San Félix), 16–25 Jun 1965 fl, C. Blanco 134 (holotype: VEN!; isotypes: MO! US!).

Liana ramis sericeis demum glabrescentibus. Lamina foliorum majorum 7.8–11.3 cm longa, 4–5.6 cm lata, elliptica ovatave, basi obtusa rotundatave, apice obtusa mucronulataque, margine glandulis parvis instructa, supra sericea demum glabrescens, subtus pertinaciter sericea; petiolus 7–9 mm longus, basi biglandulifer; stipulae minutae, interpetiolares. Inflorescentia pseudoracemus axillaris sericeus 8–17 cm longus, 20–60-florus; bracteae eglandulosae; pedunculus (0.5–) 1–3 (–4) mm longus; bracteolae apicales, 1 bracteola cujusque paris 1 glandula abaxiali excentrica 0.7–0.8 mm diametro instructa; pedicellus 4–7 mm longus. Sepala per anthesin apice revoluta. Petala lutea, glabra, in alabastro exposita; petalum posticum limbo toto circuitu glanduloso-dentato. Stamina petalis posticolateralibus opposita maxima. Styli apice dorsaliter truncati vel brevissime apiculati.

Vine, the stems initially sericeous with fine, straight, white and golden hairs, eventually glabrescent. Lamina of larger leaves 7.8–11.3 cm long, 4–5.6 cm wide, elliptical or ovate, obtuse or rounded at base, mostly obtuse and mucronulate at apex, bearing many small bordered glands on very margin or on adaxial side of the eventually slightly revolute margin, adaxially loosely sericeous to eventually glabrescent with the hairs stramineous, 1–1.5 mm long, sessile or short-stalked, abaxially tightly and persistently sericeous but never so densely that the epidermis is completely concealed, the hairs on midrib and principal veins silvery, the hairs on lamina between veins golden, strongly parallel to each other, 0.2–1.2 mm long; lateral veins 6–8 pairs; petiole 7–9 mm long, persistently golden-sericeous, bearing 2 glands ca 1 mm in diameter at very base; stipules ca 0.3 mm long, triangular, borne on stem beside petiole, often deciduous. Inflorescence an unbranched axillary pseudoraceme 8–17 cm long, sericeous with the hairs straight or sinuous, proximally silvery, distally golden, the flowers 20–60; bracts 0.9–1.5 mm long, narrowly triangular, abaxially sericeous, adaxially glabrous, eglandular, persistent; peduncle (0.5–) 1–3 (–4) mm long, golden-sericeous to glabrescent; bracteoles like bracts but ovate and 0.5–0.7 mm long, borne at apex of peduncle, one of each pair bearing 1 large eccentric abaxial gland 0.7–0.8 mm in diameter; pedicel 4–7 mm long, golden-sericeous. Sepals 1.5–2 mm long, ca 1 mm long beyond glands, 1–1.5 mm wide, triangular, revolute at apex and sides in anthesis, abaxially densely and uniformly golden-sericeous, adaxially glabrous, the anterior eglandular, the lateral 4 biglandular, the glands 1.5–2 mm long, narrowly elliptical, slightly detached but not reflexed at apex, glabrous. Petals exposed in the enlarging bud, yellow, glabrous, abaxially smooth; lateral petals spreading to reflexed, with claw 1–1.5 mm long and limb 3–3.5 mm long, 3–3.2 mm wide, subrotund, eglandular and entire or slightly erose or denticulate at the margin; posterior petal erect or spreading, with

claw 1.5–1.8 mm long and limb 3–3.2 mm long, 2.5–2.8 mm wide, elliptical, glandular-dentate all around the margin. Stamens glabrous; filaments connate at base, 1.5–2.3 mm long, longest opposite anterior sepal, shortest opposite posterior petal, very stout opposite posterior-lateral petals, very slender opposite lateral sepals; anthers 0.8–1.2 mm long, largest opposite lateral petals, smallest opposite lateral sepals. Ovary ca 1 mm high, densely sericeous with white or white and brown hairs; styles 1.5–1.8 mm long, subequal, glabrous, erect, the anterior straight, the posterior 2 somewhat bowed, all 3 laterally flattened especially distally, dorsally truncate or more commonly very briefly apiculate at apex. Fruit unknown; enlarging carpels of oldest flowers apparently with a dorsal wing and without lateral wings.

This species is known only from the type. Similar plants have been collected in Mato Grosso, Brazil, but they probably deserve recognition as a distinct species; I shall defer describing that in the hope of seeing fruits.

The epithet of this peculiar species refers to the vexation it has caused me for the last 20 years. I have never doubted that it represents an undescribed species, but I have been unable to decide in which genus it should be described. The two obvious possibilities are *Mascagnia* and *Heteropterys*. Several characters argue for *Mascagnia*: glands at the base of the petiole, marginal lamina glands, interpetiolar stipules, long unbranched axillary pseudoracemes, one large gland on one of the bracteoles, and revolute sepals. All of these character-states occur in various species of *Mascagnia*, but never all together. For example, the sepals are only revolute in species in which the petals are completely concealed in bud, not exposed as they are here. The species whose lamina glands are most like those in *Blanco 134*, *M. sinemariensis* (Aubl.) Griseb., has petiole glands absent or borne well above the base, short crowded compound inflorescences, eglandular bracteoles, appressed sepals, and densely hairy petals. Search as I might, I cannot find a *Mascagnia* (even construing that polymorphic “genus” broadly) that I can advance as a close relative for *Blanco 134*.

Heteropterys presents similar difficulties. Revolute sepals are always present in the subgenus in which the petals are concealed in bud, but very rare in the rest of the genus. Bracteoles with glands are rare in *Heteropterys*, and nearly unknown in species with marginal lamina glands. *Heteropterys leschenaultiana* Adr. Juss., of southeastern Brazil and adjacent Argentina, has glands at the base of the petiole, lamina glands that are marginal or submarginal, petals exposed in bud, and revolute sepals, but its stipules are epipetiolar, the inflorescence is compound with the flowers mostly in few-flowered umbels or corymbs, and the bracteoles are eglandular. *Heteropterys sylvatica* Adr. Juss., a species of Mato Grosso do Sul, Brazil, Santa Cruz, Bolivia, and Salta, Argentina, is the other most convincing candidate for a close relative to *Blanco 134*. In that the lamina glands, if they are present at all, are marginal, the inflorescence is a long simple axillary pseudoraceme, and the bracteoles bear glands (indeed, *both* are biglandular). However, the petiole is biglandular above the middle, the stipules are epipetiolar, and the sepals are not revolute.

Fruits would decide the matter, but fruits are not available. The oldest flowers on *Blanco 134* show enlarging carpels with the beginning of a dorsal wing that seems to be thicker on the abaxial edge, and no sign of lateral wings; that is clear support for *Heteropterys*. Therefore, I have decided to describe the plant in *Heteropterys*. I suppose its relationships lie with *H. leschenaultiana* and its relatives or with *H. sylvatica*, but as I have tried to show above, *H. molesta* is rather isolated in *Heteropterys*—assuming it really does belong in *Heteropterys*!

Heteropterys sylvatica Adr. Juss., Ann. Sci. Nat. Bot., Sér. 2, 13: 277. 1840.—
TYPE: BOLIVIA. Santa Cruz: "In sylvis interioribus juxta Santa-Cruz de la
Sierra," Mar fr, A. d'Orbigny (holotype: P! F neg. 35593, WRA negs. 81-
27-4 & 5).

Heteropterys tenuifolia (Nied.) Nied. in Engler, Pflanzenr. IV. 141: 333. 1928.
Clonodia tenuifolia Nied., Meded. Rijks-Herb. 19: 74. 1913.—TYPE: BRA-
ZIL. Mato Grosso do Sul: Corumbá, 18 Dec 1902 fl/fr, A. Robert 736
(lectotype, here designated: BM!; isolectotype: K!)

In his 1928 treatment in *Das Pflanzenreich*, Niedenzu recognized his own species *Heteropterys tenuifolia* while placing Jussieu's name *H. sylvatica* among the species of whose identity he was uncertain, because he never had the opportunity to see Jussieu's type. Comparison of Niedenzu's syntypes to my photographs of and notes on Jussieu's type shows that the two names represent the same very distinctive species, of which I have now seen specimens from Santa Cruz, Bolivia, adjacent Mato Grosso do Sul, Brazil, and Salta, Argentina. The following diagnostic characters make *H. sylvatica* easy to recognize: Ovate, glabrescent lamina raised on a well-developed petiole with two knobby glands near the apex; lamina eglandular or with small glands on the margin, not on the surface of the lamina; inflorescence a simple or ternate pseudoraceme in the axil of current leaves, the long narrow bracts deciduous in fruit; peduncle ca 5–6 mm long, bearing both bracteoles at its very apex; both bracteoles bearing 1 or 2 abaxial glands; pedicel only 1–2 mm long, much shorter than the peduncle; sepals erect; petals yellow; samara 3.5–4 cm long, the nut spherical and smooth-sided, the wing straight and distally flared to 1.5 cm wide.

Niedenzu described a sister species, *Heteropterys mollis* (Nied.) Nied., also from lowland Bolivia. That seems to differ from *H. sylvatica* only in having the lamina abaxially very densely and persistently tomentose. It remains to be seen whether those two species will stand as distinct as more collections of the two accumulate. The one collection I have seen from Argentina (*Abbiatti & Claps* 205, from Vespucio, Orán, Salta [MO]) is somewhat intermediate in its vesture, but for now I am considering that to represent *H. sylvatica*. The name *Heteropterys sylvatica* was misapplied by O'Donnell & Lourteig (1943) to a very different species that is common in Argentina, *Heteropterys dumetorum* (Griseb.) Nied., of which the type came from Orán, Salta.

Heteropterys velutina W. R. Anderson, sp. nov.—TYPE: GUYANA. Siparuni-Potaro Region; Iwokrama Rainforest Reserve; Burro Burro River, between Sandstone and confluence with Sipariparu River, 4°23'N, 58°55'W, riparian vegetation, 65 m, 31 Mar 1996 fr, D. Clarke 1541 (holotype: MICH!).

Arbor 6 m alta ramis dense et pertinaciter velutinis. Lamina foliorum majorum 9.5–11.7 cm longa, 2.5–3.3 cm lata, anguste elliptica, basi cuneata vel subrotundata, apice acuminata, supra glabrata, subtus ± pertinaciter tomentosa pilis T-formibus; petiolus 4–5 mm longus, velutinus. Inflorescentia panícula ex pseudoracemis 6–14-floris constans, velutina; bracteae deciduae; pedunculus 0.5–2 mm longus, velutinus; bracteolae 2.5–3.5 mm longae, 1.8–2.2 mm latae, eglandulosae, reticulo adaxialiter visibiles; pedicellus 5–7 mm longus (in fructu), velutinus vel subtomentosus. Sepala omnia eglandulosa, apice revoluta. Samara 15–23 mm longa, 8–10 mm lata, saepe reflexa, ala dorsali proximaliter ultra nucem producta.

Tree 6 m tall; stems densely and persistently velutinous, the hairs brown, erect and straight, 0.4–1.2 mm long, many basifixed but some Y-shaped or bearing a rudimentary second branch near the middle. Lamina of larger leaves 9.5–11.7 cm long, 2.5–3.3 cm wide, narrowly elliptical or widest slightly above or below the middle, cuneate to nearly rounded at base, mostly long-acuminate at apex, bearing in the abaxial surface, set in 1–3 mm from both margins, a row of 3–7 small impressed glands, adaxially quite glabrate at maturity or persistently tomentose on margin or base of midrib, abaxially densely and persistently tomentose or eventually patchily glabrescent with the hairs T-shaped with the stalk 0.1–0.15 mm long and the sinuous crosspiece 0.6–1 mm long, the 6–9 pairs of lateral veins somewhat sunken above between raised sections of lamina and prominent below, the reticulum prominent on both sides; petiole 4–5 mm long, persistently velutinous like stem, eglandular; stipules not found, to be sought among hairs on interpetiolar ridge. Inflorescence a terminal panicle, with the flowers borne in decussate pseudoracemes 2–5 cm long and containing 6–14 flowers, all the axes densely and persistently velutinous like stem; floriferous bracts deciduous in fruit and mostly not seen, apparently 3.5–4 mm long, 3–3.5 mm wide, broadly ovate, concave, eglandular, appressed-tomentose on both sides but more densely so on abaxial surface, the reticulum visible on adaxial side; peduncle 0.5–2 mm long, velutinous; bracteoles apical, resembling bracts but smaller (2.5–3.5 × 1.8–2.2 mm), more narrowed at base and thus elliptical, nearly flat, deciduous in fruit or irregularly persistent; pedicel 5–7 mm long in fruit, velutinous or subtomentose. Flowers not seen; sepals all eglandular, ca 3 mm long and 2 mm wide, strongly revolute distally, abaxially appressed-tomentose, adaxially glabrous; old petals glabrous, the claw ca 3 mm long, the limb 4.2–5 mm long, 3–4 mm wide, broadly elliptical to rotund, erose; filaments glabrous, partially connate; ovary densely velutinous; styles 3.5–4 mm long in fruit, with an internal stigma and a dorsal hook ca 0.5 mm long at apex, the hook pedaliform (i.e., flattened and elliptical when viewed from above). Samara immature but probably full-sized, 15–23 mm long, 8–10 mm wide, elliptical or somewhat wider distally than proximally, borne horizontally or reflexed; dorsal wing extended proximally over apex of nut; nut 6–9 mm long, 4–5 mm high, mostly bent downward, without lateral wings or crests.

This distinctive species is named for its velvety stem and inflorescence. It is known only from the type. *Heteropterys velutina* belongs in subgenus *Parabanisteria* (C. V. Morton) C. V. Morton, and there it is to be compared to other species that bear elongated pseudoracemes rather than umbels. Its closest relative is probably *H. subhelicina* Nied. (= *H. catoptera* W. R. Anderson), a shrub or woody vine of savannahs and riverine forests in southern Guyana and adjacent Roraima, Brazil. They are especially similar in the samara, which in both species has the nut bent downward, producing an often reflexed orientation of the whole samara, and the dorsal wing in both extends over the apex of the nut as a rounded flange. They also have similar large bracteoles with the reticulum visible adaxially. However, in *H. subhelicina* the vegetative axes are sparsely sericeous to glabrate and the inflorescence, peduncles, and pedicels are persistently sericeous—this dramatic difference in vesture gives the two species very different aspects. The leaf in *H. subhelicina* is sparsely sericeous to quite glabrate, the base of the lamina is more rounded, and the apex is obtuse, acute, or only slightly acuminate. When *H. velutina* is found with flowers, additional differences may be evident.

The label with the type says that the plant was a tree 6 m tall. Habit is variable in other species in this subgenus, so it will not surprise me if *H. velutina* is also found growing as a shrub and woody vine.

In the holotype, one side of the stem is persistently velutinous, while the other side has lost most of the hairs. I have never seen such one-sided glabrescence in a malpighiaceae stem before, and suspect that in this case the side with few hairs may have had the vestiture scraped off during collection. If *H. velutina* really loses its stem hairs in that pattern, that will be yet another way in which it differs from its congeners.

Hiraea buntingii W. R. Anderson, sp. nov.—TYPE: VENEZUELA. Trujillo: Distr. Betijoque, carretera Agua Viva–Carora, entre Agua Viva y Valerita, en bosque seco premontano, 300 m, 1 Nov 1977 fl/fr, G. S. Bunting 5845 (holotype: MICH!; isotype: VEN!).

Frutex vel liana ramis sericeis. Lamina foliorum majorum 6.5–16.5 cm longa, 3–7.3 cm lata, abaxialiter sericea, margine aliquot glandulis parvis instructa; petiolus 5–11 mm longus, sericeus, distaliter biglandulosus; stipulae (2–) 3–4 mm longae. Cyma axillaris ex (1–) 3–7 umbellis 4-floris constans; bracteae 2.5–5 mm longae, 1.3–2 mm latae; bracteolae 1.5–2.5 mm longae, 1–1.5 mm latae; pedicellus 9–23 mm longus, gracilis. Glandulae calycis saepe brevistipitatae. Petala eglandulosa. Antherae 0.5–0.9 mm longae. Samara alis lateralibus 12–15 mm latis, 16–21 mm altis, ala dorsali 1.5–3 mm lata, 3.5–5.5 mm alta, in dentibus acutis dissecta.

Shrub 1.6 m tall or woody vine in treetops; stems densely sericeous with a persistent mixture of silvery and golden or brownish hairs, eventually glabrescent as stem enlarges through secondary growth. Lamina of larger leaves 6.5–16.5 cm long, 3–7.3 cm wide, elliptical or widest slightly above middle, broadly cuneate, rounded, or slightly cordate at base, obtuse or rounded and usually short-apiculate at apex, bearing several small button-like glands evenly distributed on distal 2/3 of margin, initially sericeous above but soon glabrescent and eventually quite glabrate or with some hairs persistent proximally on midrib, moderately to densely and persistently sericeous below or eventually glabrescent, the principal lateral veins 8–10 pairs, prominent below but not above, interconnected by scalariform tertiary veins; petiole 5–11 mm long, sericeous like stem, biglandular between middle and apex; stipules (2–) 3–4 mm long, subulate, sericeous, borne well above base of petiole but mostly below middle, oriented at right angles to petiole and parallel to each other, straight or decurved. Inflorescence a sericeous axillary cyme of (1–) 3–7 4-flowered umbels, each cyme usually solitary in its axil, occasionally subtended by a second smaller one; umbel without a gland in center, each borne on a stalk 4–15 (–22) mm long; bracts 2.5–5 mm long, 1.3–2 mm wide, ovate or lanceolate and somewhat boatshaped, abaxially sericeous, adaxially glabrous or very sparsely sericeous, eglandular, persistent; bracteoles similar to subtending bract but only about half as long, 1.5–2.5 mm long, 1–1.5 mm wide, elliptical; pedicel 9–19 mm long (–23 mm in fruit), very slender, thinly sericeous to glabrate. Sepals 2–2.5 mm long, 1.5–2 mm wide, ovate or elliptical, rounded at apex, appressed in anthesis, abaxially sericeous, adaxially glabrous, the anterior eglandular or bearing 1 or 2 small glands, the lateral 4 biglandular, the glands 0.9–1.5 mm long, circular or elliptical, separated from each other, slightly detached all around or (especially in age) short-stalked. Petals yellow, glabrous, the limb \pm orbicular, erose or short-laciniate, eglandular; lateral 4 petals spreading to reflexed, with the claw 2–2.5 mm long and the limb 5–6 mm long and wide; posterior petal similar to the lateral 4 but more nearly erect, with a slightly longer claw (2.5–3 mm long) and a smaller limb (4–5 mm long and wide), the margin more deeply dissected. Stamens glabrous; filaments connate for 1–1.5 mm, the anterior 3 longest (3.5–4.5

mm long), the posterior 7 2.5–3.5 mm long, shortest opposite the posterior petal; anthers 0.5–0.9 mm long, similar to each other, the locules separated on a massive glandular connective. Ovary ca 1.5 mm high, densely hispid; styles with a few hairs proximally or glabrous, short-apiculate dorsally at apex; anterior style 2.5–3 mm long, erect and straight or slightly bowed toward posterior petal; posterior styles ca 3 mm long, strongly bowed outward and then back toward center of flower. Samara butterfly-shaped; lateral wings membranous, 12–15 mm wide, 16–21 mm high, roughly tetrahedral to semicircular, subentire or sinuous to rounded-erose, thinly but persistently sericeous on both sides with fine, sessile, appressed hairs; dorsal wing 1.5–3 mm wide, 3.5–5.5 mm high, widest near style, irregularly but deeply dissected into sharp teeth, hispid like nut; nut globose, 2.5–3 mm in diameter, hispid with long spreading sub-basifixed hairs or belatedly glabrescent.

As often happens in this genus, the filaments are not straight or parallel, but bent and even twisted in a complex but bilaterally symmetrical pattern. Because all flowers now available are rather far along in anthesis, I shall not try to describe the bending of the filaments here, but defer that until younger material is available.

ADDITIONAL SPECIMENS EXAMINED: **Venezuela.** TRUJILLO: Agua Viva, carretera de Maracaibo, dry steep slopes, Aug fl, *Tamayo 1767* (US, VEN).—ZULIA: Distr. Miranda-Bolívar, vía El Consejo, La Tabla–Quirós–El Pensado, en Corral de Nava (2 km al NE de La Tabla), in gallery forest and adjacent chaparral near stream, 140 m, Feb fl, *Bunting 8633* (MICH).

The epithet of this interesting species honors George S. Bunting (b. 1927), who collected the type and one of the paratypes during the course of many years of botanizing in northern Venezuela.

This species belongs in subg. *Hiraea* (see discussion below under *H. hypoleuca*). The most obvious feature distinguishing *Hiraea buntingii* is the unusually long bracts and bracteoles, larger than any others I have seen in the genus. In addition, the species differs from others in the following combination of characteristics: lamina abaxially sericeous, with a rounded or slightly cordate base and a row of marginal glands; axillary cyme relatively open (for *Hiraea*) with the umbels raised on well-developed stalks; pedicel long and slender; calyx glands detached to short-stalked; posterior petal eglandular; anthers small; dorsal wing of samara dissected into sharp teeth. *Hiraea buntingii* bears a resemblance to *H. sanctae-marthae* C. V. Morton, from nearby Colombia, because that too has the lamina abaxially sericeous, but *H. sanctae-marthae* has the lamina shape and veins of *H. reclinata* Jacq. and the compact cyme and short bracts and bracteoles typical of the genus.

Bunting 8633 was a vine, whereas the other two collections were shrubs, and its leaves are substantially larger than theirs. However, the three agree well in characters of the inflorescence, flowers, and fruits, so I think they must all represent the same species.

Hiraea hypoleuca W. R. Anderson, sp. nov.—TYPE: VENEZUELA. Táchira: region of Cerro Las Minas, S of main road from Santa Ana, 17 km SE of Santa Ana, pastured ridge with bordering forest, 1150–1250 m, 11 Nov 1979 fr, *J. A. Steyermark, R. Liesner & A. González 119901* (holotype: MICH!; isotype: VEN!).

Liana ramis sericeis. Lamina foliorum majorum 8.5–13.5 cm longa, 5–9 cm lata, elliptica vel late elliptica vel paulo obovata, basi rotundata vel subcordata, apice rotundata vel latissime obtusa, adaxialiter glabrata, abaxialiter appresso-

tomentosa glaucae; petiolus 10–25 mm longus sericeus; stipulae 1–1.5 mm longae. Umbella axillaris 10–30-flora; bracteae bracteolaeque ca 1 mm longae, rotundatae; pedicellus 18–25 mm longus. Petalum posticum distaliter glanduloso-fimbriatum. Styli postici in fructu arcuati. Samara alis lateralibus 13–18 mm latis, 20–30 mm altis, ala dorsali 1–3 mm lata, 3–6 mm alta.

Woody vine; stems densely and persistently sericeous. Lamina of larger leaves 8.5–13.5 cm long, 5–9 cm wide, elliptical or broadly elliptical or somewhat obovate, rounded or subcordate at base, rounded or very broadly obtuse and sometimes apiculate at apex, eglandular or bearing several tiny button-like glands just within margin on abaxial side, initially appressed-tomentose above but glabrate at maturity or with some hairs persistent proximally on midrib, persistently appressed-tomentose below or belatedly glabrescent except for the \pm persistently sericeous midrib and lateral veins, thinly to densely glaucous below, the principal lateral veins 7–9 pairs, prominent below but not above, interconnected by scalariform tertiary veins; petiole 10–25 mm long, sericeous like stem, bearing 2 (–4) small (ca 0.5 mm diam.) glands between middle and apex, mostly at apex or just above apex against midrib of lamina; stipules 1–1.5 mm long, subulate, sericeous, borne above base of petiole but below middle, mostly curved away from stem, parallel or bent toward each other. Inflorescence axillary, an umbel of 10–30 flowers borne on a sericeous stalk 11–33 mm long, 1.5–2 mm in diameter, jointed 1–12 mm below umbel and bearing a pair of deciduous or persistent bracts or much-reduced leaves at the joint; floriferous bracts and bracteoles ca 1 mm long, wider than long, broadly rounded, abaxially sericeous, adaxially glabrous, eglandular, persistent; pedicel 18–25 mm long, 1–1.5 mm in diameter (–2 mm at apex), persistently sericeous. Good flowering material not seen. Sepals 2–2.5 mm long and 1.5–2 mm wide in flower, up to 3.5×2.5 mm in fruit, ovate or triangular, obtuse to rounded at apex, appressed in anthesis, abaxially sericeous, adaxially glabrous, the anterior eglandular, the lateral 4 biglandular, the glands 1.3–2.5 mm long, elliptical, separated from each other or compressed. Petals yellow, glabrous, the lateral 4 erose or dentate, the posterior glandular-fimbriate in the distal 2/3 of the limb. Stamens glabrous; filaments connate at base, ca 2.7–3.2 mm long. Ovary densely hispid; posterior 2 styles strongly bowed (at least eventually), laterally slightly flattened, dorsally truncate or apiculate at the apex. Samara butterfly-shaped; lateral wings membranous, 13–18 mm wide, 20–30 mm high, trapezoidal to flabellate, subentire or sinuous to rounded-erose, persistently thinly sericeous or appressed-tomentose on both sides; dorsal wing 1–3 mm wide, 3–6 mm high, entire or irregularly dissected, usually not extending to base of nut, tomentose; nut globose, 4–5 mm in diameter, tomentose or hispid with straight spreading hairs.

ADDITIONAL SPECIMENS EXAMINED: **Colombia.** ANTIOQUIA: Mpio Anorí, Vereda El Carmen, 18–20.5 km NW de Anorí en la vía a “Dos Bocas,” 7°15'N, 75°12'W, 820–910 m, Nov fr, *Callejas et al.* 8802 (MICH).—SANTANDER: Mpio Charalá, Corrig. Virolín, “Cañaverales,” liana in tree at edge of pasture, 1680 m, Jan fr, *Albert de Escobar et al.* 3060 (MICH). **Venezuela.** TÁCHIRA: Distr. Uribante, Complejo Hidroeléctrico Uribante-Caparo, Sector El Cedral, inmediaciones Presa La Honda, 8°01'N, 71°37'W, low montane forest, 1100–1250 m, Nov fl, *Rivero et al.* 1920 (MICH, PORT).

Hiraea hypoleuca is named for the glaucescence on the abaxial surface of its lamina, which is much thicker in the Venezuelan specimens than in the Colombian specimens cited. I know of no other species of *Hiraea* with many-flowered umbels and glaucous leaves. It is also notable for the relatively small leaf that is rounded at the apex, short stipules, very short rounded bracts and bracteoles, and glandular-fimbriate posterior petal.

I divide *Hiraea* into two subgenera. Subgenus *Hiraea* has the flowers borne in umbels of four, with the umbels often borne in a compound, cymose, axillary inflorescence, or several such inflorescences in the same axil. The other subgenus is *Archihiraea* Nied., to which I would assign all species in which the axillary inflorescence is unbranched and bears a single umbel of 5–60 flowers (but see the discussion below under *H. perplexa*). Cuatrecasas (1958) distributed the species of subg. *Archihiraea* between sect. *Archihiraea* (Nied.) Cuatrec. and sect. *Polyactinia* Nied., on the basis of the shape of the mature styles. The lack of open flowers makes it difficult for me to assign *H. hypoleuca* to one or the other with confidence, but the strong curvature of the posterior styles in fruit suggests that it probably belongs in sect. *Polyactinia*.

Hiraea neblinensis W. R. Anderson, sp. nov.—TYPE: VENEZUELA. Amazonas: Depto. Río Negro, Río Baria (=Río Mawarinuma) just upstream from Base Camp, SW side of Cerro de la Neblina, 0°49'50"N, 66°09'40"W, tropical lowland evergreen forest along gravelly and silty banks of river, 140 m, 17 Feb 1985 fl, M. Nee 30920 (holotype: MICH!; isotypes: NY! VEN!).

Liana lignosa ramis sericeis mox glabratis. Lamina foliorum majorum 13.5–31 cm longa, 8.5–17 cm lata, late elliptica vel obovata, basi paulo cordata, apice rotundata vel late obtusa vel abrupte breviacuta, margine eglandulosa, utrinque mox plus minusve glabrata; petiolus 9–19 mm longus; stipulae 2–3 mm longae, super medium petioli portatae. Cyma axillaris plerumque ex 3 umbellis 4-floris constans; umbella sine glandula centrali; bracteae bracteolaeque 1–1.2 mm longae, 0.8–1.2 mm latae, eglandulosae; pedicellus 11–20 mm longus. Sepala adaxialiter sparsim sericea. Petala omnia limbo transverse late elliptico, fimbriato fimbriis 0.5–1 mm longis eglandulosis. Filamenta sepalis opposita 3.1–3.6 mm longa, petalis opposita 2.3–3 mm longa; antherae 0.9–1.3 mm longae. Stylus anticus apice dorsaliter obtusus ca 0.2 mm productus, 2 styli postici apice dorsaliter breviuncinati unco ca 0.3 mm longo rotundato. Samara immatura alis lateralibus semicircularibus, ala dorsali bene evoluta.

Woody vine in trees; stems initially sericeous, soon glabrate. Lamina of larger leaves 13.5–31 cm long, 8.5–17 cm wide, broadly elliptical or somewhat obovate, shallowly cordate at base, rounded or broadly obtuse at apex or abruptly narrowed to a very short acute tip, eglandular on margin, initially sericeous but soon nearly glabrate, often with some hairs persisting on abaxial midrib and sometimes with sparse short appressed hairs scattered on abaxial surface, the principal lateral veins 8–10 pairs, prominent below but not above, interconnected by many closely spaced scalariform tertiary veins; petiole 9–19 mm long, abaxially sericeous, adaxially velutinous, glabrescent in age, bearing 2 large glands at apex or just above apex against midrib of lamina; stipules 2–3 mm long, subulate, sericeous, borne slightly above middle of petiole, oriented at right angles to petiole and parallel to each other, distally ascending. Inflorescence a sericeous axillary cyme of (1–) 3 4-flowered umbels, the cymes solitary in the axil or 2–3 in a vertical array; umbel without a gland in the center, each borne on a stalk 2–5 mm long; bracts 1–1.2 mm long and wide, triangular or ovate, abaxially sericeous, adaxially glabrous, eglandular, persistent; bracteoles similar to subtending bract but smaller, ca 1 mm long and 0.8 mm wide; pedicel 11–20 mm long, loosely sericeous. Sepals 2–2.5 mm long, 1–1.5 mm beyond glands, 1–1.5 mm wide, ovate, obtuse or acute at apex, appressed in anthesis, abaxially densely sericeous, adaxially sparsely sericeous, the

anterior eglandular, the lateral 4 biglandular, the glands 1.3–2 mm long, elliptical, distally detached. Petals yellow, glabrous, the limb transversely broadly elliptical and long-fimbriate with the divisions 0.5–1 mm long and eglandular; lateral 4 petals with the claw 2.5–3 mm long, the limb 4.5–6 mm long, 5.5–7.5 mm wide; posterior petal with the claw 3.5 mm long, the limb 4.5–5 mm long, 5–5.5 mm wide. Stamens glabrous; filaments connate for 0.7–1 mm at base, mostly bowed, 3.1–3.6 mm long opposite sepals with the longest opposite the anterior sepal, 2.3–3 mm long opposite petals with the shortest opposite the posterior petal; anthers 0.9–1.3 mm long, slightly longer opposite petals than opposite sepals, with the connective proximally red and distally yellow in dried material. Ovary ca 1.2 mm high, densely hispid; styles tomentose on proximal half; anterior style ca 3.5 mm long, moderately bowed, with an obtuse dorsal projection at apex ca 0.2 mm long; posterior 2 styles longer (ca 4 mm) but more strongly bowed, bearing a rounded dorsal hook at apex ca 0.3 mm long. Immature samara with the lateral wings 18 mm wide, 30 mm high, semicircular to almost reniform with the rounded edges meeting or overlapping at base and apex, entire or slightly sinuous, appressed-tomentose with most hairs medifixed; dorsal wing 5 mm wide, 7 mm high, rectangular, entire or subentire, appressed-tomentose; nut slightly depressed-globose (?), ca 5 mm in diameter, tomentose with many hairs medifixed.

ADDITIONAL SPECIMENS EXAMINED: **Venezuela.** AMAZONAS: Depto. Río Negro, at west or lower end of Río Mawarinuma, 4 km by air west of Cerro de la Neblina Base Camp. 0°50'N, 66°12'W, 140 m, Mar imm fr. *Liesner & Funk 16380* (MICH. MO, VEN).

Hiraea neblinensis is named for the Cerro de la Neblina, at the base of which were found the only known collections. It is assignable to subgenus *Hiraea*; see the discussion above under *H. hypoleuca*. It is especially notable for its large leaves and petals with a long-fimbriate limb that is wider than long. It may be compared to two other species of southern Venezuela in which the lamina is large and has an eglandular margin, *H. celiana* W. R. Anderson and *H. affinis* Miq. *Hiraea celiana* is known from only three collections from Cerro Cuao-Sipapo. Its lamina is cuneate at the base, its sepals are adaxially glabrous, and its styles are dorsally rounded or truncate at the apex. Its fruit is not known. *Hiraea affinis* is an extremely variable species that is fairly well collected in the Guianas but has been found only twice in Venezuela, in Delta Amacuro. Its petiole is shorter, up to 8 mm long, its sepals are adaxially glabrous, and its petals are dentate to short-fimbriate, with the divisions up to 0.2 mm long. The samara of *H. affinis* lacks a dorsal wing but is similar in outline to that of *H. neblinensis*, with rounded lateral wings that meet or overlap at the base and apex, which leads me to think that they may be closely related.

Hiraea perplexa W. R. Anderson, sp. nov.—TYPE: ECUADOR. Napo: Cantón Tena, Estación Biológica Jatun Sacha, Río Napo, 8 km al E de Misahuallí, 1°04'S, 77°36'W, 400 m, bosque muy húmedo tropical, bosque primario, colinas, 3–6 Sep 1989 fl. *W. Palacios 4384* (holotype: MICH!).

Liana lignosa ramis velutinis. Lamina foliorum majorum 10.5–13.5 cm longa, 5–7.2 cm lata, abaxialiter pertinaciter velutina; petiolus 9–12 mm longus, velutinus, prope apicem biglandulosus; stipulae 3–5 mm longae. Cyma axillaris basi ternata, ex 3 umbellis 4–8-floris constans, saepe 2 floribus proximalibus additis;

pedicellus 15–22 mm longus, gracilis. Sepala eglandulosa, abaxialiter hispida. Petalum posticum margine distali glandulis parvis globosis instructum. Ovarium densissime hispidum pilis brunneis, 1.5–3 mm longis, rectis, ut videtur basifixis sed re vero plerumque calcari basali instructis.

Woody liana; stems densely and persistently velutinous with the hairs erect, 1–1.5 mm long, mostly bifurcate but some simple. Lamina of larger leaves 10.5–13.5 cm long, 5–7.2 cm wide, elliptical or widest slightly above middle, broadly cuneate or rounded at base, obtuse or rounded at apex with the midrib sometimes extended slightly beyond lamina, bearing several small button-like glands on margin or just within margin on abaxial side, initially velutinous above with erect bifurcate hairs but glabrate at maturity except for midrib, margin, and scattered hairs elsewhere, densely and persistently velutinous below with most hairs erect and bifurcate, the hairs even denser on midrib and on the 8–10 pairs of major lateral veins than elsewhere, the veins, including the scalariform tertiary veins, sunken above and prominent below; petiole 9–12 mm long, velutinous like stem, biglandular near apex; stipules 3–5 mm long, subulate, velutinous to loosely sericeous, borne between base and middle of petiole, curved back toward stem. Inflorescence a velutinous, axillary, basally ternate cyme of 3 umbels, the lateral umbels occasionally not developing; umbel without a gland in center, comprising 4–8 flowers plus often an additional pair on the stalk well below the rest, the stalk 2–10 mm long; bracts 1.5–2.5 mm long, ca 1 mm wide, ovate or elliptical, abaxially sericeous, adaxially glabrous, eglandular, persistent; bracteoles like bracts but shorter and narrower, narrowly elliptical or linear; pedicel 15–22 mm long, very slender, subvelutinous or appressed-tomentose. Sepals ca 2 mm long, 1.5 mm wide, ovate, obtuse or acute at apex, appressed in anthesis, abaxially densely appressed-hispid, adaxially glabrous, all eglandular. Petals yellow, glabrous; lateral 4 petals with the claw 2–3 mm long, the limb 4.5–5 mm long and 4–4.5 mm wide, ovate or obovate, erose or denticulate, eglandular; posterior petal with the claw 3–3.5 mm long and the limb 4–5 mm long, 3.5–4 mm wide, elliptical or obovate, dentate or short-laciniate with the divisions on the distal 1/2–2/3 each terminating in a tiny globose gland. Stamens glabrous; filaments connate at very base, longer opposite sepals (3.5–4.5 mm) than petals (2.7–3.5 mm), mostly bowed, especially opposite the posterior-lateral sepals; anterior 7 anthers 0.9–1.1 mm long with the glandular connective swollen, posterior 3 anthers 0.7–0.9 mm long with the connective glandular but not much enlarged. Ovary almost 1 mm high but completely hidden by the very dense covering of straight brown hairs 1.5–3 mm long, these apparently basifixes but most with a tiny basal spur representing the missing branch; styles bearing scattered long hairs on proximal half, the apex with a short acute dorsal projection ca 0.2 mm long; anterior style 3.5–4 mm long, moderately bowed; posterior 2 styles longer (4.5–5.5 mm) but more strongly bowed so that all 3 stigmas are at same level. Fruit not seen.

Hiraea perplexa is known only from the type. Its epithet refers to the puzzling architecture of the inflorescence. Its basally ternate structure suggests that the species belongs in subgenus *Hiraea* (see discussion above under *H. hypoleuca*), but most species of that subgenus are very consistent in that each umbel contains exactly four flowers, whereas they usually contain more in this species, up to eight. Moreover, in many species of the subgenus the two bracts near the middle of the stalk of each umbel subtend an additional pair of umbels; in *H. perplexa* they generally subtend a pair of flowers, each with two bracteoles just like the other flowers in the umbel. It seems likely that the inflorescence in subg. *Hiraea* is

ancestral in the genus, because the sister genus *Excentradenia* (see separate article in this volume) also bears four-flowered umbels. Perhaps *H. perplexa* indicates how that cyme of four-flowered umbels gave rise to the unbranched multiflowered umbel of subg. *Archihiraea*—through increase in the number of flowers in each umbel, followed by suppression of the lateral umbels. *Hiraea perplexa* is also notable for the velutinous stems and leaves, the eglandular hispid sepals, the small petals, the small globose glands around the margin of the posterior petal, and the very densely hispid ovary.

Hiraea steyermarkii W. R. Anderson, sp. nov.—TYPE: VENEZUELA. Bolívar: Reserva Forestal “La Paragua,” márgenes del Río Asa, Jun 1970 imm fr, C. Blanco 803 (holotype: F!).

Liana lignosa ramis sericeis vel velutinis demum glabrat. Lamina foliorum majorum 14–23.5 cm longa, 7–13.7 cm lata, obovata, basi cuneata vel obtusa, apice abrupte acuminata, margine glandulis prominentibus munita; petiolus 14–20 mm longus; stipulae 4.5–6 mm longae, plerumque inter basim et medium petioli portatae. Cyma axillaris ex 3–7 umbellis 4-floris constans, laxe sericea vel subtomentosa pilis cinereis vel stramineis; umbella sine glandula centrali; pedicellus 14–28 mm longus. Petala ut videtur lutea; petala lateralia limbo integro vel eroso eglanduloso; petalum posticum limbo fimbriato fimbriis \pm glandulosis. Styli glabri. Samara immatura ala dorsali bene evoluta, grosse dentata.

Woody vine; stems sericeous or velutinous to glabrate. Lamina of larger leaves 14–23.5 cm long, 7–13.7 cm wide, obovate, cuneate to obtuse at base, abruptly rounded and acuminate at apex to a short tip 5–10 mm long, bearing a series of large prominent button-like glands on distal 1/2–2/3 of margin, initially sericeous but soon glabrate except for \pm persistently sericeous abaxial midrib, or with some hairs persistent on abaxial surface as well, the principal lateral veins 8–12 pairs, prominent below but not above, interconnected by scalariform tertiary veins; petiole 14–20 mm long, sericeous or velutinous, bearing 2 large bulging glands at or just below apex; stipules 4.5–6 mm long, subulate, borne between base and middle of petiole or slightly higher, generally reflexed. Inflorescence a cyme of 3–7 4-flowered umbels, loosely sericeous or subtomentose with gray or gray and straw-colored hairs, the cymes solitary in the axil or 2 in a vertical array, each cyme borne on a stalk 3–7 mm long; umbel without a gland in the center, each borne on a stalk 7–22 mm long; bracts 1–1.5 mm long and wide, triangular or ovate, abaxially sericeous, adaxially glabrous, eglandular, persistent; bracteoles similar to subtending bract but usually smaller, 1–1.2 mm long, ca 0.8 mm wide; pedicel 14–22 mm long in flower, up to 28 mm long in immature fruit, loosely sericeous. Flowers known only in age, with enlarging fruits. Sepals ca 2 mm long and 2–2.5 mm wide, broadly triangular or ovate, obtuse at apex, appressed in anthesis, abaxially densely sericeous except glabrous near margin, adaxially glabrous, all eglandular. Petals apparently yellow, glabrous; lateral 4 petals with the claw 2.5 mm long, the limb 4.5–5 mm long, 5.5–6 mm wide, concave, entire or erose, eglandular; posterior petal with the claw 3–3.5 mm long, the limb 4.5–5 mm long and wide, flat or crumpled, fimbriate all around the margin with the divisions ca 0.5 mm long and glandular-thickened, especially proximally. Stamens glabrous; filaments bowed; anthers 1–1.4 mm long. Styles strongly bowed, bearing a rounded dorsal projection at apex only 0.1 mm long. Immature samara with the lateral wings elliptical or semicircular, entire or slightly sinuous, initially sericeous but glabrescent as

they enlarge, the hairs 0.5–1 mm long, medifixed, straight and appressed; dorsal wing 1–3 mm wide, 1.8–2 mm high, triangular to rectangular, mostly dissected into several coarse teeth, sericeous to glabrate.

ADDITIONAL SPECIMEN EXAMINED. **Venezuela.** BOLÍVAR: Altiplanicie de Nuria; forest at base, between Rancho Alegre and base of Altiplanicie, on trail to Quebrada Cabeza Burro, 5 km E of Las Chicharras, 47 km N of Tumeremo, 100–250 m, Feb sterile, *Steyermark* 89349 (NY).

I name this species in honor of my friend, the late Julian A. Steyermark (1909–1988), whose accomplishments in Venezuelan botany need no description by me. The holotype and paratype have leaves that are similar in shape and glands, but those of *Steyermark* 89349 are substantially larger than those of *Blanco* 803 (22–23.5 × 12.7–13.7 cm in the Steyermark collection vs. up to 14.5 × 7.4 cm in the Blanco collection). Moreover, the stems of the Steyermark collection are velutinous, while those of the type are sericeous. The two collections may represent different species, but it is not rare for lianas to have smaller leaves in the inflorescence than lower on the stems, so the Steyermark collection's large leaves may simply reflect the fact that they were collected from a sterile plant; I cannot assess the importance of the difference in vesture with so little material. Although the type is fertile, it is in an intermediate stage, with the remnants of old flowers and very immature fruits, such that our knowledge of characters of both flowers and fruits is incomplete and will have to await additional collection for supplementation.

Among the species of *Hiraea* known to occur in Venezuela, *H. steyermarkii* bears a strong resemblance to *H. celiana* W. R. Anderson, because their laminas are similar in shape, cuneate at the base, not at all rounded or cordate, and they both have unusually long pedicels. However, the two are easy to distinguish, because *H. celiana* has the leaf margin quite eglandular, its stipules are only 1–1.5 mm long, its inflorescence is rufotomentose, its petals are all fimbriate and eglandular, and its styles are hairy. In spite of the leaf shape, I think those two species are not especially closely related. *Hiraea steyermarkii* is also easily distinguished from *H. affinis* Miq., in which the lamina margin is eglandular, the petioles, stipules, and pedicels are shorter, all the petals are eglandular, and the samara lacks a dorsal wing. *Hiraea neblinensis* W. R. Anderson has shallowly cordate leaves with an eglandular margin, shorter stipules, petals that are all long-fimbriate and eglandular, and the dorsal wing of the samara entire or subentire. Large glands on the leaf margin are found in two species of French Guiana, *H. longipes* W. R. Anderson and *H. morii* W. R. Anderson; both have the lateral petals eglandular and the posterior petal glandular-dentate, as in *H. steyermarkii*. *Hiraea longipes* also has a long pedicel and long stipules like those of *H. steyermarkii*. However, its lamina is rounded to cordate at the base, producing a shape like that of *H. reclinata* Jacq., and it has shorter petioles and longer bracts and bracteoles. In *H. morii* the lamina is similar in shape to that of *H. steyermarkii*, the marginal leaf glands are even more prominent, and the stipules are almost as long, but the inflorescence is much less open, with the cyme sessile and the umbels raised on stalks only 4–10 mm long. Its pedicels are short, up to 17 mm long, and its petals are red in anthesis. Young flowers and mature fruits of *H. steyermarkii* should help to sharpen these distinctions.

Hiraea valida W. R. Anderson, sp. nov.—TYPE: ECUADOR. Napo: Cantón Tena, Estación Biológica Jatun Sacha, 8 km al E de Misahuallí, 1°04'S, 77°36'W, 400 m, bosque muy húmedo tropical, bosque primario cerca al riachuelo Chiquipino, parcela permanente 03, 20 Jan 1990 fr, C. E. Cerón, C. Iguago & E. Saldumbide 8370 (holotype: MICH!).

Liana lignosa ramis sericeis mox vel demum glabratis, quoque nodo cristis interpetiolaribus munito. Lamina foliorum majorum 12–22.5 cm longa, 8–15 cm lata, obovata, basi obtusa, rotundata, vel subcordata, apice late rotundata vel saepius retusa vel subcordata, margine glandulosa, supra mox glabrata, subtus pertinaciter sparsim vel densius sericea; petiolus 15–23 mm longus, apice biglandulosus glandulis 2–3 mm longis; stipulae (2.5–) 3–5 mm longae, 0.9–1.5 mm latae, complanatae, in quarta distali petioli portatae. Inflorescentia ex 4–10 cymis in serie verticali axillari constans, quaque cyma plerumque ex 1 umbella 4-flora constanti; pedicellus 10–16 mm longus, usque ad 24 mm in fructu. Petala lateralia eglandulosa vel dentibus distalibus paulo glandulosis; petalum posticum limbo glanduloso-fimbriato. Styli apice dorsaliter acuti. Samara alis lateralibus 25–40 mm latis, 40–60 mm altis, ala dorsali 4–10 mm lata, 10–14 mm alta.

Woody vine; stems originally sericeous with very short, brown, strongly appressed hairs, soon or eventually glabrate, the nodes marked by a prominent corky ridge connecting the bases of opposite petioles. Lamina of larger leaves 12–22.5 cm long, 8–15 cm wide, obovate, obtuse, rounded, or subcordate at base, broadly rounded or more often retuse to obcordate at apex and often apiculate, bearing several non-prominent, often recessed glands on distal 1/2 or more of margin, initially sericeous on both sides, soon glabrate above or with some hairs persistent on midrib, sparsely to fairly densely sericeous below at maturity with the hairs 0.1–0.3 mm long, very straight and tightly appressed, the principal lateral veins 8–11 pairs, very prominent below but not above, interconnected by scalariform tertiary veins; petiole 15–23 mm long, densely sericeous to glabrate, bearing 2 glands 2–3 mm long at or just above apex, pressed against petiole and/or abaxial midrib; stipules (2.5–) 3–5 mm long, 0.9–1.5 mm wide, flattened, sericeous to glabrate, arising from upper edge of petiole and pressed together at base, borne on distal 1/4 of petiole. Flowers borne above current leaves and, often, on old leafless stems. Inflorescence a dense vertical array of 4–10 cymes in an elongated zone on the stem above the axil, each cyme usually with only the central branch developing and flanked on each side by dormant buds (but the lateral branches occasionally developing), bearing a single 4-flowered umbel; umbel without a gland in the center, borne on a sericeous stalk 2–11 mm long; bracts 0.7–1 mm long and wide, triangular or ovate, abaxially sericeous to glabrate, adaxially glabrous, eglandular, persistent; bracteoles similar to subtending bract or smaller, especially narrower; pedicel 10–16 mm long in flower, up to 24 mm long in fruit, sericeous. Sepals 1–1.7 mm long, hardly exceeding glands when they are present (ca 0.5 mm), 1.5–2.5 mm wide, broadly ovate, obtuse to rounded at apex, appressed in anthesis, abaxially densely sericeous, adaxially glabrous, the anterior eglandular, the lateral 4 all eglandular or all biglandular, the glands 1.4–2 mm long, broadly elliptical, borne partly below sepals on receptacle. Petals “orange,” glabrous, thick-textured; lateral 4 petals with the claw 1.5–2 mm long, the limb 4.5–6.5 mm long and wide, the anterior pair \pm concave and undulate or erose, eglandular, the posterior pair \pm flat and subrectangular, irregularly dentate or short-laciniate, eglandular or with the distal teeth slightly glandular; posterior petal with the claw ca 3.5 mm long and held erect, the limb 3.5–4 mm long, 3.5–4.5 mm wide, bent forward and usually conduplicate, glandular-fimbriate all around margin or at least on the proximal 2/3. Stamens glabrous; filaments nearly free to connate up to 0.7 mm at base, straight or somewhat bowed, 2.2–2.5 mm long opposite sepals, ca 1.5 mm long opposite petals; anthers 0.7–1.1 mm long, mostly somewhat longer opposite sepals than opposite petals, with the connective proximally dark red and distally yellow in dried material. Ovary 1.5 mm high, densely

sericeous; styles glabrous, with an acute dorsal projection at apex 0.1–0.2 mm long; anterior style 2–2.5 mm long, moderately bowed; posterior 2 styles 2.5–3 mm long, strongly bowed. Samara butterfly-shaped; lateral wings membranous, 25–40 mm wide, 40–60 mm high, broadly flabellate to nearly semicircular but with an evident gap between their edges, at least above, sinuous or erose, persistently thinly sericeous or appressed-tomentose on both sides; dorsal wing 4–10 mm wide, 10–14 mm high, rectangular or irregularly dissected, erose or coarsely toothed, extending forward at apex between lateral wings, appressed-tomentose; nut globose, 5–7 mm in diameter, tomentose with short medifixed hairs, the ventral areole circular, 2.5–3 mm in diameter, partially surrounded (on the sides but not around the base) by an irregular callose thickening 0.5–1 mm thick.

ADDITIONAL SPECIMENS EXAMINED. **Ecuador.** NAPO: confluence of Quiwado and Tiwaeno Rivers, primary forest, Apr fl, *Davis & Yost 1038* (ECON, F, MICH, QCA); Cantón Orellana, Sector Huashito, 20 km al N de Coca, propiedad de Palmoriente, 0°20'S, 77°05'W, 250 m, bosque húmedo tropical, primario, Nov imm fr, *Gudiño 194* (MICH).—**PASTAZA:** Pastaza, pozo petrolero Villano 2 de Arco, 1°25'S, 77°20'W, 400 m, bosque húmedo tropical, primario, Dec fl, *Hurtado 2820* (MICH); entre los ríos Iquino y Villano, 1°29'S, 77°27'W, 350 m, bosque húmedo tropical, primario, Aug fl buds, *Tirado et al. 55* (MICH). **Peru.** AMAZONAS: Lugar Aintami, monte, Jan fr, *Kayap 182* (MO).

The epithet of this species, which means strong, refers to its stout woody stems and large leaves, and its habit of growing in the canopy of primary forests. *Hiraea valida* is distinguished by the ridge across its nodes, the large leaf with a retuse to subcordate apex and marginal glands, the flattened stipules borne on the distal fourth of the petiole, the elongated vertical array of umbels above each axil, the glandular-fimbriate posterior petal, the dorsally acute style apex, and the large samara with a well-developed dorsal wing. Perhaps it is best compared to *H. affinis* Miq., because that also has a vertical array of umbels, the lamina often retains some short hairs on the abaxial surface, and it usually has a large membranous samara. However, *H. affinis* has no interpetiolar ridge, its stipules are much shorter, not especially flattened, and borne lower on the petiole, its lamina is more pointed and lacks marginal glands, its petals are all eglandular, the dorsal projection at the style apex is rounded, and the samara lacks a dorsal wing. A closer sister species is probably *H. morii* W. R. Anderson, of French Guiana, which differs from *H. valida* in lacking prominent interpetiolar ridges and in having the leaf apex short-acuminate to rounded, the leaf glands prominent, the petiole shorter, the stipules nearly terete and borne lower on the petiole, the inflorescence a single cyme of three umbels in each axil, and longer filaments and styles. The petals in *H. morii* were described by the collector as red in anthesis, those of *H. valida* as “orange.”

There are two sterile specimens at MICH that probably represent this species. They are *Gentry et al. 27924 & 42992*, both collected in Maynas, Loreto, Peru, in the Yanamono Explorama Tourist Camp near the confluence of the Río Napo and Río Amazonas, 3°28'S, 72°50'W. The lamina is enormous, up to 44 cm long and 22 cm wide, and more gradually tapered proximally, and the stipules are very long, up to 10 mm. Nevertheless, the specimens have a ridge across the node between the petiole bases as in *H. valida*, and they also resemble the latter in the shape and position of the stipules, in the very large petiole glands, in the thinly sericeous abaxial surface of the lamina, and in the marginal glands of the lamina. Moreover, there is an elongated zone above the axil, suggesting the area that produces the inflorescences in *H. valida*. This is most likely a case of sterile stems having leaves that are much larger than those found on fertile branches.

Mascagnia haenkeana W. R. Anderson, sp. nov.—TYPE: ECUADOR. Guayas: Guayaquil, *T. Haenke* 2256 in 1790 (holotype: F!).

Liana lignosa, ramis velutinis. Lamina foliorum majorum 7–11.5 cm longa, 4–6.5 cm lata, ovata ellipticave, subtus pertinaciter velutina; petiolus 11–18 mm longus, pertinaciter velutinus, adaxialiter aliquot glandulis parvis instructus. Inflorescentia paniculata, velutina pilis albis V-formibus; bracteae eglandulosae, persistentes; pedunculus 0.8–2 (–2.5) mm longus; bracteolae eglandulosae, persistentes, in medio pedunculi portatae; pedicellus 7–9 mm longus, velutinus vel tomentosus. Antherae 0.8–1 mm longae, tomentosae. Styli 1.8–2.1 mm longi, apice dorsaliter vix apiculati. Samara 13–18 mm alta, 14–19 mm lata; ala lateralis basi apiceque continua, membranacea; ala dorsalis 3.5–4.5 mm alta, 1.5–3 mm lata; nux super medium samarae posita.

Woody vine; stems persistently velutinous with the hairs very short, V-shaped, mixed white and brown, eventually deciduous. Lamina of larger leaves 7–11.5 cm long, 4–6.5 cm wide, ovate or elliptical, broadly cuneate to rounded at base, acute (?) or short-acuminate at apex, initially densely tomentose or velutinous above but soon or eventually glabrate, densely and persistently velutinous below with V-shaped hairs, bearing 1–several impressed glands abaxially near base on each side of midrib and several more distally between midrib and margin, the principal lateral veins few (ca 5 pairs), visible but not raised above, prominent below; petiole 11–18 mm long, densely and persistently velutinous, bearing several small glands distributed along the adaxial edges; stipules 0.5–0.8 mm long, triangular, sericeous, borne on horizontal ridges on stem beside base of petiole. Inflorescence a large open panicle, the axes and peduncles densely and persistently velutinous like stem but the hairs all white, the ultimate pseudoracemes 5–40 mm long, bearing 4–30 flowers \pm evenly distributed except often absent from the proximal 3–8 mm, proximally decussate but borne in no regular order distally; bracts 0.8–1.3 mm long, narrowly triangular, abaxially subvelutinous to glabrescent, adaxially glabrous, eglandular, persistent; peduncle 0.8–2 (–2.5) mm long; bracteoles like bracts but smaller, 0.5–0.7 mm long, borne at or below middle of peduncle; pedicel 7–9 mm long in flower, up to 11 mm long in fruit, densely and persistently velutinous or tomentose. Lateral 4 sepals bearing 8 glands 1.1–2 mm long, the sepals 1–1.5 mm long beyond glands, ca 1.2 mm wide, ovate and rounded at apex, abaxially white-sericeous, ciliate on margin, adaxially glabrous, appressed in anthesis. Petals glabrous, exposed in enlarging bud, abaxially very narrowly keeled on claw; lateral petals with the claw ca 1.5 mm long, the limb ca 3 mm long, 2 mm wide, subentire or denticulate; posterior petal with the claw ca 2 mm long, the limb somewhat larger than in lateral petals, erose. Filaments ca 2–2.5 mm long, glabrous; anthers 0.8–1 mm long, densely tomentose. Ovary ca 0.8 mm high, densely white-hirsute; styles glabrous, stigmatic on inner angle of apex and dorsally minimally apiculate with the extension up to 0.1 mm long, the distance from face of stigma to dorsal tip 0.3–0.4 mm; anterior style ca 1.8 mm long, erect and straight; posterior styles 2.1 mm long, divergent at base, then erect and straight. Samara 13–18 mm high, 14–19 mm wide, broadly ovate, sparsely sericeous to nearly glabrate at maturity, the lateral wing membranous, continuous at base and apex, entire or very shallowly emarginate at apex, entire or sinuous and often denticulate around margin; nut positioned above middle of samara; dorsal wing 3.5–4.5 mm high, 1.5–3 mm wide, rounded or quadrangular, entire or slightly erose, arising near base of nut and extending about halfway from apex of nut to apex of lateral wing, connate with lateral wing beyond nut; ventral winglet present as a

flange on underside of lateral wing, extending from apex of nut to apex of lateral wing, ca 0.5 mm wide; ventral areole ovate, 1.5–2 mm long, 1–1.3 mm wide; torus ca 2 mm high, surrounded by a narrow, glabrous, 3-lobed, disciform outgrowth of the receptacle.

ADDITIONAL SPECIMEN EXAMINED. **Ecuador.** GUAYAS: 14 km ESE of Montero, elev. 10 m, fence shrubbery, Dec fr, *MacBryde & Simmons 951* (QCA).

Mascagnia haenkeana is named in honor of Thaddaeus Haenke (1761–1817), the collector of the holotype. The only flowers available, those on the holotype, are badly damaged by insects, so the estimates of sizes given above are rough approximations. The petals will surely prove to be pink or violet. In most characters *M. haenkeana* is very similar to the widespread species *Mascagnia divaricata* (H. B. K.) Nied., which has long been misidentified as *M. ovatifolia* (H. B. K.) Griseb. (see discussion in Anderson, 1993, pp. 380–381). However, in *M. divaricata* the lamina is thinly sericeous to glabrate, the hairs when present nearly straight and appressed. I have never seen specimens of it with the leaves densely and persistently velutinous as they are in *M. haenkeana*.

Mascagnia lilacina (S. Watson) Nied., Arbeiten Bot. Inst. Königl. Lyceums Hosianum Braunsberg 3: 14. 1908. *Hiraea lilacina* S. Watson, Proc. Amer. Acad. Arts 17: 333. 1882.—TYPE: MEXICO. Coahuila: Caracol Mountains 21 mi SE of Monclova, Aug fl, *E. Palmer 124* in 1880 (lectotype, here designated: GH!; isoelectotypes: G! NY! US!).

This species is mentioned here for the sole purpose of designating a lectotype.

Mascagnia lugoi W. R. Anderson, sp. nov.—TYPE: ECUADOR. Napo: Tierra Colorada, ca 3 km N of Coca (Puerto Francisco de Orellana), 22 Jan 1973 fl, *H. Lugo S. 2920* (holotype: GB!; isotype: MICH!).

Liana lignosa, ramis viridibus sericeis mox glabratis. Lamina foliorum majorum 7–12 cm longa, 2.5–6.5 cm lata, ovata ellipticave, sparsim sericea mox glabrata; petiolus 9–18 mm longus, sparsim sericeus vel glabratus, eglandulosus. Inflorescentia minute velutina pilis brunneis; bracteae bracteolaeque eglandulosae, persistentes; pedicellus 3.5–7 mm longus, velutinus vel tomentosus. Petala plerumque rosea, lateralia ungue 1.5–2.7 mm longo, limbo 3–4 mm longo, 3–5 mm lato, posticum ungue 2.5–3.5 mm longo, limbo 4–4.5 mm longo, 5–6 mm lato. Antherae 0.9–1.4 mm longae, sericeae vel tomentosae. Stylus anticus 2–3 mm longus, fere rectus, styli postici 2.5–4.5 mm longi valde arcuati, omnes 3 styli apice dorsaliter apiculati apiculo 0.2–0.3 mm longo. Samara 19–30 (–38) mm alta lataque; ala lateralis basi apiceque continua, membranacea; ala dorsalis (3.5–) 5–9 mm alta, 2–4 mm lata; nux super medium samarae posita.

Woody vine; stems green the first year, sericeous to glabrate, the hairs when present brown, straight, appressed. Lamina of larger leaves 7–12 cm long, 2.5–6.5 cm wide, ovate or elliptical, cuneate or rounded at base, usually slightly revolute at margin, acuminate at apex, sparsely sericeous to glabrate on both sides, bearing 4–9 impressed glands abaxially in a row on each side of midrib, from base to apex between midrib and margin, the 5–7 pairs of principal lateral veins visible but hardly raised above, prominulous or prominent below; petiole 9–18 mm long,

sparsely sericeous to glabrate, eglandular; stipules 0.3–0.8 mm long, triangular, sericeous to glabrate, borne on stem beside base of petiole. Inflorescence paniculate with the branches subtended by successively more reduced vegetative leaves, the axes and peduncles minutely velutinous or eventually glabrescent with the hairs mostly brown, the ultimate pseudoracemes 10–50 mm long, bearing 4–20 (–28) flowers \pm evenly distributed above the proximal 5–15 mm or denser toward apex, often decussate proximally but borne in no regular order distally; bracts 0.5–1.2 mm long, narrowly triangular, abaxially sericeous to glabrescent, adaxially glabrous, eglandular, persistent; peduncle 0.5–3.5 mm long; bracteoles like bracts but smaller and more elliptical, 0.4–0.7 mm long, borne well below apex of peduncle; pedicel 3.5–7 mm long in flower, up to 10 mm long in fruit, velutinous or tomentose. Lateral 4 sepals bearing 8 glands, the sepals 0.8–1.5 mm long beyond glands, 1–1.3 mm wide, obtuse or rounded, abaxially sericeous with the hairs white or golden, ciliate on margin, adaxially glabrous, appressed in anthesis; glands 1.1–2 mm long, detached at apex. Petals “pink” or “reddish,” rarely “lilac,” glabrous, exposed in enlarging bud, usually abaxially narrowly keeled on claw and base of limb, especially the lateral petals; lateral petals with the claw spreading and the limb often reflexed, the claw 1.5–2.7 mm long, the limb 3–4 mm long, 3–5 mm wide, nearly rotund to oblate or roughly triangular with rounded lobes at base, flat or slightly concave, proximally erose, distally entire; posterior petal with the claw nearly erect and the limb strongly reflexed, the claw 2.5–3.5 mm long, stout, the limb 4–4.5 mm long, 5–6 mm wide, oblate, somewhat crumpled, erose. Filaments 1.5–3.5 mm long, longest opposite anterior sepal and posterior-lateral petals with the latter stouter, shortest opposite posterior petal, connate at base for up to 0.7 mm, glabrous; anthers 0.9–1.4 mm long, longest opposite posterior-lateral petals, sericeous or tomentose. Ovary ca 1 mm high, densely hirsute; styles with a few hairs at base, distally glabrous; anterior style 2–3 mm long, erect and straight or curved slightly toward posterior petal, posterior styles 2.5–4.5 mm long, very strongly bowed outward from base and then back toward center of flower, elongating and twisting outward in age; all 3 styles with a sharp well-developed apical-dorsal extension 0.2–0.3 mm long, the distance from internal stigma to tip of dorsal extension 0.5–0.8 mm. Samara 19–30 (–38) mm high and wide, broadly ovate to rotund, persistently sericeous on nut, otherwise sparsely sericeous to glabrate at maturity, the lateral wing membranous, continuous at base and apex, broadly notched ca 2–3 mm deep at apex, sinuous around margin; nut positioned above middle of samara; dorsal wing (3.5–) 5–9 mm high, 2–4 mm wide, semicircular or quadrangular or irregular in shape, entire or sinuous, arising at or below base of nut and extending almost halfway from apex of nut to apex of lateral wing, connate with lateral wing beyond nut; ventral winglet absent or present only as a rudimentary flange ca 0.4 mm wide extending from apex of nut about halfway to apex of lateral wing; ventral areole ovate, 2.5–3.3 mm long, 1–1.3 mm wide; torus 1.7–2.5 mm high, surrounded by a wide, reddish, glabrous, 3-lobed, disciform outgrowth of the receptacle.

ADDITIONAL SPECIMENS EXAMINED. **Brazil.** AMAZÓNAS: near mouth of Rio Embira, tributary of Rio Tarahuaca, 7°30'S, 70°15'W, *Krukoff 4639* (MICH). **Ecuador.** NAPO: Río Payamino, tributary of the Río Napo, vicinity of Payamino-Capihuara, *Lugo 2895* (GH, MICH).—SUCUMBÍOS: near ferry crossing over Coca River, 69 km S of Lago Agrio, *Gentry 12556* (GB, MICH, MO, QCA, S); Cañón de los Monos, road Coca (Puerto Francisco de Orellana)–Lago Agrio, 12 km N of Coca, *Lugo 2947* (GB, MICH); road Lago Agrio–El Chaco, *Lugo 3484* (GB, MICH); environs of Limoncocha, *Madison et al. 5484* (MICH, QCA, SEL). **Peru.** AMAZONAS: Río Cenepa, vicinity of Huampami, 5 km E

of Chávez Valdívía, 4°30'S, 78°30'W, *Ancuash 1247* (MICH, MO).—HUÁNUCO: Prov. Huánuco, Tingo María, *Asplund 13004* (G).—LORETO: Alto Amazonas Prov., Washinta and vicinity, Río Huasaga, 3°20'S, 76°20'W, *Lewis et al. 11225* (MO).—MADRE DE DIOS: Parque Nacional del Manu, Río Manu, Cocha Cashu Station, *Foster 5411* (F, MICH); Tambopata Province, Las Piedras, Cusco Amazónico, 12°29'S, 69°03'W, *Timaná 2009, 2336, 2414* (all MO).—SAN MARTÍN: Prov. Mariscal Cáceres, Distr. Tocache Nuevo, Río Cañuto, *Schunke V. 10957* (MICH).

The epithet of *Mascagnia lugoi* honors Hólguer Lugo Sánchez (b. 1941), the collector of the type and many other excellent specimens from Amazonian Ecuador. This species inhabits Amazonian tropical wet forests at elevations of 185–500 m. It has been collected with flowers in January, February, May, June, August, and September, and with fruits in June, September, October, and November. *Mascagnia lugoi* is closely related to *M. divaricata* (H. B. K.) Nied., but that widespread species has petioles bearing several small glands on the adaxial edges, densely white-velutinous inflorescences, smaller petals that are usually described as violet, and shorter styles that bear only a very short dorsal apiculum at the apex, ca 0.1 mm long.

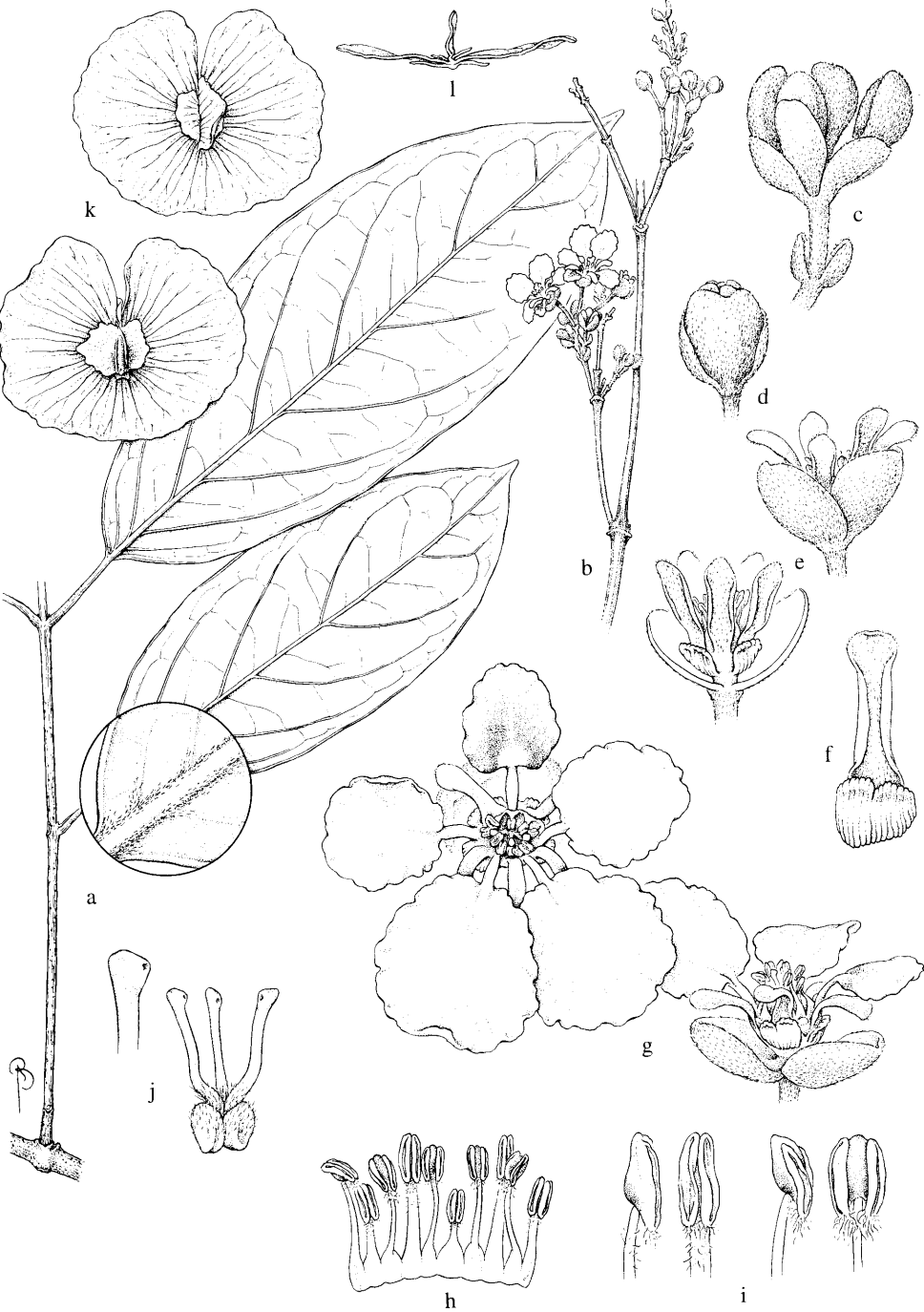
Mezia angelica W. R. Anderson, sp. nov.—TYPE: FRENCH GUIANA. Saül, La Fumée Mountain Trail, 3°37'N, 53°12'W, 17 Sep 1989 fl, S. Mori, C. Gracie & M. Rothman 20945 (holotype: MICH!; isotypes: CAY! K! NY! U! US!). Fig. 5.

Liana lignosa. Lamina foliorum majorum 12–22 (–24) cm longa, 4.5–8 (–9.8) cm lata, primo sericea mox glabrescens vel glabrata. Bracteolae 5–7 (–8) mm longae, eglandulosae. Glandulae 2 in quoque sepalo laterali omnino connatae. Petala omnia abaxialiter tomentosa, margine eglandulosa, lateralia citrina, posticum distaliter citrinum proximaliter rubrum. Filamenta tomentosa, 2–4.2 mm longa, tantum basaliter connata, valde heteromorpha; antherae basi tomentosae, praecipue illae sepalis oppositae. Styli apice pedalisformes, anticus 3–3.5 mm longus ± rectus, postici 3.5–4 mm longi lyrati vel sigmoidei. Samara oblata, 55–80 mm lata, 45–60 mm alta; ala lateralis basi continua; 3 alae dorsales planae, parallelae; nux utrinque inter areolam ventralem et alam lateralem 1 crista vel alula 1–9 (–15) mm lata et 11–23 mm alta instructa.

Woody vine, the stems initially brown-sericeous but mostly soon glabrescent, initially flattened or quadrangular but soon or eventually becoming terete. Lamina of larger leaves 12–22 (–24) cm long, 4.5–8 (–9.8) cm wide, elliptical or somewhat ovate or obovate, truncate or cuneate at base, flat and not or only slightly thickened at margin, abruptly short-acuminate at apex with the acumen 5–10 mm long, initially sericeous adaxially but very soon glabrate or thinly sericeous proximally on and near midrib, thinly sericeous abaxially to glabrescent with the hairs dark brown fading to white, sessile, straight, tightly appressed, and hardly noticeable without a lens, abaxially eglandular or bearing 1 large gland at base on each side of midrib (these glands often sunken in crypts) and occasionally several small impressed glands distally in a single row several mm inside margin, the reticulum and 5–8 pairs of lateral veins visible but hardly raised adaxially, prominent abaxially; petiole 15–30 mm long, sericeous to glabrate, eglandular; stipules none or minute triangular rudiments up to 0.3 mm high, borne on an interpetiolar ridge. Inflorescence open with spreading flattened branches 2–13 cm long, light- to dark-brown-sericeous or eventually glabrescent; stalk of the umbel 6–16 mm long, bearing 1 pair of deciduous sterile bracts 2–8 mm above the base, well below to

slightly above the middle; floriferous bracts 3.5–6.5 mm long, obovate and broadly rounded at apex, concave, eglandular, abaxially densely sericeous, adaxially glabrous or proximally sericeous, deciduous before or during anthesis; peduncle 7–14 mm long in flower, thickened and often somewhat elongated in fruit, sericeous or subvelutinous; bracteoles 5–8 mm long, eglandular, abaxially densely sericeous with the hairs light to fairly dark brown, adaxially glabrous, emarginate or bifid at apex, with the midrib usually raised abaxially, mostly persistent past maturity of the fruit; pedicel 0–0.8 mm long in flower, up to 2 mm long in fruit, hirsute with the hairs spreading or appressed. Sepals 4–7 mm long beyond glands, 2–3 mm wide, spatulate, often strongly revolute along sides, abaxially densely brown-tomentose, adaxially glabrous, the anterior eglandular, the lateral 4 biglandular with the glands 2–3 mm long, nearly or completely connate, the pair 1.8–3 mm wide, obovate. Petals abaxially loosely white-tomentose in center; lateral petals pure lemon-yellow, the claw 3–4 mm long, the limb 6–11 mm long and wide, significantly larger in anterior pair than in posterior pair, orbicular or suborbicular or obovate, slightly crumpled, erose, eglandular; posterior petal distally lemon-yellow, proximally red in the center, the claw 3.5 mm long, very thick, constricted at apex, the limb 6–7 mm long and wide, orbicular, often crumpled and folded backward, distally erose, proximally dentate or short-fimbriate but eglandular. Filaments connate only in the basal 0.5–1 mm, tomentose especially distally, erect and straight or (especially opposite lateral sepals) bent toward center of flower, strongly heteromorphic, 2–4.2 mm long, shortest opposite posterior petal, then progressively longer opposite anterior-lateral petals, lateral sepals, and posterior-lateral petals (these 2 much stouter than all others), longest opposite anterior sepal; anthers 1–1.8 mm long, tomentose at base, with the connective adaxially dark red its whole length and abaxially dark red proximally and yellow distally, heteromorphic, those opposite sepals more abundantly tomentose than those opposite petals and having the connective widened so as to displace the locules laterally and elongated so as to exceed the locules. Ovary 1.5 mm high, sericeous; styles proximally sericeous, nearly terete, pedaliform at apex (i.e., with a short, broad abaxial extension resembling from above the sole of a shoe); anterior style 3–3.5 mm long, nearly straight and erect or inclined slightly toward posterior petal; posterior styles 3.5–4 mm long, lyrate or sigmoid, bent outward in proximal third, then erect or bent inward, and distally often bent outward, with the stigmas twisted toward posterior petal. Samara oblate, 55–80 mm wide, 45–60 mm high, sericeous on the nut, thinly sericeous on the wings; lateral wing 25–34 mm wide, continuous at base, incised to nut at apex, membranous, apparently nearly flat or somewhat corrugated, entire or repand at margin; central dorsal wing 7–14 mm wide, 18–33 mm high, semicircular or irregularly repand, flat; 1 flat winglet 3–7 mm wide and 10–18 mm high present on each side of and parallel to central dorsal wing, entire or irregularly repand; 1 flat crest or winglet 1–9 (–15) mm wide and 11–23 mm high present on each side of nut, outside of and parallel to lateral wing, irregularly repand or coarsely dentate; nut with the ventral areole 9–13 mm high, 2–4 mm wide, narrowly ovate or elliptical, bordered by 2 ribs that remain on samara. Pyramidal receptacle 1–2 mm high. Embryo circular in cross section and elliptical in longitudinal section, the cotyledons equal, straight, semicircular in cross section.

ADDITIONAL SPECIMENS EXAMINED. **Brazil.** AMAZÔNAS: Distr. Agropecuário, Reserva 1501 (Km 41) da WWF/INPA Projeto da Dinâmica Biológica dos Fragmentos Florestais, 2°24'26"–2°25'31"S, 59°43'50"W, *Lepsch da Cunha et al.* 342 (MICH); Reserva Florestal Ducke, Manaus–Itacoatiara Km

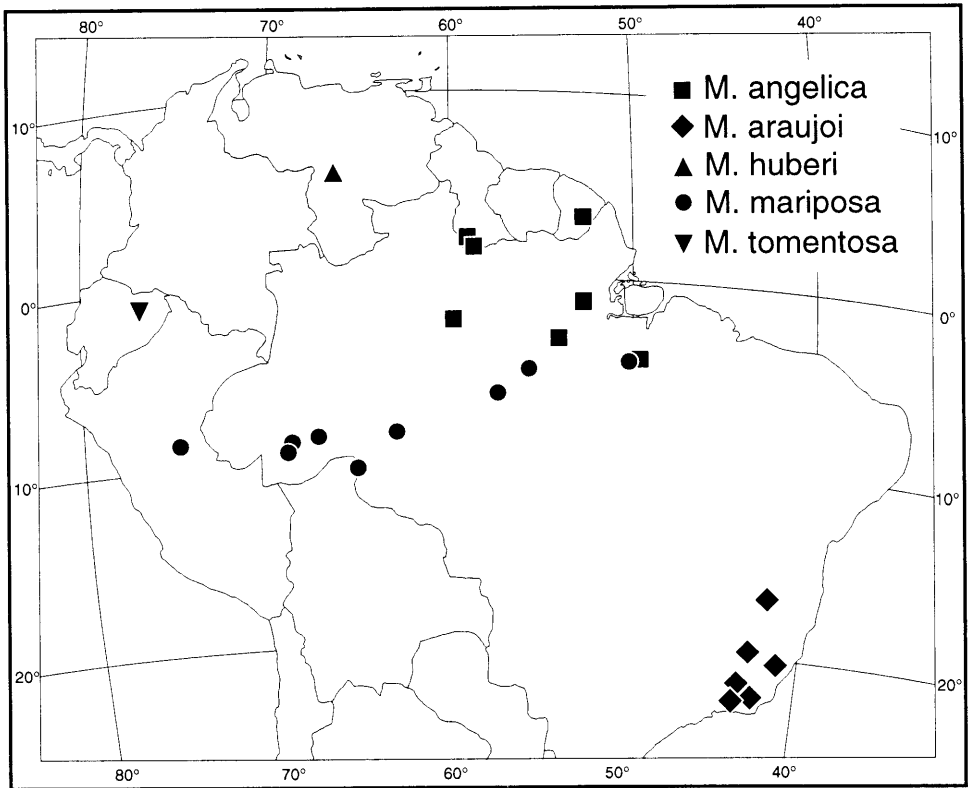


26, 2°53'S, 59°58'W, *Vicentini 1014* (MICH).—PARÁ: Rio Jarí, Monte Dourado, *Cavalcante 3329* (MG, NY); Tucuruí, margens da PA-149 até o Km 50, *Revilla et al. 8310* (INPA); Santarém, Km 70 da estrada do Palhão, Ramal do Caeteté, *M. Silva 2604* (MG, MICH, NY); Rio Jarí, estrada entre Planalto A e Tinguelin, Km 13, *N. T. Silva 2785* (IAN, UB); Rio Jarí, *N. T. Silva 2830* (UB). **French Guiana.** Saül, La Fumée Mountain Trail, 3°37'N, 53°12'W, *Mori et al. 21012* (CAY, MICH, NY). **Guyana.** Kamoá River, Clarence Hill, 1°31'N, 58°50'W, *Jansen-Jacobs et al. 1738* (MICH, MO, NY, US); Rupununi Distr., between Kuyuwini Landing and Kassikaityu River, 2°00'N, 59°15'W, *Jansen-Jacobs et al. 3019* (MICH).

Moist non-flooded forests at elevations of 50–360 m, in eastern Amazonia from eastern Amazonas and northern Pará, Brazil, north to central French Guiana and southern Guyana (Fig. 6); to be expected in Suriname. Collected with flowers and fruits from August to October. The epithet of this species honors Bobbi Angell (b. 1955), the talented artist who has contributed so much to plant taxonomy in recent years through her graceful drawings.

Mezia angelica is probably most closely related to *M. araujoi* Nied., the type of the genus, which occurs far to the south of *M. angelica* in Espírito Santo, Rio de Janeiro, and eastern Minas Gerais (see Fig. 6). Both species have all five petals abaxially loosely white-tomentose, tomentose filaments that are connate only at the base, tomentose anthers, and slender styles of which the posterior two are lyrate. They differ most dramatically in their fruits. In *M. araujoi* the samara bears a complex of many winglets with diverse orientations on each side of the central dorsal wing, some of them at right angles to the lateral and dorsal wings. In *M. angelica* there is only one flat intermediate crest or winglet on each side of the dorsal wing, parallel to it; there is also a flat winglet on each side of the nut *outside* the large lateral wing. A similar external winglet occurs sometimes in *M. araujoi*, associated with ribs oriented at right angles to the lateral wing. *Mezia huberi*, a species of southern Venezuela (Fig. 6), has a smaller but somewhat similar samara, with only two flat intermediate winglets (but without additional winglets outside the lateral wing); it differs from *M. angelica* in many characters, including its persistently sericeous leaves, glabrous posterior petal, glabrous filaments 1/3–2/3 connate, glabrous anthers, and straight, erect, stout styles. *Mezia angelica* is further distinguished from both *M. araujoi* and *M. huberi* in having the two glands on each sepal nearly or completely connate.

FIG. 5. *Mezia angelica*. a) leafy stem, with enlargement of abaxial base of lamina to show persistent hairs, $\times 0.5$; b) portion of inflorescence, $\times 0.5$; c) umbel of 4 flower buds, each bud enclosed by 2 bracteoles and subtended by 1 bract, the stalk of the umbel bearing a pair of sterile bracts, $\times 2$; d) flower bud about to open, with the 2 bracteoles being forced apart by the enlarging sepals, $\times 2$; e) open flower with petals removed, with the 2 subtending bracteoles intact (above) and with the bracteoles half cut away (below) to show sepals, with the eglandular anterior sepal in center, $\times 2$; f) abaxial view of 1 lateral sepal bearing a large double gland formed from 2 nearly connate glands, $\times 4$; g) open flower, from above with posterior (flag) petal uppermost (left) and from the side with 2 petals removed and the posterior petal to the right (right), $\times 2$; h) adaxial view of complete androecium, laid out with the shortest stamen (fifth from right) that opposite the posterior petal, $\times 4$; i) side and adaxial views of anthers, the pair on left opposite petals, those on right opposite sepals, $\times 8$; j) gynoecium with anterior style in center, $\times 4$, and 1 style-apex enlarged, $\times 8$; k) samaras, abaxial view (above) and adaxial view (below), $\times 0.5$; l) samara in cross section, showing large lateral wing, smaller dorsal wing (pointing straight up), single winglets between dorsal and lateral wings, and single winglets outside lateral wing, $\times 0.5$. Drawn by Bobbi Angell, a–j from *Mori et al. 20945*, k & l from *Silva 2830*. Reproduced with permission of Dr. Scott Mori and the New York Botanical Garden.

FIG. 6. Distribution of selected species of *Mezia*.

Mezia mariposa W. R. Anderson, sp. nov.—TYPE: BRAZIL. Acre: Basin of Rio Purus, near mouth of Rio Macauhan (tributary of Rio Yaco), 9°20'S, 69°W, 11 Aug 1933 fl, B. A. Krukoff 5452 (holotype: MICH!; isotypes: A! F! G! K! MO! NY! U! US!).

Liana lignosa. Lamina foliorum majorum 13–22 cm longa, (5–) 6–10.5 (–12) cm lata, primo sericea vel subsericea permox glabrata. Bractae floriferae 1.5–3.5 mm longae; bracteolae 5–8 mm longae, exterior 1 glandula abaxiali excentrica instructa. Petala glabra, lateralia citrina eglandulosaque, posticum distaliter citrinum proximaliter rubrum margine eglandulosum vel proximater glanduloso-dentatum. Antherae sepalis oppositae tomentosae, petalis oppositae glabrae vel paene glabrae. Styli complanati, apice dorsaliter breviuncinati. Samara papilionacea alis lateralibus 22–33 mm latis, 31–52 mm altis, ala dorsali 7–12 mm lata, 18–28 mm alta, alis intermediis nullis.

Woody liana climbing to tops of tall trees, the stems initially sericeous with brown and cinereous hairs but very soon glabrate, initially flattened or quadrangular but soon or eventually becoming terete. Lamina of larger leaves 13–22 cm long, (5–) 6–10.5 (–12) cm wide, narrowly to broadly elliptical or somewhat ovate or obovate, rounded, truncate, or cuneate at base, flat and not thickened at margin, abruptly short-acuminate at apex with the acumen 9–17 mm long, initially sericeous or subsericeous but very soon glabrate (usually before lamina is fully expanded), abaxially bearing 1 large gland at base on each side of midrib (these glands often sunken in crypts) and a single row of impressed glands several mm

inside margin on distal 1/2–3/4, the reticulum and 5–8 pairs of lateral veins visible but only moderately raised adaxially, prominent abaxially; petiole 8–14 (–17) mm long, initially sericeous but very soon glabrate, eglandular; stipules none or minute, caducous, triangular rudiments ca 0.2 mm high, borne on an interpetiolar ridge. Inflorescence open, often branched, up to 50 cm long, the major axes indeterminate, the short lateral branches cymes of 1–3 (–7) 4-flowered umbels, all axes dark-brown-sericeous or appressed-tomentose, the major axes often glabrescent, the ultimate axes and peduncles with the vestiture persistent or patchily deciduous in fruit; stalk of the umbel or cyme 5–13 mm long, bearing 1 pair of persistent or deciduous sterile bracts above middle to (usually) near the apex, 0–2 (–4) mm below umbel; floriferous bracts 1.5–3.5 mm long, ovate, rounded at apex, often concave or conduplicate, eglandular, abaxially loosely sericeous, adaxially glabrous, deciduous during anthesis; peduncle (9–) 11–18 mm long in flower, thickened and elongated in fruit; bracteoles 5–8 mm long, the outer bearing 1 circular or elliptical gland 0.5–1.1 mm long sunken in abaxial tissue at base between middle and margin, the inner eglandular, both abaxially densely sericeous or appressed-tomentose with the hairs reddish brown to dark brown, adaxially glabrous or sparsely sericeous, broadly rounded or truncate but not emarginate at apex, the midrib not raised abaxially, persistent past maturity of fruit; pedicel 0–1 mm long in flower, up to 3 mm long in fruit, hirsute with the hairs spreading or appressed to glabrate. Sepals (4–) 5–6.5 mm long beyond glands, 2–3.4 mm wide, spatulate or narrowly oblong, reflexed in anthesis, strongly revolute along sides, abaxially densely appressed-tomentose or subsericeous with the hairs reddish to fairly dark brown, adaxially glabrous, the anterior usually eglandular (rarely biglandular), the lateral 4 biglandular, the glands 2–3.3 mm long, distinct or partially to almost completely connate, the pair 1.5–2.7 mm wide, quadrate or obovate. Petals glabrous; lateral petals yellow, the claw 2.5–3.5 mm long, the limb 9–16 mm long, 9–15 mm wide, significantly larger in anterior pair than in posterior pair, orbicular or obovate, flat or slightly crumpled, coarsely erose, eglandular; posterior petal distally yellow, proximally red in the center, the claw 2.7–3.5 mm long, ca 1 mm wide, constricted at apex, the limb 7–9 mm long, 5–9 mm wide, orbicular or elliptical, often crumpled and folded backward, proximally dentate with the teeth glandular or eglandular, distally erose. Filaments connate in the proximal 0.5–1.2 mm, those opposite sepals glabrous or sparsely pilose, those opposite petals glabrous, erect and straight or (especially opposite lateral sepals) bent toward center of flower, strongly heteromorphic, 1.8–4 mm long, shortest opposite posterior petal, then progressively longer opposite anterior-lateral petals, lateral sepals, and posterior-lateral petals (these 2 much stouter than all others), longest opposite anterior sepal; anthers (1–) 1.3–2.4 mm long, shortest opposite the posterior petal, with the connective adaxially reddish and abaxially dark red proximally and yellow distally, heteromorphic, those opposite sepals abundantly tomentose the whole length of their locules and having the connective widened so as to displace the locule laterally and elongated so as to exceed the locules, those opposite petals nearly or quite glabrous, the locules extending to apex of connective. Ovary 1.5–1.8 mm high, loosely sericeous; styles loosely sericeous on proximal half, flattened laterally in distal half, not or only very narrowly pedaliform at apex, dorsally short-hooked at apex with the projection 0.1–0.3 mm long; anterior style 2.5–3.2 mm long, straight and erect or inclined slightly toward posterior petal; posterior styles 3–4 mm long, lyrate, bent outward in proximal third, then erect or bent inward, and distally often bent outward, with the stigmas twisted toward posterior

petal. Samara butterfly-shaped, the whole oblate, 56–70 mm wide, 31–52 mm high, densely short-tomentose or subsericeous on the nut, the vestiture thinner on wings, especially distally, or patchily deciduous; lateral wings 22–33 mm wide, dissected to nut at base and apex, roughly trapezoidal but rounded at base and obtuse at apex, relatively firmly membranous or subcoriaceous (compared to the very fragile samaras of other species of the genus), nearly flat, entire or repand at margin; dorsal wing 7–12 mm wide, 18–28 mm high, crescent-shaped, triangular, or rectangular, usually widest near apex, entire or coarsely erose, flat; nut devoid of winglets or other outgrowths between dorsal and lateral wings, and lacking crests or winglets outside lateral wings; nut inflated, broadly cylindrical, 10–13 mm across, 14–17 mm high, with the ventral areole 10–13 mm high, 4–6 mm wide, elliptical or obovate, bordered by 2 ribs that remain on samara. Pyramidal receptacle 2–3 mm high.

ADDITIONAL SPECIMENS EXAMINED: **Brazil.** ACRE: Vizinhança de Sena Madureira, 9°05'S, 68°40'W, Nelson *et al.* 523 (INPA, MICH, MG); Colocação Boa União, Sothers & Santos 8 (MICH).—AMAZÔNAS: Track from São Paulo to Terra Firme, Rio Purus, opposite Boca do Acre, Prance *et al.* 2586 (INPA, NY).—PARÁ: Upper Cupari River, plateau between the Xingú and Tapajós Rivers, Krukoff 1135 (A, G, K, NY, P); Tucuruí, Lima & Silva 83 (INPA); Bôa Vista on the Tapajós River, Monteiro da Costa 56 (F); Tucuruí, Rio Caraipé, Revilla *et al.* 8272 (INPA) & PA-149, Revilla *et al.* 8425 (INPA).—RONDÔNIA: Estrada Belmonte, Cordeiro 766 (MICH); Rio Jarú, BR-29, Pôrto Velho, Duarte 7158 (MICH); Pôrto Velho, estrada Belmonte, Mota & Coêlho 100 (INPA); eastern bank of Rio Madeira at Misericórdia between Cachoeiras Madeira and Misericórdia, Prance *et al.* 6633 (INPA, MG, MICH, NY). **Peru.** HUÁNUCO: Prov. Pachitea, Distr. Honoria, Bosque Nacional de Iparia, Río Pachitea cerca del campamento Miel de Abeja, 1 km arriba del pueblo de Tournavista o unos 20 km arriba de la confluencia con el Río Ucayali, Schunke V. 2062 (F, NY, US), 2179 (F, NY, US), 2186 (F).

Collected with flowers from June to October and with fruits in September and October, in high *terra firme* forests at elevations up to 400 m, in Amazonian Brazil and Peru (Fig. 6). The epithet *mariposa* is the Portuguese and Spanish word for butterfly. It refers to the shape of the samara of *Mezia mariposa*, which is unique in the genus in having two lateral wings completely distinct at the base as well as at the apex; all other species have a single lateral wing continuous at the base. Another unique characteristic is the single gland present on one side of the outer bracteole; other species of *Mezia* have both bracteoles eglandular. In many other characters *M. mariposa* resembles *M. angelica*, e.g., the relative lengths of the filaments and shapes of the anthers, but *M. angelica* has hairy petals, all the anthers are tomentose, and the samara bears additional winglets or crests between the dorsal and lateral wings and outside the lateral wings. See the description and discussion of *M. angelica* above.

***Mezia tomentosa* W. R. Anderson, sp. nov.**—TYPE: ECUADOR. Pastaza: Pastaza Cantón; Pozo petrolero “Masaramu” de UNOCAL, 40 km al NE de Montalvo, 76°52'W, 00°44'S, 390 m, bosque húmedo tropical, primario, 1–17 May 1990 fr, S. Espinoza 244 (holotype: MICH!; isotype: MO!).

Liana lignosa. Lamina foliorum majorum 11.5–17 cm longa, 5–9.4 cm lata, abaxialiter dense et pertinaciter velutina vel tomentosa, eglandulosa; petiolus 15–23 mm longus, eglandulosus. Umbellae pedunculus 5–11 mm longus; bracteae floriferae 2–4 mm longae; pedunculus florifer in fructu 10–14 mm longus; bracteolae 6–8 mm longae, eglandulosae. Glandulae 2 in quoque sepalo laterali distinctae. Filamenta ca 1/2-connata, glabra. Styli apice dorsaliter rotundati vel obtusi. Samara

oblata vel subcircularis, 70–90 mm lata, 60–75 mm alta; ala lateralis basi continua; alae dorsales et intermediae numerosae, dissectae, interconnexae, non parallelae, ca 8–10 mm latae.

Woody liana, the stems persistently subsericeous or appressed-tomentose with dark reddish-brown hairs to eventually glabrate, initially quadrangular but soon or eventually becoming terete. Lamina of larger leaves 11.5–17 cm long, 5–9.4 cm wide, elliptical or slightly ovate or obovate, cuneate at base, somewhat revolute at margin, abruptly acuminate at apex with the acumen 7–15 mm long, probably initially hairy adaxially but at maturity glabrate or tomentose proximally on midrib and often shiny as if lacquered, abaxially densely and persistently appressed-tomentose on midrib and elsewhere velutinous or tomentose with the hairs dark brown or reddish brown, often fading in age and sometimes unevenly abraded from oldest leaves, a mixture of sessile V-shaped hairs and Y- or T-shaped hairs with a short but definite stalk and the branches straight to sinuous, the lamina apparently eglandular, the reticulum and 5–8 pairs of lateral veins sunken or at most prominulous adaxially, prominent adaxially; petiole 15–23 mm long, persistently subsericeous like stem, eglandular; stipules not found, but perhaps initially present on stem beside petiole where apparent scars ca 0.5 mm wide may sometimes be found. Inflorescence known only in late fruit, such that only a very imperfect idea of its branching and structures is possible, but apparently a lateral panicle with vestiture like that of stems on decussate branches and presumably bearing bracts or small leaves at the nodes, subtending ultimately single umbels of 4 flowers; stalk of the umbel 5–11 mm long, bearing 1 pair of deciduous sterile bracts 1–3 mm above base, well below the middle; floriferous bracts 2–4 mm long, elliptical or obovate and rounded at apex, concave, eglandular, abaxially densely sericeous, adaxially glabrous, deciduous before maturation of fruit or persistent; peduncle 10–14 mm long in fruit, subsericeous or subvelutinous; bracteoles 6–8 mm long, eglandular, abaxially densely sericeous or subsericeous with the hairs light to dark brown, adaxially glabrous, truncate or somewhat emarginate at apex, with the midrib sometimes raised abaxially, mostly persistent past maturity of fruit; pedicel 1–2.5 mm long in fruit, hirsute with the hairs spreading. Flowers not seen. Sepals 6.5–7.5 mm long beyond glands in fruit, 2.5–3 mm wide, spatulate, slightly revolute all around margin, abaxially densely and loosely subsericeous with the hairs more or less spreading, adaxially glabrous, the anterior eglandular, the lateral 4 biglandular with the glands 1.5–2 mm long, 1–1.3 mm wide, obovate, distinct. Filaments ca 1/2 connate, glabrous. Styles 2.4–3.2 mm long in fruit, straight, terete or laterally flattened distally, densely sericeous on proximal 1/2–2/3, dorsally rounded or obtuse at apex. Samara oblate to nearly circular, 70–90 mm wide, 60–75 mm high, tomentose on nut, tomentose to subsericeous on wings; lateral wing 30–43 mm wide, continuous at base, incised to nut at apex, membranous, distally flat but strongly corrugated near nut, repand at margin; dorsal wing and several intermediate wings indistinguishable, highly dissected and interconnected by transverse winglets, all ca 8–10 mm wide, together forming a ruffled complex of winglets of diverse orientations; nut with the ventral areole 7–10 mm high, 2–3 mm wide, narrowly ovate, bordered by 2 ribs that remain on samara. Pyramidal receptacle 2–3.5 mm high.

ADDITIONAL SPECIMENS EXAMINED. **Ecuador.** PASTAZA: Pastaza Cantón; Pozo petrolero "Masaramu" de UNOCAL, 40 km al NNE de Montalvo, 76°52'W, 00°44'S, 400 m. bosque húmedo tropical, primario, May 1990 fr, *Gudiño 396* (MICH, MO).

This species is named for its most distinctive feature, the persistently velutinous or tomentose leaves. Those stalked hairs are unique in the genus and give *Mezia tomentosa* a very different look from its congeners, whose hairs are sessile, straight, and tightly appressed. The large, membranous samara with a ruffled complex of dorsal winglets suggests that its closest relatives are *M. includens* (Benth.) Cuatrec. and *M. curranii* W. R. Anderson. When it is collected with flowers, those should supply additional evidence to use in assessing its relationships. *Mezia tomentosa* is known only from the two collections cited above, which were made at the same time in the same place (Fig. 6).

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