

NOVELTIES IN MALPIGHIACEAE FROM SOUTH AMERICA

W. R. ANDERSON[†] & C. ANDERSON

Nine new species in four genera of Neotropical Malpighiaceae are described and illustrated: *Banisteriopsis rostrata* W.R.Anderson (Brazil: Minas Gerais), *Bunchosia andina* W.R.Anderson (Colombia: Antioquia, Caldas, Nariño, Putomayo, Quindío, Tolima, Valle; Ecuador: Azuay, Napo, Pichincha, Tungurahua); *Bunchosia parrae* W.R.Anderson (Peru: Loreto, San Martín, Ucayali), *Bunchosia phaeocarpa* W.R.Anderson (Ecuador: Napo, Orellana, Pastaza, Sucumbíos; Peru: Loreto), *Byrsonima anisophylla* W.R.Anderson (Brazil: Bahia), *Byrsonima cardenasii* W.R.Anderson (Colombia: Antioquia, Nariño, Riseralda, Santander, Valle del Cauca), *Byrsonima goiana* W.R.Anderson (Brazil: Goiás), *Byrsonima nana* W.R.Anderson (Colombia: Meta) and *Tetrapteryx catarinensis* W.R.Anderson (Brazil: Santa Catarina).

Keywords. *Banisteriopsis*, Brazil, *Bunchosia*, *Byrsonima*, Colombia, Ecuador, Malpighiaceae, Peru, *Tetrapteryx*.

INTRODUCTION

The nine species here described and illustrated had been recognised as unpublished by the late William R. Anderson during his years of studying Malpighiaceae. He had set them aside in expectation of including them in floristic or monographic treatments. The descriptions are based mostly on his detailed notes, which he had placed with the sorted specimens. He supervised the preparation of the illustrations for all these novelties, except for *Bunchosia phaeocarpa*.

Four of the new species are known only from Brazil (*Banisteriopsis rostrata* W.R.Anderson, *Byrsonima anisophylla* W.R.Anderson, *Byrsonima goiana* W.R.Anderson, *Tetrapteryx catarinensis* W.R.Anderson), two only from Colombia (*Byrsonima cardenasii* W.R.Anderson, *Byrsonima nana* W.R.Anderson), and one only from Peru (*Bunchosia parrae* W.R.Anderson). *Bunchosia andina* W.R.Anderson occurs in Colombia and Ecuador, and *Bunchosia phaeocarpa* W.R.Anderson in Ecuador and Peru.

BANISTERIOPSIS

***Banisteriopsis rostrata* W.R.Anderson, sp. nov.**

Banisteriopsis rostrata differs from all other species of *Banisteriopsis* C.B.Rob. in its rostrate samaras. – Type: Brazil, Minas Gerais, [Monte Belo], Fazenda Lagoa, disturbed

semideciduous forest, 800 m, 21°25'S, 46°15'W, 6 ix 1987 (fr), *Gentry et al.* 59106 (holo MICH; iso MO, UEC not seen). **Fig. 1.**

Liana; stems sericeous when young, soon glabrous. *Leaves* opposite but occasionally alternate; lamina of larger leaves 5.5–9.5 × 2.5–4.6 cm, elliptical, apex acute to short-acuminate, base rounded, adaxially glabrous, abaxially sericeous when young, glabrescent in patches, the hairs most persistent on midrib and along margins and near the base, with appressed white hairs, 0.1–0.4(–0.5) mm long, and scattered brown hairs, 0.3–0.5 mm long, with a pair of prominent glands at or slightly above the base, each gland 0.3–0.6 mm in diameter; petiole 3–11 mm long, sericeous; stipules 0.5–0.7 mm long, triangular. *Inflorescence* paniculate, bearing greatly reduced leaves, floriferous axes glabrescent, sometimes alternate, with 5–10(–15) flowers borne alternate or in pairs, each of a pair of floriferous axes at a node often subtended by a smaller subsidiary floriferous branchlet; bracts 1.5–2.2 × 0.8–1 mm, elongate to narrowly ovate, apex obtuse, margin sparsely ciliate, persistent; peduncles 0–1.2 mm long; bracteoles 1–1.2 × c.0.7 mm, like bracts, persistent; pedicels 7–9.5 mm long in fruit; peduncles, pedicels, and bracts and bracteoles abaxially sparsely sericeous. *Sepals* in fruit 5–6.5 × 2–3.5 mm, strap-shaped, apex obtuse, adaxially glabrous, abaxially sericeous, the anterior eglandular, the lateral four biglandular, glands c.1.5 mm long. *Petals* and *androecium* not seen. *Ovary* not seen; styles in fruit 3.2–4 mm long, stigma terminal. *Samara* with the dorsal wing 2.8–3.5 × 0.9–1.2 cm, sparsely sericeous to glabrescent, with a shallow tooth to 1 mm high on the upper margin; nut 5–6.5 mm long, 3.5–3.8 mm in diameter, rugose, covered with stinging stiff stramineous hairs 0.7–2.5 mm long when immature, these eventually abraded, at maturity with a prominent rostrum to 3.5 mm long at the base; areole 2.7–3.5 × 2–2.5 mm; carpophore to 0.5 mm long.

Additional specimen examined. BRAZIL. **Minas Gerais:** Estação Biológica de Caratinga, mata atlântica, [19°37'30"S, 42°09'00"W], 24 ix 1984 (fr), *Andrade* 363 (MICH). **Fig. 2.**

Banisteriopsis rostrata is named for the long sharp projection that extends backwards from the base of the samara (Fig. 1K), a trait not previously reported for the genus. *Banisteriopsis rostrata* is known from two collections in fruit. The paratype consists of only a portion of an old infructescence with a few, mostly immature, samaras.

Banisteriopsis rostrata belongs to the *B. nummifera* group of Gates (1982) and shares a number of characteristics with that group, for example a pair of glands at the apex of the petiole, paniculate inflorescences with the flowers borne ultimately in short dense pseudoracemes, and samaras with the nut bearing long stiff irritating hairs. The petals will surely prove to be yellow and glabrous when the species is collected in flower. Of the five species recognised by Gates, the plants treated here as *Banisteriopsis rostrata* would fall into her broadly defined *B. nummifera* (A.Juss.) B.Gates; indeed, the paratype cited above was identified as *B. nummifera* by Gates in 1986, almost certainly because she did not note the rostrate samaras.

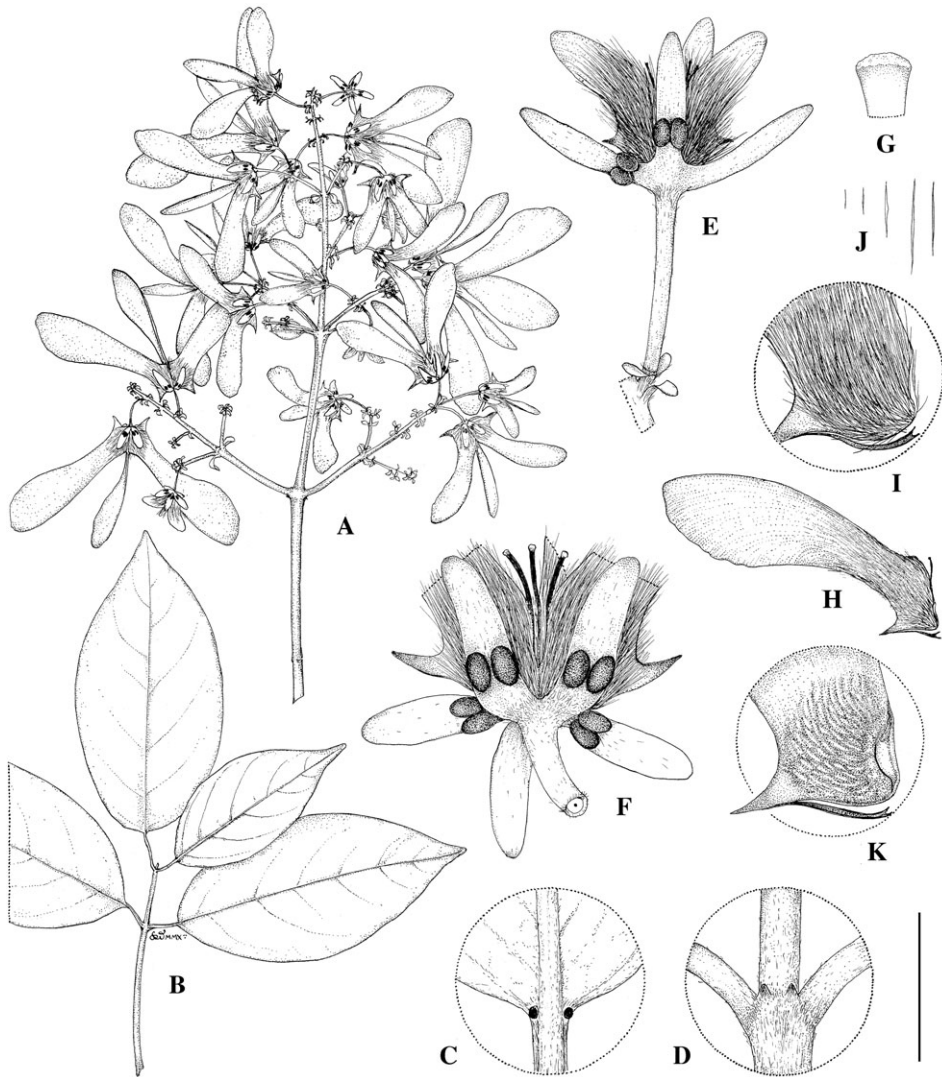


FIG. 1. *Banisteriopsis rostrata* W.R.Anderson, sp. nov. A, Fruiting branch. B, Leafy branch. C, Base of lamina, abaxial view, showing a pair of basal glands. D, Node, showing a pair of interpetiolar stipules. E, Young developing fruit. F, Nearly mature fruit, with distal portion of dorsal wings removed and eglandular sepal bent downwards. G, Distal portion of style. H, Samara. I, Nut of samara, with hairs present and showing carpophore. J, Hairs from nut of samara. K, Nut of samara, with hairs removed and showing carpophore and rostrum. Scale bar equivalents: A and B, 4 cm; C, 8 mm; D, 4 mm; E, 8 mm; F, 0.5 mm; G, 8 mm; H, 2 cm; I, 6.7 mm; J, 4 mm; K, 6.7 mm. Based on Gentry et al. 59106 (MICH). Drawn by Karin Douthit.

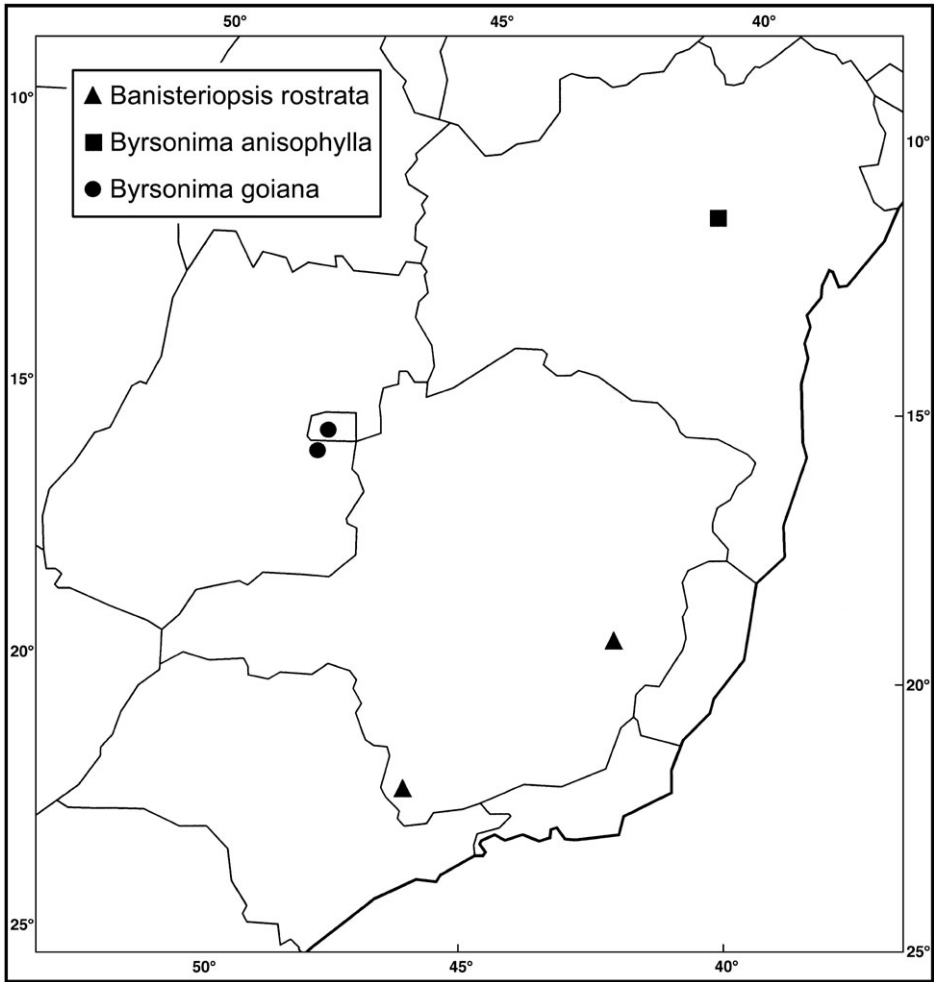


FIG. 2. Distribution of *Banisteriopsis rostrata*, *Byrsonima anisophylla* and *Byrsonima goiana*.

The five species referred to as the “*B. nummifera* group” by Gates all have the nut of the samara rounded at the base or bear a short, blunt projection, for example *Banisteriopsis anisandra* (A.Juss.) B.Gates, that is probably homologous to the beak of *B. rostrata* but could not possibly be called a beak. Indeed, although such basally rostrate samaras are common in the genus *Janusia* A.Juss. (e.g. *J. schwannioides* W.R.Anderson; Anderson, 1982), they have not been reported before in *Banisteriopsis*. This species is assigned to *Banisteriopsis* rather than *Janusia* on the basis of its inflorescence, its three styles (instead of one), and its overall similarity in most characters to *B. nummifera* et al.

BUNCHOSIA

Bunchosia andina W.R.Anderson, **sp. nov.**

Bunchosia andina differs from *B. armeniaca* (Cav.) DC. in its entirely glabrous laminae lacking scattered distal glands abaxially, the yellow to pale brown anther connectives, and the large fruits 3–4 cm in diameter dried. – Type: Ecuador, Tungurahua, east slope of Mt Tungurahua, 2100 m, i (without year), *Rimbach* 584 (holo S, iso MICH). **Fig. 3.**

Tree to 8 m; stems sericeous when very young, soon glabrous. *Lamina* of larger leaves 8–21 × 3.5–10.5 cm, narrowly to broadly elliptical, apex acute to acuminate, acumen to 1 cm, sometimes apiculate, base acute, margin thickened and slightly recurved, adaxially and abaxially glabrous, with appressed straight hairs 0.2–0.3 mm long only when emergent, bearing (1 or) 2 large glands abaxially on each side of midrib at or near base, rarely both glands absent, without inframarginal glands; petiole 7–11 mm long, initially sericeous, mostly glabrescent to glabrous, eglandular; stipules (1.2–)1.5–2 mm long, borne on the petiole above the base. *Inflorescence* a simple pseudoraceme borne 1 or 2 per axil, 6–9(–11) cm long and containing 9–18 flowers, the first few pairs mostly decussate but distally alternate; bracts 1.3–2 mm long, triangular, apex acute to rounded, margin sparsely ciliate; peduncles 1.5–4 mm long (–5 mm in fruit); bracteoles 1–1.5 mm long, margin ciliate or sparsely so, one of the pair or sometimes both bearing at base an abaxial gland 0.5–1(–1.5) mm in diameter, partly to almost entirely on peduncle; pedicels 4–6.5 mm long in flower (–10 mm in fruit); axes, peduncles, and pedicels sericeous, and bracts and bracteoles abaxially sparsely and scattered sericeous. *Sepals* 1.5–2 mm long beyond glands, apex rounded, margin ciliate, abaxially glabrous, all biglandular, glands 2.5–3 mm long. *Petals* yellow, glabrous; lateral petals reflexed, claw c.2 mm long, margin of limb glandular-denticulate in the distal 1/2, proximally mostly eglandular, teeth to 0.4 mm long; anterior-lateral petals with the limb 5.5–6.5 mm in diameter, orbicular, concave; posterior-lateral petals with limb 3.5–4.5 × 3–4 mm wide, ovate, somewhat concave; posterior petal erect, claw 2.5–3 mm long, limb 3.5–4.5 × 3–3.5 mm, narrowly elliptical, flat, margin glandular-denticulate. *Stamens* glabrous; filaments (1.5–)2–2.5 mm long, proximally connate; anthers 1–1.3 mm long, the connective light brown. *Gynoecium* 2-carpellate; ovary 1.8–2.5 mm long, ovoid, densely sericeous; styles 2, free, 1.5–2 mm long, the proximal 1/4 sericeous. *Fruit* red at maturity, (2.5–)3–4 cm in diameter, spherical, appearing glabrous to the naked eye but scattered sericeous when young, at maturity verruculose.

Phenology. Collected in flower in January to April, August to November, in fruit February to April, July to September, and December.

Distribution and habitat. Colombia (Antioquia, Caldas, Nariño, Putomayo, Quindío, Tolima, Valle del Cauca) and Ecuador (Azuay, Napo, Pichincha, Tungurahua); in forests and pastures; (1050–)1700–2700 m; also cultivated. **Fig. 4.**

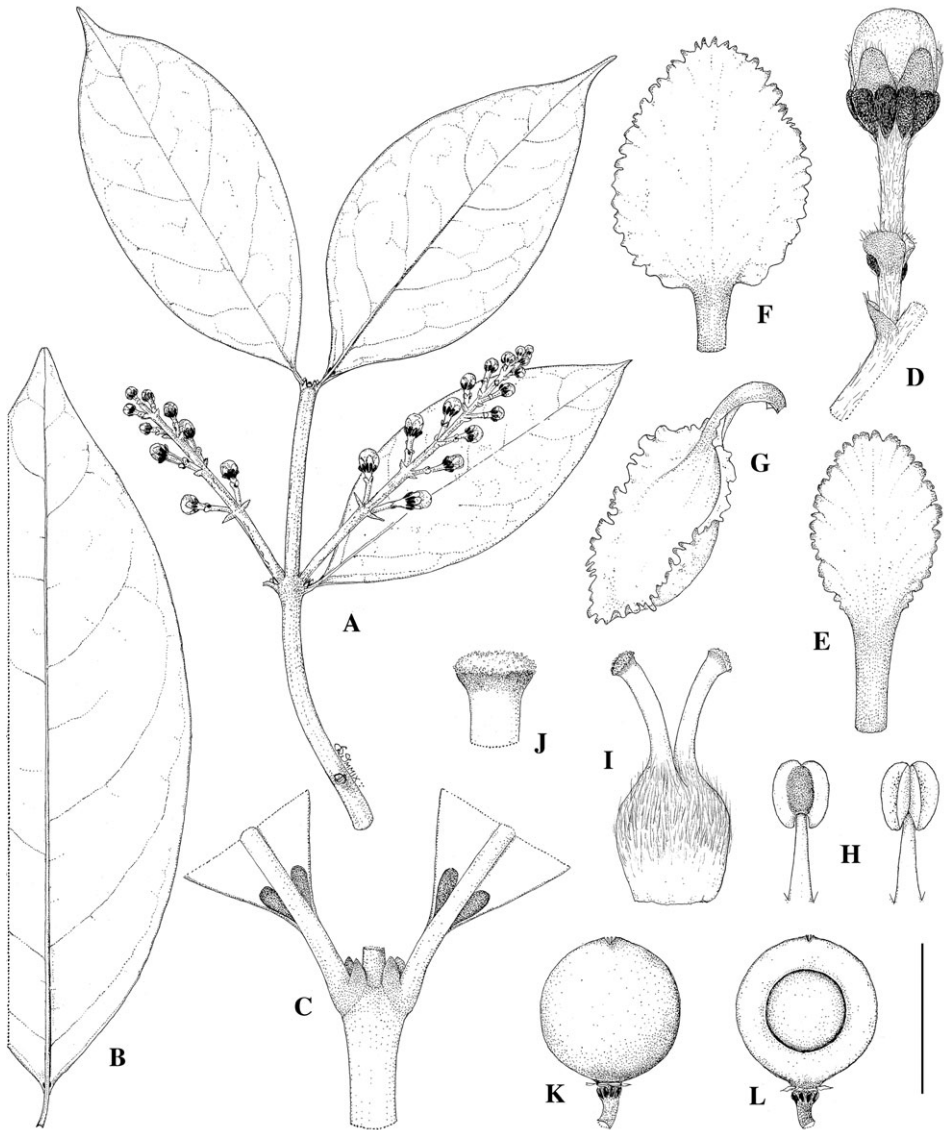


FIG. 3. *Bunchosia andina* W.R.Anderson, sp. nov. A, Branch with inflorescences in bud. B, Large leaf, abaxial view. C, Node with base of leaves, abaxial view, showing stipules and glands. D, Flower bud. E, Posterior petal, adaxial view. F, Posterior-lateral petal, adaxial view. G, Anterior-lateral petal, lateral view. H, Stamens, abaxial view (left) and adaxial view (right). I, Gynoecium. J, Apex of style. K, Intact fruit. L, Fruit in longitudinal section to show thick flesh and one large seed. Scale bar equivalents: A and B, 4 cm; C, 4 mm; D, 8 mm; E–H, 4 mm; I, 2 mm; J, 1 mm; K and L, 4 cm. Based on: A and C–J, *Holmgren* 401 (S); B, *Cuatrecasas* 21949 (F); K, *García-Barriga* 17606 (AAU); L, *Cerón* et al. 923 (MO). Drawn by Karin Douthit.

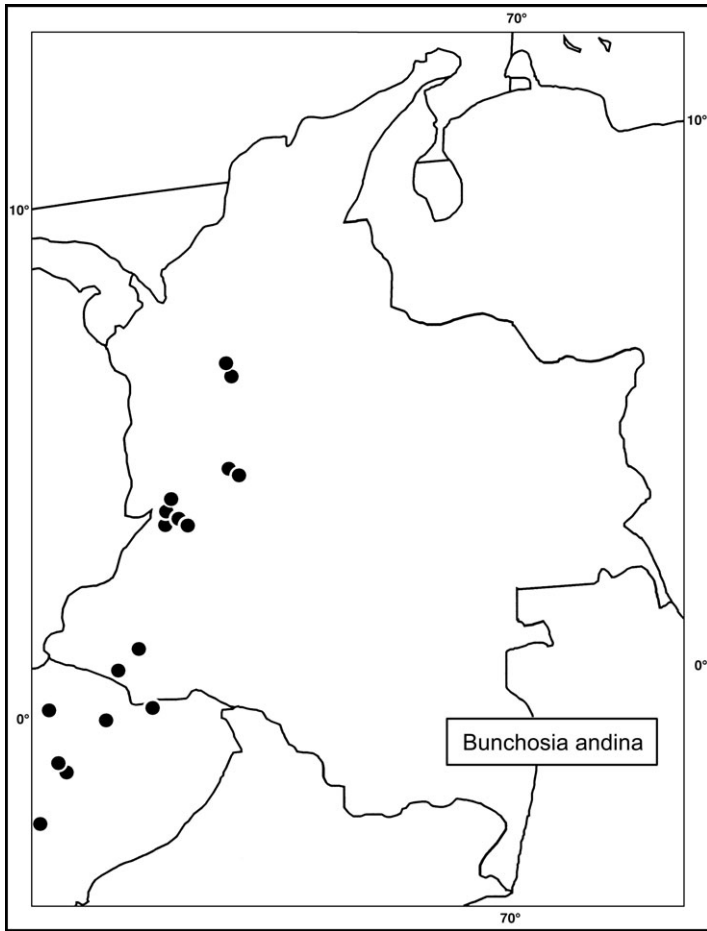


FIG. 4. Distribution of *Bunchosia andina*.

Additional specimens examined. COLOMBIA. **Antioquia:** cumbre cerca de Las Palmas, camino entre Medellín y El Retiro, 2500 m, 8 xi 1945 (fl), *Hodge* 6695 (GH, MEDEL, US); Sonsón, La Morelia, 2240 m, 28 xi 1984 (fl), *Orozco* 1303 (COL). **Caldas:** Vereda Guayabal, Villa Hermosa, 2380 m, 21 ii 1997 (fl, y fr), *Ruiz* 100T (COL). **Nariño:** Ipiales, Las Lajas, 2700 m, 5 viii 1939 (fr), *García-Barriga* 7777 (COL). **Putumayo:** Sibundoy, 2224 m, 2 viii 1956 (fl), *Barclay* et al. 333 (COL); Valle de Sibundoy, S of Sibundoy, 2200 m, 25 i 1963 (fl), *Bristol* 484 (GH); Valle de Sibundoy, 1 km S de Sibundoy, 2200 m, 12 iv 1963 (fr), *Bristol* 746 (COL, ECON); Valle de Sibundoy, 2 km SW of Sibundoy, 2200 m, 19 ix 1963 (fl), *Bristol* 1390 (ECON, GH); alta cuenca del Río Putomayo, Valle de Sibundoy, lado sur, 2200 m, 3 i 1941 (fl), *Cuatrecasas* 11682 (COL); Valle de Sibundoy, Santiago, 19 ix 1953 (fl, fr), *Fernández-Pérez* 2645 (COL); valley of Sibundoy, Sibundoy, 2225–2300 m, 29 v 1946, *Schultes & Villareal* 7649 (F). **Quindío:** Génova, camino Finca Las Miras–Servia, 1500–2700 m, 14 vii 1990 (y fr), *Vélez* N. 1706 (COL). **Tolima:** Roncesvalles,

2580 m, 15 xi 1980 (fl), *Camargo G.* 7581 (COL); Roncesvalles, hacia el páramo de Normandía, 8 xi 1980 (fl), *Camargo G.* 7486 (COL). **Valle del Cauca:** hoya del Río Cali, Río Pichindé, entre Los Cárpatos y El Olivo, 1920–2025 m, 6 viii 1946 (fl, fr), *Cuatrecasas* 21949 (F); Mpio. Tuluá, Corregimiento Naranjal, Quebrada Naranjal, Río Tuluá, 1400 m, 9 viii 1988, *Devia* et al. 2309 (MO); Yanaconas al Silencio, montaña La Victoria, 1700–2000 m, 5–10 xii 1962 (fr), *García-Barriga* 17606 (AAU); Quereamal–Dagua, 22 i 1935 (fl), *Pérez-Abeláez* 3098 (COL); Cali, Corr. Pichindé, 17 km W Cali, por carretera Pichindé–La Leonora–Felidia, finca Bellavista, 18 i 1998, *Silverstone* 8022 (CUVC). **Without province:** 1857–59 (fl), *Spruce s.n.* (K).

ECUADOR. **Azuay:** Cuenca, 17–24 ix 1918 (st), *Rose* et al. 22907 (US). **Napo:** Quijos, Parroquia de Baez, comunidad de Santa Lucía de Bermejo, 00°31'S, 77°55'W, 2000–2500 m, 16 xi 1993 (fr), *Alvarez* et al. 988 (MICH). **Napo–Pastaza:** Río Chigual, 2750 m, 12 viii 1949 (buds), *Acosta Solís* 13264 (F). **Pichincha:** Parroquia Calacalí, camino a Lulumbamba, 00°05'N, 78°30'W, 2000–2500 m, 26 ii 1987 (fr), *Cerón M.*, et al. 923 (MICH, MO); Reserva Geobotánica del Puluahua, 00°05'N, 78°30'W, 2500–2610 m, 29 vi 1988, *Cerón M.* 4280 (MICH, MO). **Tungurahua:** Ambato a Huachi, 2650–2700 m, 29 x 1944 (fl), *Acosta Solís* 8862 (F); Baños, 1800–2000 m, without date (fl), *Lehmann* 6621 (F); Baños, ad Runtum, 2 iii 1920 (fl), *Holmgren* 401 (A, F, G, S); mountain side to S of Baños, 1900 m, 16 iii 1939 (fr), *Penland & Summers* 110 (US); eastern slope of Mt Tungurahua, 2000 m, i (without year; fl), *Rimbach* 245 (US); vicinity of Ambato, 24–26 viii 1918 (fl), *Rose* 22374 (US).

CULTIVATED. COLOMBIA. **Antioquia:** Sonsón, La Morelia, 2240 m, 28 xi 1984 (fl), *Orozco* 1303 (COL). **Cundinamarca:** Bogotá, D. E. Ciudad Universitaria, Jardín Dept. Biología, 15 iv 1998 (fl), *Bernal G.* 71 (COL), 29 ix 1975 (fl, fr), *Herrera-C. & Llorente del Castillo s.n.* (COL). **Valle del Cauca:** hoya del Río Cali, El Recuerdo, 2000 m, 32 vii 1946 (y fr), *Duque-Jaramillo* 3896 (COL); Hacienda 'El Trejo', entre El Cerrito & Palmira, 1050 m, 28 xii 1938 – 5 i 1939 (fr), *García-Barriga* 6419 (AAU, COL).

CULTIVATED. ECUADOR. **Esmeraldas:** Zambillos, 2700 m, 1918 (fr), *Mille s.n.* (A). **Loja:** Loja, without date (fl), *Lehmann* 7920 (F). **Pichincha:** Quito, 2859 m, 20 viii 1949, *Acosta Solís* 13417 (F).

Collections of *Bunchosia andina* traditionally had been included in *B. armeniaca* (e.g. Cuatrecasas, 1958), but that species differs in its bulging dark red to black anther connectives and smaller fruits (1.3–2 cm in diameter, dried). Also, the laminae of *Bunchosia armeniaca* are thinly sericeous to glabrate, with some hairs often persistent at least on the midrib abaxially, whereas those of *B. andina* are entirely glabrous. Both species have a pair of large glands at the base of the lamina, but *Bunchosia armeniaca* usually has also several smaller glands distally, at or slightly inside the margin. *Bunchosia andina* might be confused with *B. nitida* (Jacq.) DC., which also has large fruits (2–3 cm long, 1.5–2 cm in diameter, dried), but in that species the styles are completely connate and the fruit is ovoid. Although the abaxial surface of the lamina of *Bunchosia nitida* appears to be glabrous to the naked eye, it is thinly sericeous with very short, transparent, strongly appressed hairs.

Like some other species of *Bunchosia* with large fleshy fruits, *B. andina* is locally cultivated under the names of 'ciruela', 'ciruela de fraile' and 'ciruela de montaña' (e.g. *García-Barriga* 6419), and 'ciruela de perro' and 'mamey de tierra fría' (e.g. *Duque-Jaramillo* 3896).

***Bunchosia parrae* W.R.Anderson, sp. nov.**

Bunchosia parrae differs from *B. armeniaca* (Cav.) DC. and *B. hookeriana* A.Juss. in its glabrous ovary and fruits, and longer stipules, and in the raised to peltate bracteole glands, from *B. armeniaca* also in its connate styles, from *B. hookeriana* also in its smaller spherical to spheroid fruits. – Type: Peru, San Martín, Prov. Lamas, [Mpio.] Alonso de Alvarado, Plantano Yacu, carretera a Moyobamba, 800 m, 13 iv 1973 (fl), Schunke V. 6026 (holo MICH). **Fig. 5.**

Shrub or tree to 8 m; stems sericeous when very young, soon glabrous. *Lamina* of larger leaves 7.5–21 × 4–10 cm, narrowly elliptical to elliptical or lanceolate or sometimes ovate, apex acuminate, acumen to 1.5 cm and gland-tipped, base acute to attenuate, margin slightly thickened, when very young both surfaces very sparsely sericeous, when mature adaxially glabrous, abaxially glabrous to the naked eye but with scattered appressed translucent hairs 0.02–0.03 mm long, bearing 1 large gland abaxially on each side of midrib near base, with smaller inframarginal glands (0–)2–8 per side, 0.5–2 mm from margin, the distalmost 2 or 3 glands on the acumen on or adjacent to margin, occasionally also with 1 or 2 additional glands on abaxial surface; petiole 6.5–9 mm long, sericeous to glabrescent, eglandular; stipules (1–)1.2–1.6(–2) mm long, borne on the petiole at or slightly above base. *Inflorescence* a simple pseudoraceme borne 1 per axil (rarely 2), 6.5–15 cm long and containing 14–35(–40) flowers, arranged irregularly, both opposite and alternate; bracts 1–1.5 mm long, narrowly triangular, apex acute, margin sparsely ciliate; peduncles 0.1–1 mm long; bracteoles 1–1.3 mm long, margin ciliate, one of each pair bearing 1 (rarely 2) stalked or peltate abaxial gland (0.5–)0.8–1.5 mm in diameter; pedicels 3–7 mm long; axes, peduncles, pedicels, and abaxial surface of bracteoles sericeous, bracts abaxially glabrous or with a few scattered hairs. *Sepals* 0.5–1 mm long beyond glands, apex rounded, margin ciliate, abaxially sparsely sericeous to glabrate, all biglandular, glands 2.5–3.5 mm long, the distal 1/4 free, recurved. *Petals* yellow, glabrous, margin of limb glandular-denticulate, teeth to 0.2(–0.3) mm long; lateral petals reflexed, limb of outermost petal orbicular, concave, of others elliptical, somewhat concave; anterior-lateral petals with the claw c.1.5 mm long, limb of outer petal 4–5 mm in diameter, of inner 3.5–4.5 × 3–3.3 mm; posterior-lateral petals with limb 3.5–4.5 × 3–4 mm; posterior petal erect, claw 2.2–2.5 mm long, limb 2.5–3.1 × 2.2–2.3 mm, narrowly elliptical, flat. *Stamens* glabrous, filaments proximally connate, anther connectives dark red to black; filaments of stamens opposite sepals 1.7–2 mm long, anthers 1.5–2 mm long, filaments of stamens opposite petals 1.4–1.7 mm long, anthers 0.8–1 mm long. *Gynoecium* 2-carpellate; ovary 1.3–5.5 mm long, cylindrical, densely sericeous; styles 2, completely connate, 1.3–1.5 mm long, glabrous. *Fruit* red to red–orange at maturity, 1–1.2 cm in diameter, spherical to spheroid, 2-lobed at full maturity, glabrous, verruculose.

Etymology. This species honours the Colombian botanist Carlos Alberto Parra Osorio (b. 1975), expert on Myrtaceae and Myricaceae.

Phenology. Collected in flower in February, April, May and July, in fruit in February, April, June, August, September, November and December.

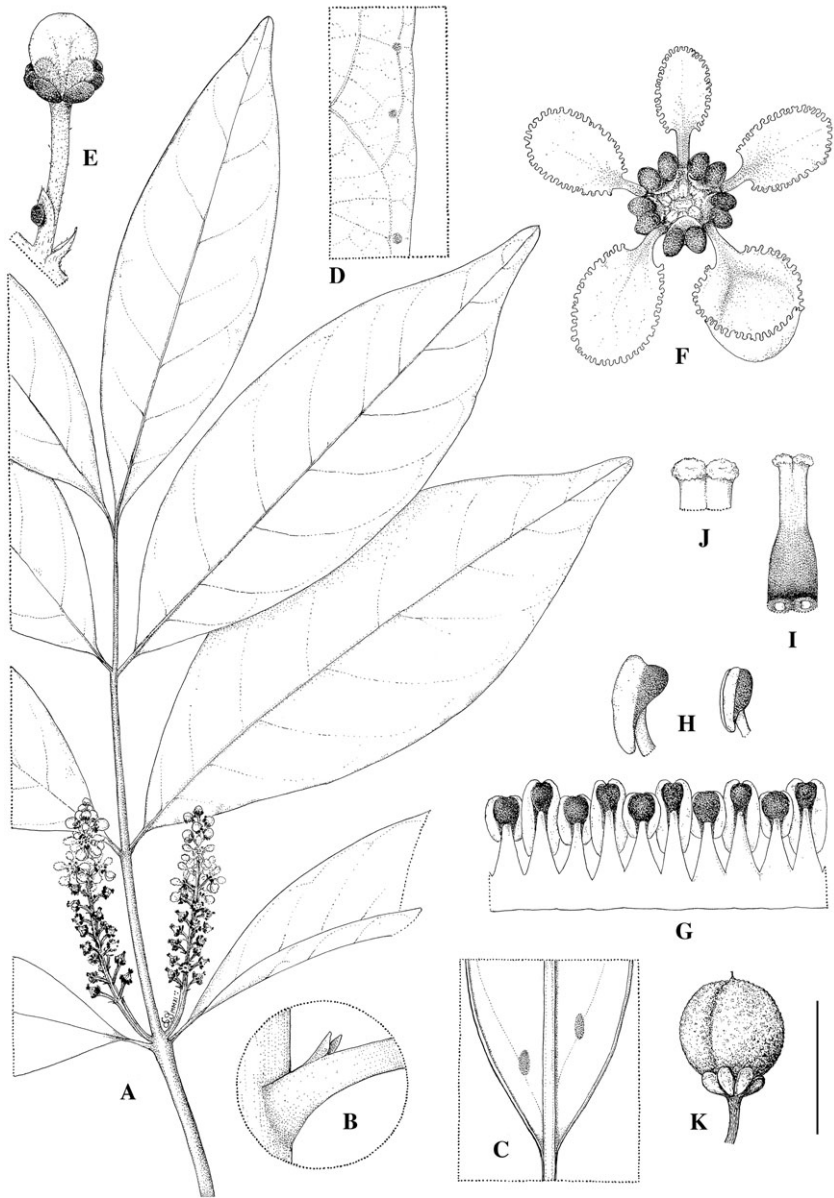


FIG. 5. *Bunchosia parrae* W.R.Anderson, sp. nov. A, Flowering branch. B, Base of petiole to show stipules. C, Enlargement of base of abaxial surface of lamina to show glands. D, Enlargement of distal portion of abaxial lamina near margin to show glands. E, Flower bud. F, Flower, posterior petal uppermost. G, Androecium, abaxial view, the stamen fifth from left opposite posterior petal. H, Lateral views of two anthers, from opposite sepal (left) and opposite petal (right). I, Gynoecium. J, Terminal portion of coherent styles. K, Fruit. Scale bar equivalents: A, 4 cm; B, 4 mm; C and D, 8 mm; E, 5.7 mm; F, 5 mm; G, 2.7 mm; H, 2 mm; I, 2.7 mm; J, 2 mm; K, 1.3 cm. Based on: A–J, Lewis et al. 11230 (MO); K, Lewis et al. 11417 (MO). Drawn by Karin Douthit.

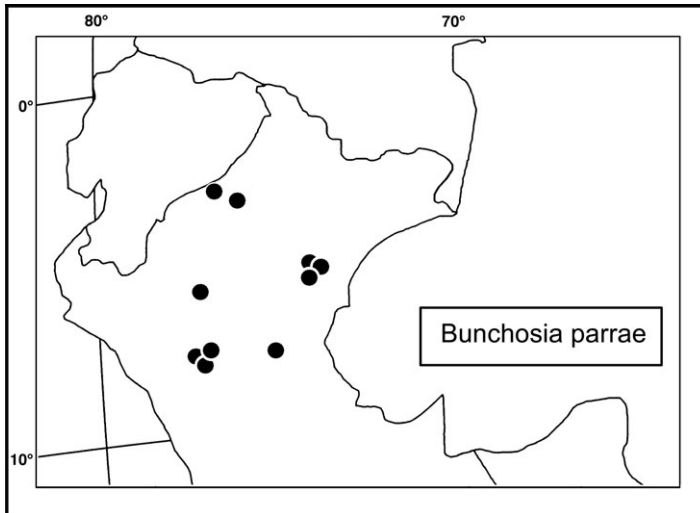


FIG. 6. Distribution of *Bunchosia parrae*.

Distribution and habitat. Peru (Loreto, San Martín, Ucayali); forest, often near or along watercourses; 130–800 m. Fig. 6.

Additional specimens examined. PERU. **Loreto:** Prov. Alto Amazonas: Washintsa and vicinity, Río Huasaga, 03°20'S, 76°20'W, 185 m, 16–26 vi 1986 (fr), *Lewis et al.* 11229 (MICH, MO), 16–26 vi 1986 (fl), *Lewis et al.* 11230 (MO), 16–26 vi 1986 (fr), *Lewis et al.* 11417 (MO); Puranchim, Río Sinchiyacu, 02°50'S, 76°55'W, 30 iii – 1 iv 1987 (fl), *Lewis et al.* 13324 (MICH, MO). Prov. Loreto: San José de Parinari (Río Marañón), 04°32'S, 74°30'W, 160 m, 10 viii 1981 (fr), *Vásquez et al.* 2277 (MICH, MO). Prov. Maynas: Río Yarapa, Quebrada Fillico, 04°20'S, 73°30'W, 122 m, 17 xi 1989 (fr), *Grández* 1425 (MICH, MO); Nuevo San Juan, Quebrada Tamshiyacu, 04°10'S, 73°22'W, 130 m, 16 ix 1990 (fr), *Grández et al.* 1887 (MICH, MO). **San Martín:** Prov. Mariscal Cáceres, Dtto. Tocache Nuevo: Fondo Miramar, along Río Huallaga, 2–3 km below Tocache Nuevo, 450 m, 30 vi 1978 (fl), *Plowman & Schunke V.* 7487 (MICH); Miramar, left bank of Río Huallaga, 1–2 km downriver from Tocache Nuevo, c.08°10'S, 76°28'W, c.500 m, 15 xii 1981 (fr), *Plowman & Schunke V.* 11415 (K, MICH); Río Canuto, 'Curarelandia', property of José Schunke Vígo, near Km 23 along road from Tocache Nuevo to Puerto Pizana, 08°06'S, 76°36'W, 475 m, 19 xii 1981 (fr), *Plowman & Schunke V.* 11518 (MICH); desembocadura del Río Tocache, 400 m, 7 iv 1975 (fl), *Schunke V.* 8233 (MICH, MO); camino al aceso de la Quebrada de Pucayacu, 400–450 m, 24 xii 1999 (fr), *Schunke V.* 14671 (MICH). **Ucayali:** Prov. Coronel Portillo: Leoncio Prado (Yarina cocha), 08°20'S, 74°35'W, 200 m, 14 v 1984 (fr), *Vásquez* 4983 (MICH, MO), 15 v 1984 (fl), *Vásquez* 5012 (MICH, MO).

Bunchosia parrae is distinctive in its raised to peltate bracteole glands and the combination of connate styles, glabrous ovaries, and spheroidal fruits 1–1.2 cm in diameter. The abaxial leaf surface bears inframarginal glands that are placed increasingly closer to the margin towards the apex, with the distalmost glands adjacent to or on the margin. The local name 'ciruelito chino' is noted on the label of *Schunke* 6695.

Specimens of *Bunchosia parrae* had been mostly identified as *B. armeniaca* and sometimes *B. hookeriana*, with which it shares dark red to black anther connectives. *Bunchosia parrae* is immediately separated from both by its glabrous instead of sericeous ovary and fruits. Usually, *Bunchosia parrae* also has longer stipules [(1–)1.2–1.6(–2) mm] versus c.0.5–1 mm in *B. armeniaca* and 0.4–0.5 mm in *B. hookeriana*. Also, in *Bunchosia armeniaca* the styles are at least 2/3 to completely free rather than connate; its fruits are generally ovoid and 1.5–2 cm in diameter.

***Bunchosia phaeocarpa* W.R.Anderson, sp. nov.**

Bunchosia phaeocarpa differs from *B. argentea* (Jacq.) DC. in its brown, ribbed, glabrate, spherical fruits, longer stipules to 2.5(–3) mm long, and the conglutinated abaxial laminar pubescence. – Type: Ecuador, Pastaza, Pastaza Cantón, pozo petrolero ‘Corrientes’ de UNOCAL, 35 km SSE de Curaray, 01°43’S, 76°49’W, 300 m, 1–13 ix 1990 (fr), *Gudiño* 753 (holo MICH, iso MO). **Fig. 7.**

Tree 3–25 m; stems sericeous but eventually glabrous. *Lamina* of larger leaves 9–18 × 5.5–11 cm, elliptical to broadly so to suborbicular, apex short- to long-acuminate, acumen to 1(–2) cm, base acute, margin recurved, adaxially glabrous, abaxially very densely sericeous, the epidermis obscured, the hairs conglutinating and the surface appearing glaucous, in oldest laminas eventually glabrescent, bearing (0 or) 1 large gland abaxially on each side of midrib towards base and 0–4(–6) additional large glands on the surface, without inframarginal glands; petiole 9–12 mm long, sericeous, eglandular; stipules 1.5–2.5(–4) mm long, borne on the petiole 1–1.5 mm above base. *Inflorescence* a simple pseudoraceme borne 1 (or 2) per axil, 8–15(–20) cm long and containing 22–65 flowers, only the first few pairs mostly decussate but then mostly alternate; bracts 1.5–2 mm long, triangular, apex acute, margin eciliate or with a few hairs; peduncles 0.5–1.5 mm long (–3 mm in fruit); bracteoles 0.7–1 mm long, margin eciliate or with a few hairs, one of the pair or both bearing a large abaxial gland 0.6–0.8 mm in diameter; pedicels 3–6 mm long in flower (–11 mm in fruit); axes, peduncles, pedicels, and abaxial surface of bracts and bracteoles sparsely and scattered sericeous. *Sepals* 0.8–1 mm long beyond glands, apex acute, margin ciliate, abaxially glabrous, all biglandular, glands c.2.5(–3.5) mm long. *Petals* yellow, glabrous, lateral petals reflexed, limb orbicular, the margin finely and irregularly denticulate; anterior-lateral petals with the claw c.1.5 mm long, limb 4–4.5 mm in diameter, concave; posterior-lateral petals with the claw c.1.5 mm, limb c.3.5 mm in diameter, slightly concave; posterior petal erect, claw c.2 mm long, limb c.3 mm in diameter, orbicular, flat, margin mostly erose-denticulate but glandular near base. *Stamens* glabrous, filaments proximally connate, anther connectives dark red to dark brown; filaments of stamens opposite sepals c.2.5 mm long, anthers c.1 mm long, filaments of stamens opposite petals c.2.2 mm long, anthers c.0.8 mm long. *Gynoecium* 2-carpellate; ovary 1.2–1.5 mm long, ovoid, sericeous; styles 2, distinct, c.1.5 mm long, glabrous. *Fruit* brown at maturity, 15–25 mm in diameter, broadly ovoid to subspherical, appearing glabrous to the naked eye but finely sericeous when young, at maturity glabrescent to glabrous, verruculose, and finely ribbed.

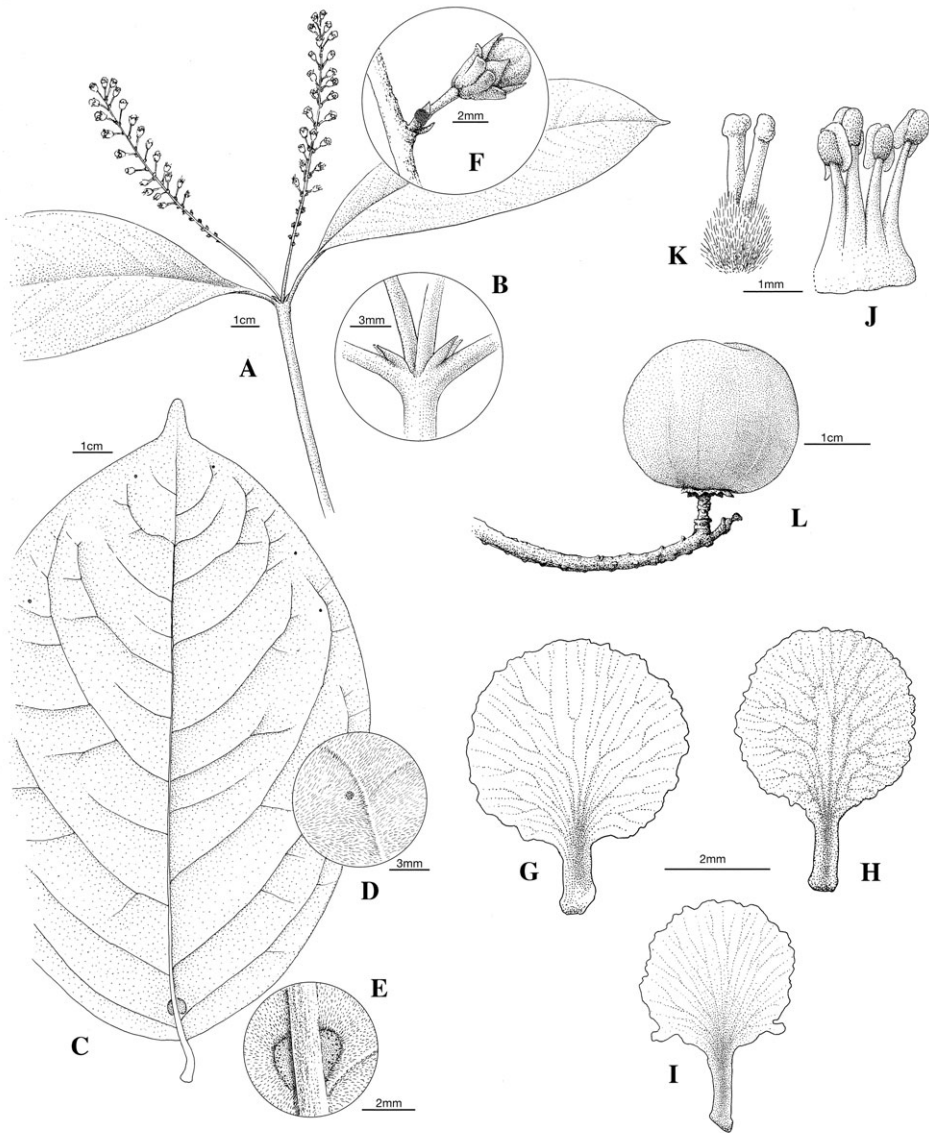


FIG. 7. *Bunchosia phaeocarpa* W.R.Anderson, sp. nov. A, Branch with inflorescences in bud. B, Node, showing stipules at base of petioles. C, Large leaf, abaxial view. D, Detail of abaxial surface of lamina, showing dense abaxial vestiture and one marginal gland. E, Detail of abaxial leaf surface, showing pair of basal glands. F, Flower bud. G, Anterior-lateral petal. H, Posterior-lateral petal. I, Posterior petal with a pair of glands near base of limb. J, Four stamens, those opposing sepals longer than those opposing petals. K, Gynoecium. L, Portion of axis bearing one fruit. Based on A–F, Palacios & Neill 900 (MICH); G–K, Grijalva et al. 271 (MICH); L, Gudiño 753 (MICH). Drawn by John Megahan.

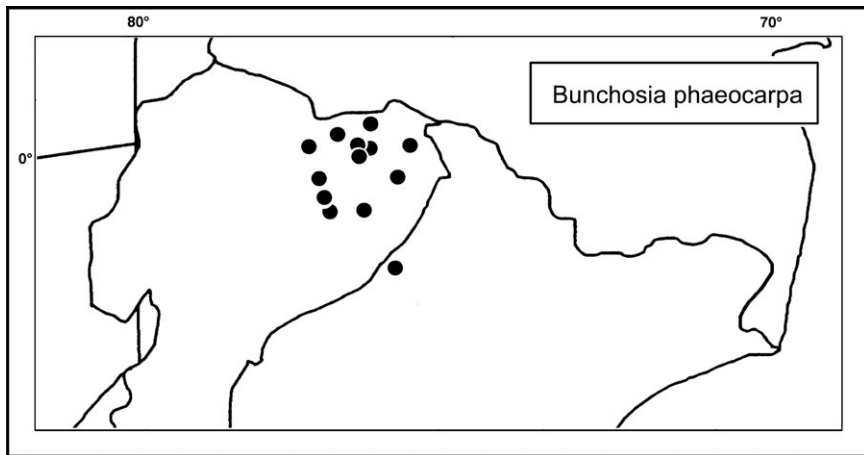


FIG. 8. Distribution of *Bunchosia phaeocarpa*.

Phenology. Collected in flower in April, May, September through January, in fruit from March through September and in January.

Distribution and habitat. Ecuador (Napo, Orellana, Pastaza, Sucumbíos) and adjacent Peru (Loreto); in wet and swamp forest, often along watercourses; 185–1000 m. Fig. 8.

Additional specimens examined. ECUADOR. **Napo:** Cantón Tena, Estación Biológica Jatun Sacha, 8 km al E de Misahuallí, 01°04'S, 77°36'W, 400 m, 23–31 i 1989 (fr), *Cerón* 6067 (MO); Cantón Archidona, carretera Hollín–Loreto, Río Huataraco, 00°43'S, 77°32'W, 800–1000 m, 23–30 viii 1989 (st), *Cerón & Factos* 7591 (MICH, MO); 8 km abajo de Puerto Misahuallí, por el Río Napo y 1.5 km al sur, 01°04'S, 77°36'W, 450 m, 18–30 v 1985 (fr), *Palacios* 491 (MICH, MO); alrededores de Estación Biológica Jatun Sacha, 2 km en la carretera a Río Arajuno, 01°08'S, 77°30'W, 450 m, 24–27 viii 1988 (fr), *Palacios* 2739 (MICH, MO). **Orellana:** La Joya de los Sachas, Comunidad de Pompeya, carretera de Maxus, Km 2, lado sur del Río Napo, 00°28'S, 76°40'W, 26–27 viii 1993 (fr), *Aulestia* 366 (MICH, MO); La Joya de los Sachas, Comunidad de Pompeya, Campamento de Maxus, Río Jivino, 00°25'S, 76°37'W, 23–29 xi 1992 (fl), *Grijalva* et al. 271 (MICH, MO); Sector Huashito, 20 km al N de Coca, propiedad de PALMORIENTE, 00°20'S, 77°05'W, 250 m, 3–21 xi 1989 (fl), *Gudiño* 200 (MICH, MO); La Joya de los Sachas, Pompeya, carretera de Maxus, Km 3–3.5, 00°25'S, 76°37'W, 250 m, 10–11 xii 1992 (fl), *Gudiño & Andi* 2050 (MICH, MO); La Joya de los Sachas, Pompeya, 00°25'S, 76°37'W, 250 m, 14 ix 1992 (fr), *Gudiño & Grefa* 1791 (MICH, MO); Añangu, Parque Nacional Yasuní, 00°31'–32'S, 76°23'W, 260–350 m, xii 1983 (buds), *Korning & Thomson* 8747 (MO); San Pablo de l'Aguarico, 22 i 1984 (fl), *Lescure* 2119 (MICH); Parq. Nac. Yasuní, Añangu, 00°30'S, 76°25'W, 15 vii 1982 (fr), *Luteyn* et al. 8691 (MICH, NY); Estación Experimental INIAP-Payamino, 5 km al N de Coca, 00°25'S, 77°00'W, 250 m, 1 viii 1986 (st), *Palacios* 1080 (MICH, MO); 8 km abajo de Puerto Misahuallí, por el Río Napo y 1.5 km al sur, 01°04'S, 77°37'W, 500 m, 30 x 1985 (fl), *Palacios & Neill* 900. **Pastaza:** Pastaza Cantón, pozo petrolero 'Danta 2' de UNOCAL, 50 km SSE de Curaray, 01°47'S, 76°48'W, 365 m, 1–20 x 1990 (fl), *Espinoza & Coba* 391 (MICH, MO); Pastaza Cantón, pozo petrolero 'Corrientes' de UNOCAL, 35 km SSE de Curaray, 01°43'S, 76°49'W, 300 m, 1–13 ix 1990 (buds) *Gudiño* 801 (MICH, MO); Pastaza, pozo petrolero Villano 2 de Arco, 01°25'S, 77°20'W, 400 m, 1–18 xii 1991 (fl), *Hurtado* 2869 (MICH, MO); Río Curaray, dos horas río abajo de pueblo Curaray, en la boca del Río Namoyuco, 01°24'S, 76°45'W, 275 m, 14–18

viii 1985 (fr), *Palacios & Neill* 603 (MICH, MO); Pastaza Cantón, pozo petrolero 'Danta 2' de UNOCAL, 50 km SSE de Curaray, 01°47'S, 76°48'W, 365 m, 1–19 x 1990 (y fr), *Rubio & Coba* 770 (MICH, MO). **Sucumbíos:** Lago Agrio, 00°07'N, 76°55'W, 250 m, 1 iv 1980 (fr), *Brandbyge & Asanza C.* 30386 (MICH, MO); Lago Agrio, Dureno, 00°02'S, 76°42'W, 350 m, 1 v 1986 (fl, fr), *Cerón* 293 (MICH, MO); Aguarico, Reserva Etnica Huaorani, carretera y oleoducto de Maxus en construcción, Km 111, 01°00'S, 76°11'W, 250 m, 30–31 viii 1994 (fr), *Dik & Ahue* 1547 (MICH, MO); Aguarico, Reserva Etnica Huaorani, carretera del oleoducto de Maxus en construcción, Km 72–75, 00°50'S, 76°21'W, 270 m, 23–31 i 1994 (y fr), *Dik & Andi* 1021 (MICH, MO); Aguarico, Reserva Etnica Huaorani, carretera y oleoducto de Maxus en construcción, Km 79–82, 00°50'S, 76°18'W, 250 m, 1–7 iii 1994 (y fr), *Dik & Enomenga* 1169 (MICH, MO); 6 km al N de Shushufindi, hacia Dureno, 00°10'S, 76°40'W, 450 m, 23 ix 1985 (fr), *Palacios et al.* 825 (MICH, MO).

PERU. **Loreto:** Prov. Alto Amazonas: Puranchim, Río Sinchiyacu, 02°50'S, 76°55'W, 200 m, 30 iii – 1 iv 1987 (fr), *Lewis et al.* 13351 (MICH, MO).

Bunchosia phaeocarpa is named for its fruits. The exocarp is brown at maturity and finely ribbed, both unusual traits in the genus known for yellow, orange or red mature fruits. The fruits are large (to 2.5 cm in diameter dry) and edible (e.g. *Lewis et al.* 13351, *Cerón* 293), but there is no record that *Bunchosia phaeocarpa* is cultivated. *Cerón* observed that the fruits are also gathered by monkeys and birds. The dense abaxial laminar vestiture is composed of flattened appressed translucent hairs, which usually become conglutinated and give the abaxial surface a glaucous appearance. The flowers are mostly alternately arranged on the rachis, with only the first pairs decussate. *Bunchosia phaeocarpa* is also distinctive in its prominent stipules, the short and nearly glabrous bracts and bracteoles, and the dark red to dark brown anther connectives.

Specimens of *Bunchosia phaeocarpa* were commonly assigned to the widespread *B. argentea*, with which it shares abaxially densely sericeous laminas and a 2-carpellate sericeous ovary with distinct styles. *Bunchosia argentea* differs in its ovoid, orange to red, and persistently sericeous fruits lacking ribs and the much smaller stipules (c.0.5 mm long). The laminas of *Bunchosia argentea* are abaxially silvery or golden-sericeous, but the hairs remain distinct and are never conglutinated.

BYRSONIMA

Byrsonima anisophylla W.R.Anderson, **sp. nov.**

Byrsonima anisophylla differs from *B. sericea* DC. in the unequally sized leaves paired at a node, with the laminas broadly elliptical or obovate and apically obtuse or apiculate, its bifid stipules, and anther connectives that exceed the locules, and from *B. paulista* A.Juss. in the densely white-sericeous abaxial vestiture of the laminas and the hirsute ovary. – Type: Brazil, Bahia, Serra do Tombador, at summit of Morro do Chapéu, c.7 km S of town of Morro do Chapéu, 1150 m, [11°30'S, 41°10'W], 17 ii 1971 (fl, fr), *Irwin et al.* 32337 (holo MICH; iso NY, UB). **Fig. 9.**

Shrub to c.1.5 m; stems sericeous when young, soon glabrous. *Leaves* notably unequal in size, even at same node; lamina 3–9.5 × 2–5.5 cm, coriaceous, elliptical to obovate to

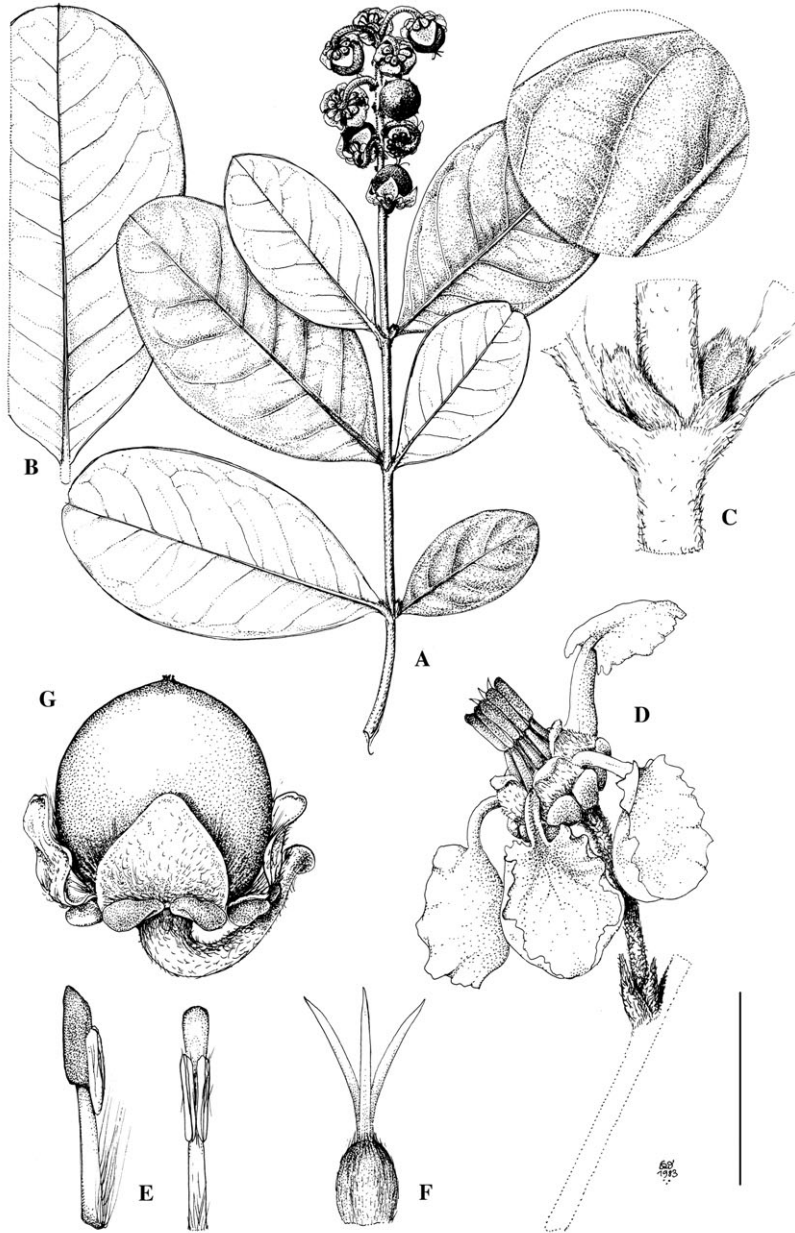


FIG. 9. *Byrsonima anisophylla* W.R.Anderson, sp. nov. A, Fruiting branch, with detail of adaxial surface of lamina. B, Large leaf, abaxial view. C, Node with almost connate intrapetiolar pairs of stipules (the apex bifid). D, Flower, posterior petal uppermost. E, Stamens, lateral view (left) and adaxial view (right). F, Gynoecium. G, Fruit. Scale bar equivalents: A and B, 4 cm; C, 5.7 mm; D, 8 mm; E, 4 mm; F, 5 mm; G, 8 mm. Based on Irwin et al. 32337 (MICH). Drawn by Karin Douthit.

oblanceolate, apex rounded or minutely apiculate (apiculum to 0.1 mm long) or emarginate-apiculate, base acute, adaxially glabrous, abaxially densely white-sericeous, the vestiture thinning with age and becoming patchy, eventually glabrescent in age, hairs 0.1–0.4 mm long, wavy; petiole 0.5–4 mm long; stipules 2.5–4 mm long, connate but bifid at apex, adaxially glabrous or with a few scattered hairs, abaxially densely sericeous. *Inflorescence* 6–10 cm long, sericeous, containing 11–30 flowers, one per bract, irregularly inserted; floriferous bracts 2.5–3.5 × c.1.5 mm, triangular, adaxially glabrous, abaxially sericeous; peduncles absent; bracteoles 1.8–2.2 × c.1.2 mm, like bracts; pedicels 6–7 mm long in flower (–14 mm in fruit), sericeous, recurved in bud and in fruit; bracts and bracteoles persistent in flower and eventually deciduous in fruit. *Sepals* c.2 mm long beyond glands (enlarging to 4 mm in fruit), c.2 mm wide, obtuse, adaxially sericeous along margin, abaxially sericeous, margin ciliate, the apex recurved at anthesis, all biglandular, glands 2–2.5 mm long. *Petals* yellow, glabrous; lateral petals reflexed, claw 3.5–3.7 mm long, limb c.4 mm in diameter, orbicular, concave; posterior petal erect, claw c.4 mm long, limb c.5 mm in diameter, flat, eglandular. *Filaments* adaxially hirsute in proximal half, anthers sparsely sericeous, locules linear, unwinged; stamens opposite anterior sepal, anterior-lateral petals and sepals, and posterior-lateral petals with the filaments 2.7–3 mm long, locules 1.8–2(–2.2) mm long, connectives 1.6–1.8(–2) mm long, exceeding the locules by 0.5–0.7 mm; stamens opposite posterior-lateral sepals with the filaments c.2 mm long, locules c.1.5 mm long, connectives c.1.6 mm long, exceeding the locules by c.0.2 mm; stamen opposite posterior petal with the filament c.2 mm long, locules c.1.3 mm long, connectives 1.3–1.4 mm long, not or barely exceeding the locules. *Ovary* c.2 mm long, hirsute; styles 3.7–4 mm long, distally divergent. *Fruit* 0.9–1 cm in diameter (dried), spherical, glabrous, colour at maturity unknown.

Byrsonima anisophylla, known only from the type collection obtained in Bahia, Brazil (see Fig. 2), is named for the leaves, which are notably disparate in size, even at the same node. It is further distinguished by the abaxially densely sericeous laminas, bifid stipules, hirsute ovary, and especially the androecium. The connectives of anthers of stamens opposing the anterior sepal and anterior-lateral sepals and petals exceed the locules, a condition unusual in yellow-flowered species of *Byrsonima*. A similar androecium is also found in *Byrsonima paulista*, but the connectives of the seven larger stamens extend beyond the locules only up to 0.2(–0.3) mm, and the filaments are only 2 mm long; the ovary is glabrous. The leaves of *Byrsonima paulista* are similar in shape to those of *B. anisophylla* and may also be of unequal size at a node, if not as strikingly different as in *B. anisophylla*; however, in *B. paulista* the laminas are abaxially sparsely sericeous only when young and soon become glabrous as the leaf matures.

Byrsonima anisophylla is sympatric with the widespread *B. sericea*, in which the laminas are also densely sericeous abaxially but narrowly elliptical, with the apex acute to short-acuminate; the leaves at a node are of similar size. Also, the stipules are completely connate, and the anther connectives do not exceed the locules.

Byrsonima cardenasii W.R.Anderson, *sp. nov.*

Byrsonima cardenasii differs from *B. nemoralis* Cuatrec. in its glabrous anthers, the connective not exceeding the locules, straight pedicels in bud and fruit, and leaves with distinct petioles and clearly defined abaxial laminar reticulum. – Type: Colombia, Antioquia, Mpio. Frontino, Correg. Nutibara, Región Murrí, carretera hacia La Blancquita, Finca Palmares, 1840 m, 15 vii 1986 (buds, fr), *Acevedo* et al. 1342 (holo NY-2 sheets; iso HUA, MICH). **Fig. 10.**

Tree to 30 m tall; stems sericeous when young, soon glabrous. *Lamina* of larger leaves 8–20.5 × 4–11.5 cm, elliptical to obovate, apex acute, base acute, adaxially glabrous, abaxially sparsely sericeous when young, soon glabrous or with scattered minute appressed hairs, midrib raised abaxially and triangular in cross-section; petiole 0.5–3 cm long; stipules 3–6 mm long, completely connate, adaxially glabrous, abaxially glabrous or with a narrow band of hairs in the centre, rounded at apex. *Inflorescence* 14–22 cm long, sericeous, containing 45–70 flowers, one per bract, irregularly inserted; floriferous bracts 1.3–2 × 1–1.5 mm, triangular, adaxially glabrous, abaxially sericeous; peduncles absent or to 1(–2) mm long in fruit; bracteoles 1.2–1.5 × 1–1.2 mm, like bracts; pedicels 6–7 mm long in flower (–25 mm in fruit), sericeous, straight in bud and in fruit; bracts and bracteoles persistent in flower and fruit. *Sepals* 1.8–2 mm long beyond glands, c.2 mm wide, obtuse, adaxially glabrous, abaxially sericeous, margin ciliate, the apex recurved at anthesis, all biglandular, glands 2.5–3 mm long. Mature *petals* not seen; immature petals white to pink, glabrous, margin eglandular. *Filaments* 1.6–2.2 mm long, those opposite the petals wider than those opposite the sepals, that opposite the anterior sepal the longest, that opposite the posterior petal the shortest, hirsute at base adaxially; anthers 1.3–1.4 mm long, glabrous, locules linear, unwinged, free only at apex, connective not or barely exceeding locules. *Ovary* c.2.3 mm long, glabrous; styles 2–2.2 mm long, distally divergent. *Fruit* 1.4–1.5 cm in diameter (dried), spherical, glabrous, yellow when ripening, orange to orange–red at maturity.

Etymology. The specific epithet honors Colombian botanist Dairon Cardenás López (b. 1957), expert of the Amazonian flora and curator at the Instituto Amazónico de Investigaciones Científicas SINCHI (COAH).

Phenology. Collected in flower in March, May, July, October and November, in fruit in January, March, July, October through December. [Note: W.R.A.'s notes of collections seen from CUCV, HUA, JAUM and MEDEL did not always include dates and/or reproductive condition.]

Distribution and habitat. Colombia (Antioquia, Nariño, Riseralda, Santander, Valle del Cauca); wet forest; 1330–2300 m. **Fig. 11.**

Additional specimens examined. COLOMBIA. **Antioquia:** Mpio. Briceño, Vereda Santa Ana de los Chorrillos, 1750–1800 m, 07°09'49''N, 75°32'30''W, (date not recorded, fl), *Callejas* 1346 (HUA); Mpios. Valdivia/Briceño, Veredas Santa Ana, en la vía quebrada El Oro–Sta. Ana, cerca 100 km NE de Medellín, 1750–1820 m, 07°06'N, 75°32'W, 16 x 1992 (old fl), *Callejas & Gómez* 10756 (HUA, MO); Mpio. Urrao, Vereda Calles, Parque Nacional Natural 'Las Orquideas', inventario permanente:

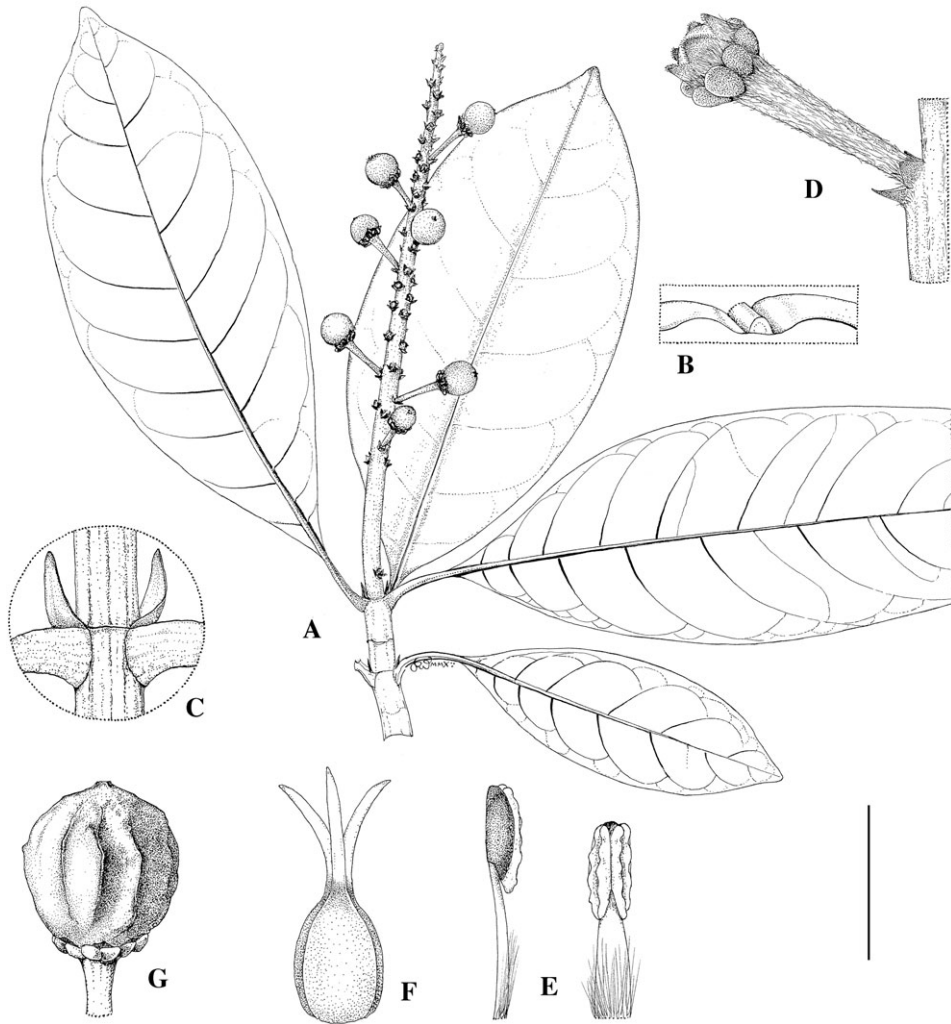


FIG. 10. *Byrsonima cardenasii* W.R.Anderson, sp. nov. A, Fruiting branch. B, Cross-section of lamina with abaxial side at top, showing raised triangular midrib. C, Node with connate intrapetiolar pairs of stipules. D, Flower bud with straight pedicel. E, Stamens, lateral view (left) and adaxial view (right). F, Gynoecium. G, Dried fruit. Scale bar equivalents: A, 4 cm; B, 8 mm; C, 1 cm; D, 5.7 mm; E, 2 mm; F, 2.7 mm; G, 1.3 cm. Based on: A–C, Zarucchi et al. 7193 (MICH); D, Acevedo et al. 1324 (NY); E and F, Callejas & Gómez 10756 (MO); G, Giraldo-Gensini 165 (MICH). Drawn by Karin Douthit.

parcela W, subparcela W-21, 1330–1400 m, 06°32'N, 76°19'W, 9 v 1993 (old fl), Cogollo et al. 6223 (MICH, MO); parcela G, subparcela G-11, 1450 m, 06°32'N, 76°14'W, 19 viii 1993 (st), Cogollo et al. 6671 (MO), 6670 (MICH, MO), 6673 (MO); parcela G, subparcela G-18, 18 x 1993 (st), Cogollo et al. 7078 (MO). Mpio. Urrao, Parque Nacional Natural 'Las Orquídeas', Sector Calles, margen derecha de la Quebrada La Agudelo, 1300–1380 m, 06°31'N, 76°19'W, date not recorded

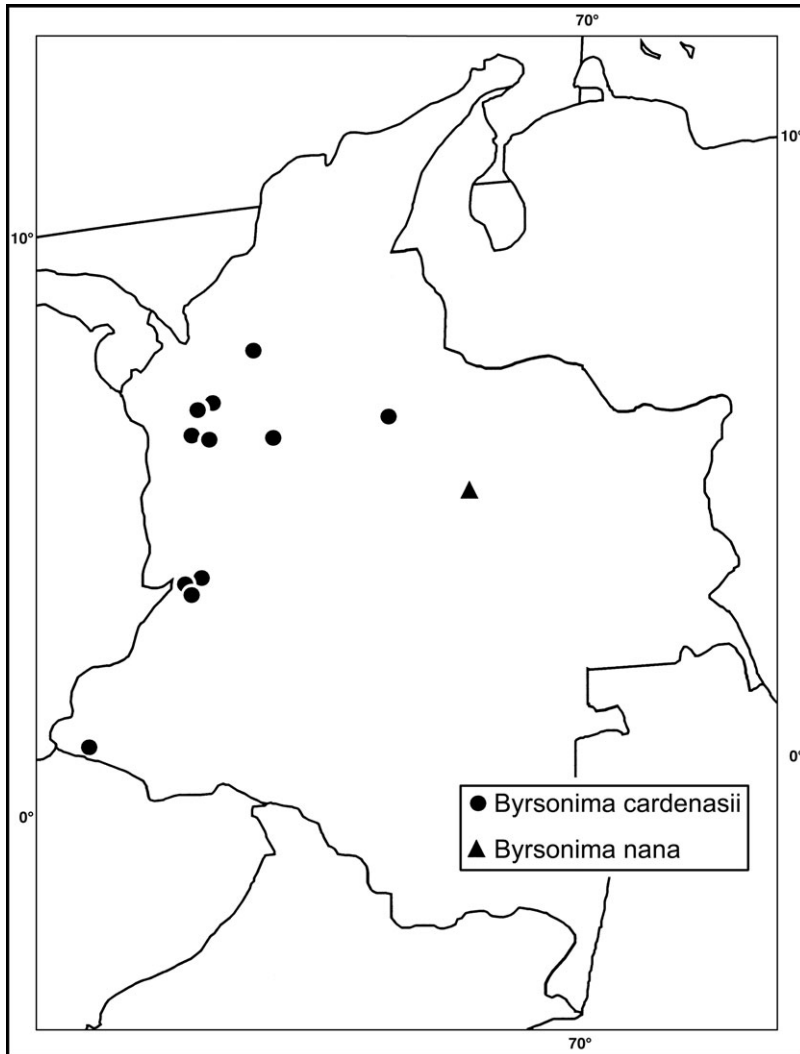


FIG. 11. Distribution of *Byrsonima cardenasii* and *B. nana*.

(buds, fr), *Ramírez J.* 4255 (HUA, JAUM); Mpio. Frontino, Correg. Nutibara, cuenca alta del Río Cuevas, 1840 m, 15 vii 1986 (fl, fr), *Sánchez et al.* 426 (COL, HUA, MEDEL), (date not recorded, buds, fr), 783 (HUA, MEDEL); Mpio. Betania, Vda. Pedral Arriba, Vte. Derecha, Qda. La Bramadora, 2000–2300 m, 28 xi 1997 (y infl), *Sánchez et al.* 3907 (COL, MEDEL); same locality but dates and phenology not recorded: *Sánchez et al.* 3757, 3781, 3815, 3916, 3949 (all MEDEL); Mpio. Amalfi, Vereda Guayabito, Bosque Caracolí, 1680–1840, 06°52'17''N, 75°06'13''W, (date and phenology not recorded), *Zapata* 46 (HUA); Mpio. Frontino, Km 13 of road Nutibara–La Blanquita, region of Murrí, Alto de Cuevas, 1990 m, 06°32'N, 76°19'W, 6 xi 1988 (fr), *Zarucchi et al.* 7193 (COL, HUA, MICH, MO). **Nariño:** Mpio. Barbacoas, Correg. Junín, sitio La Guarapería a 3 km de Junín, vía Junín–Tumaco, 1100 m, iii 1995 (fr), *Fernández et al.* 12543 (COL). **Riseralda:**

Mpio. Pueblo Rico, Vereda Tatamá, Reserva Natural Karagabí, 2027 m, (date and phenology not recorded), *Serna* 1 (MEDEL). **Santander:** Mpio. Charalá, Correg. Virolín, Vereda El Pedregal, sitio llamado El Reloj, vía a la finca Materrama, cerca al Río El Brazuelo, 1820 m, 06°06'N, 73°14'W, 13 x 1999 (fr), *Herrera* 245 (COL); Mpio. Encino, Reserva Biológica Cachalú, camino a la parcela permanente, 2100 m, 06°04'N, 73°08'W, 15 i 1999 (fr), *Reina* 263 (COL), 18 iii 1999 (fr), *Reina* 330 (COL). **Valle del Cauca:** Mpio. La Cumbre, Vereda Chicoral, Reserva Alto Bitaco, 1600 m, 25 xi 2007 (phenology not recorded), *Cano* 52 (CUCV); Mpio. Cali, near Cali-Buenaventura road, Finca Zíngara, Km 18 carretera Simón Bolívar, vía a Dapa, Correg. La Elvira, 1900 m, 31 i 1994 (fr), *Giraldo-Gensini* 165 (MICH); Mpio. Darién, Vereda San José, 2200 m, 2 vii 1970 (buds), *Mahecha* 364 (COL, UDBC); Mpio. La Cumbre, Correg. Bitaco, Reserva Agua Bonita, 1700–1900 m, 10–15 xii 1998 (old infl), *Vargas* 5247 (MO).

In the herbarium, collections of *Byrsonima cardenasii* were tentatively assigned to *B. nemoralis*, a species of the Pacific lowlands, with which it shares white to pink petals. In both species, the lamina has the midrib abaxially very prominent and triangular in cross-section instead of rounded, the common condition. *Byrsonima cardenasii* differs in its leaves, pedicels and anthers. The well-defined petioles are inserted below the acute base of the relatively thin laminas in which the reticulum is clearly evident. The pedicels remain straight from bud through the fruiting stage, and in the glabrous anthers the connective is subequal to the locules. In contrast, the laminas of *Byrsonima nemoralis* are coriaceous, with the reticulum indistinct or obscured, and narrowed gradually to a brief petiole. The anthers are pubescent and have the connective well exceeding the locules by c.1 mm. Unfortunately, none of the collections of *Byrsonima cardenasii* seen included petals; most were in fruit, in bud, or sterile, or the flowers with the petals already lost and the androecium degraded.

Byrsonima cardenasii is listed as “*Byrsonima* sp. nov. 1” in the *Catálogo de Plantas y Líquenes de Colombia* (Anderson & Anderson, 2016).

***Byrsonima goiana* W.R.Anderson, sp. nov.**

Byrsonima goiana differs from *B. guilleminiana* A.Juss. in its leaves, separated by well-developed internodes along the axis, and with elliptical laminas, adaxially glabrous and abaxially sericeous but the epidermis always evident. – Type: Brazil, Goiás, Luziânia, sítio de Dr. Jesus Reis, cerrado, 26 ii 1975 (fl), *Heringer* et al. 14435 (holo MICH; iso UB, photograph provided by André Amorim). **Fig. 12.**

Shrub to 2 m tall; stems sericeous when young, soon glabrous. *Lamina* of larger leaves 11.7–22 × 5.7–9 cm, elliptical, apex acute, base acute, adaxially glabrous, abaxially sericeous to sparsely so with age, the epidermis always evident, the hairs translucent and the surface appearing glabrous to the naked eye; petiole 2–7 mm long; stipules 4–5 mm long, completely connate, adaxially glabrous, abaxially densely sericeous, rounded at apex. *Inflorescence* 13–18 cm long, sericeous, flowers 2 or 3 (to 4) in condensed cincinni subtended by sterile bracts; floriferous bracts c.2 × 1.5–1.7 mm, triangular, adaxially glabrous, abaxially sericeous; peduncles absent; bracteoles 1.2–1.5 × 1 mm; bracts mostly deciduous in flower; pedicels 7–8.5 mm long, tomentose, recurved in bud and fruit. *Sepals*

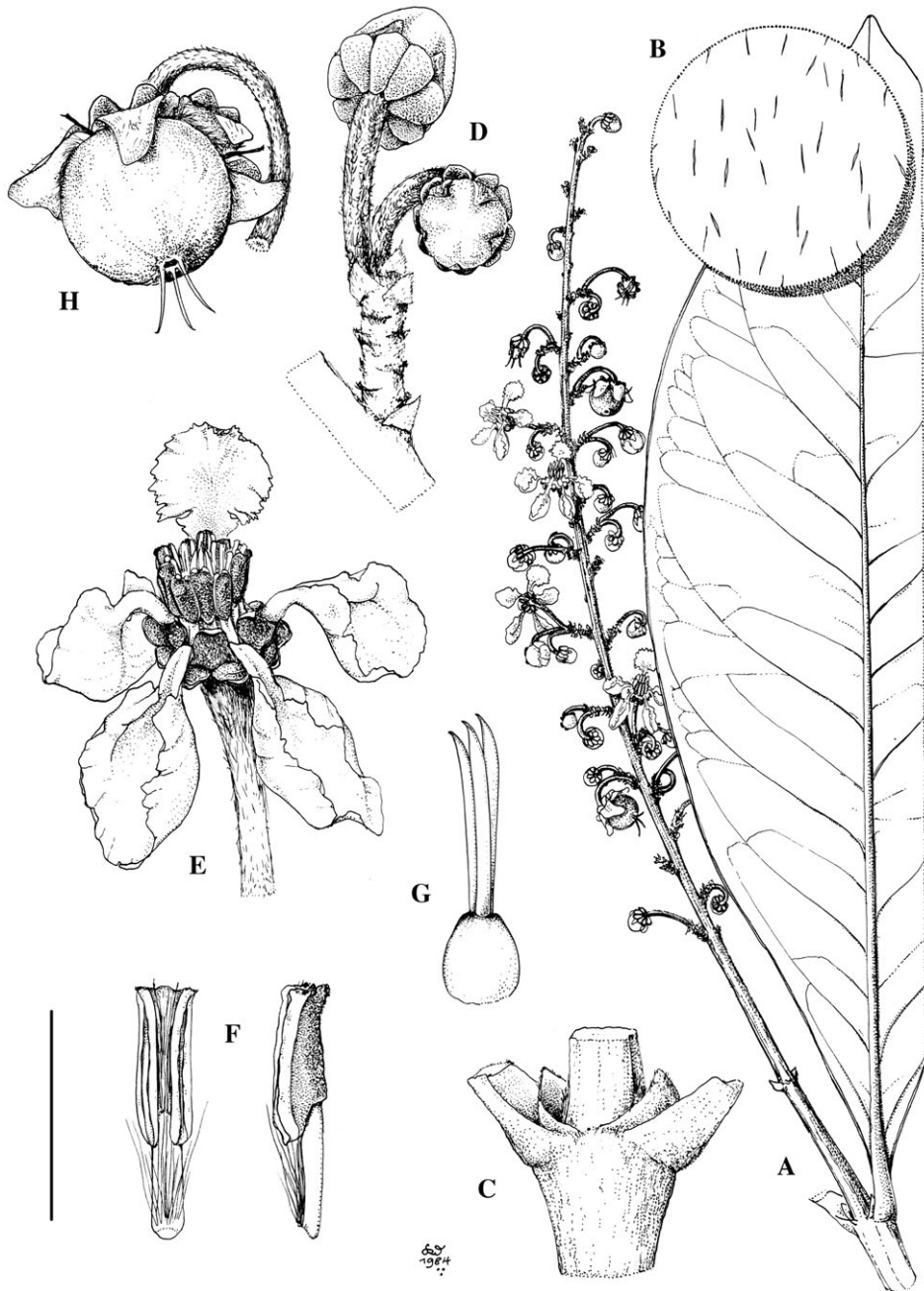


FIG. 12. *Byrsonima goiana* W.R.Anderson, sp. nov. A, Node with large leaf, abaxial view, and inflorescence. B, Detail of abaxial laminar surface, showing sparse vestiture. C, Node with two leaf bases and completely connate stipules. D, Two flower buds. E, Flower, posterior petal uppermost. F, Stamens, adaxial view (left) and lateral view (right). G, Gynoecium, anterior style at right. H, Fruit borne on circinate pedicel. Scale bar equivalents: A, 4 cm; B, 2 mm; C, 1.3 cm; D, 1 cm; E, 8 mm; F and G, 4 mm; H, 1 cm. Based on: A–G, *Heringer* 14435 (MICH); H, *Heringer* et al. 3115 (MICH). Drawn by Karin Douthit.

1.4–1.7 mm long beyond glands, c.1.5 mm wide, obtuse, adaxially glabrous or tomentulose along the margin, abaxially sericeous, margin ciliate, the apex recurved at anthesis, all biglandular, glands c.2.5 mm long. *Petals* yellow, glabrous; lateral petals reflexed, claw c.3 mm long, limb orbicular, concave, of anterior-lateral petals c.7 mm in diameter, of posterior-lateral petals c.5 mm in diameter; posterior petal erect, claw c.4 mm long, limb c.5 mm in diameter. *Filaments* c.2 mm long, hirsute at base adaxially; anthers c.2.5 mm long, subequal, sericeous between locules, locules linear, unwinged, free only at apex, connective barely exceeding locules. *Ovary* c.1.5 mm long, glabrous; styles c.3.5 mm long, slightly bent near apex. *Fruit* 0.8–1 cm in diameter (dried), spherical, glabrous, colour at maturity unknown.

Additional specimen examined. BRAZIL. **Distrito Federal:** Brasília, baxia do Rio São Bartolomeu, mata ciliar, 9 i 1980 (fl, fr), *Heringer* et al. 3115 (IBGE, MICH).

Byrsonima goiana is known from two relatively close localities in central Brazil (see Fig. 2), one described as riparian forest. André Amorim (Universidade Estadual de Santa Cruz, personal communication) provided images of a likely third collection: Distrito Federal, Brasília, Mpio. Sobradinho, no cerrado, 15°39'S, 47°48'W, 30 xi 1964, *Gomes* 2508 (CEPEC, SP).

Byrsonima goiana shares with *B. guillemianiana*, also known from Goiás and the Distrito Federal, similar inflorescences and laminas, but the two species are immediately separated by their leaves. *Byrsonima goiana* has the leaves well spaced along the axis, the internodes several centimetres long, whereas the leaves of *B. guillemianiana* are borne on condensed short shoots, the internodes c.2 mm or less long. The laminas of *Byrsonima goiana* are elliptical, adaxially glabrous and abaxially sericeous, the epidermis always evident. The narrowly obovate to oblanceolate laminas of *Byrsonima guillemianiana* are adaxially sparsely sericeous and abaxially so densely sericeous that the epidermis is obscured.

***Byrsonima nana* W.R.Anderson, sp. nov.**

Byrsonima nana differs from *B. hatschbachii* W.R.Anderson in its connate stipules, longer pedicels, filaments basally hirsute adaxially and abaxially, and shorter and glabrous anthers, and from *B. linearifolia* A.Juss. in its mature leaves (the sparse vesture, if any, composed of white hairs) and the glabrous ovary. – Type: Colombia, Meta ['Comisaría del Vichada'], carretera hacia Pto. Gaitán, 20 km del Hato 'El Tigre', 180 m, 23 iii 1971 (fl), *Pinto E. & Sastre* 1503 (holo COL). **Fig. 13.**

Suffrutex with the stems numerous and crowded, arising from a gnarled subterranean caudex, 7–27 cm tall, up to 2 mm in diameter, initially loosely sericeous but glabrescent in age, probably short-lived. *Lamina* of larger leaves 9.5–11.5 cm long, 0.9–1.3 cm wide, linear, tapered very gradually proximally to a poorly differentiated petiole 5–8 mm long and distally to a narrowly acute apex, slightly thickened at margin, initially loosely sericeous to tomentose on both sides (the epidermis always visible), adaxially soon glabrate to glabrous or sparsely sericeous proximally especially on midrib, abaxially sparsely

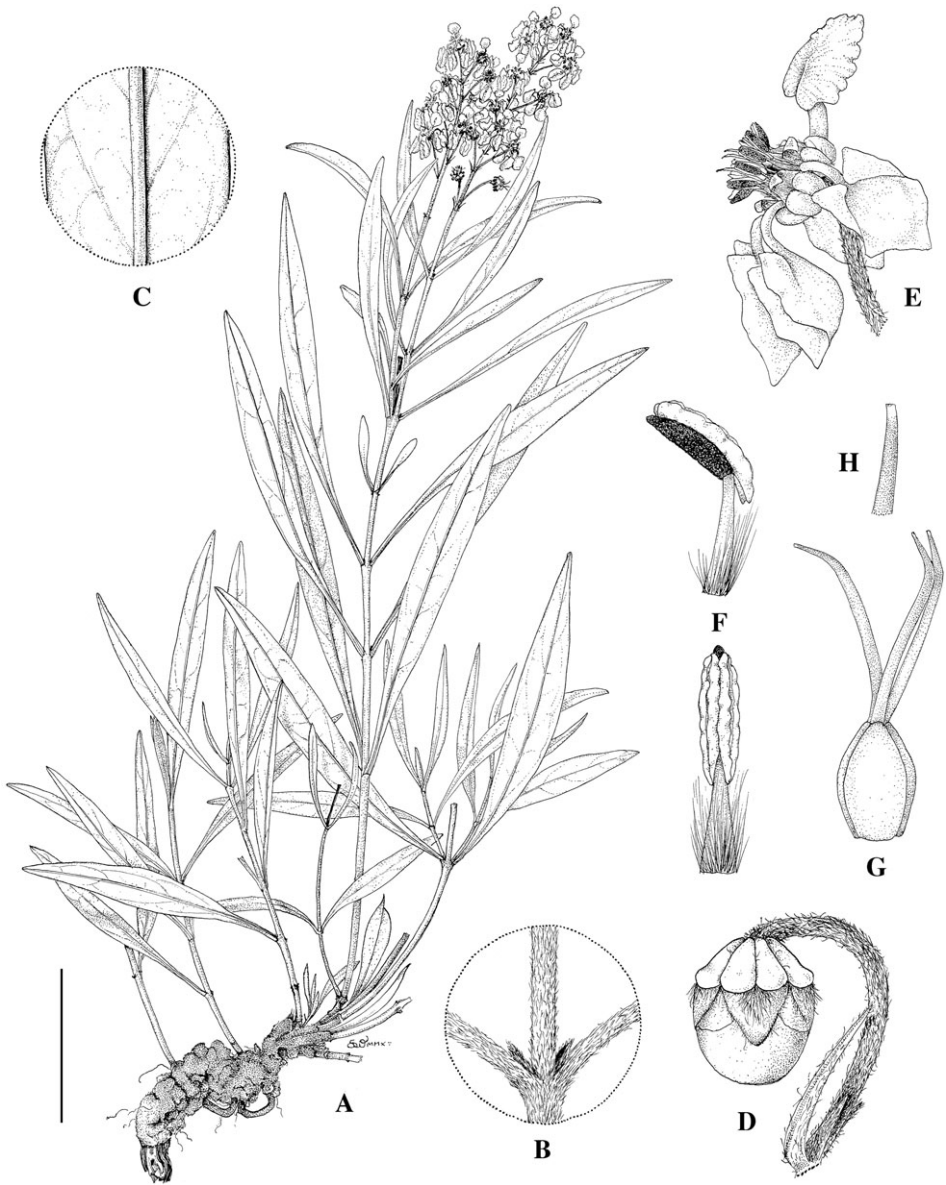


FIG. 13. *Byrsonima nana* W.R.Anderson, sp. nov. A, Flowering habit. B, Node with stipules. C, Detail showing abaxial surface of lamina. D, Flower bud. E, Flower, posterior petal uppermost, lateral view. F, Stamens, lateral view (above) and adaxial view (below). G, Gynoecium, anterior style at left. H, Distal portion of style. Scale bar equivalents: A, 4 cm; B and C, 8 mm; D, 4 mm; E, 6.7 mm; F and G, 2 mm; H, 0.8 mm. Based on Pinto E. & Sastre 1503 (COL). Drawn by Karin Douthit.

sericeous or sparsely tomentose to glabrous in age, hairs white, lateral veins poorly differentiated from reticulum; stipules 1.5–2.5 mm long, completely connate, adaxially glabrous, abaxially densely sericeous to glabrescent in age, rounded at apex. *Inflorescence* 6–10 cm long, loosely sericeous or tomentose to velutinous, containing 6–10(–12) flowers borne 1 per bract; bracts 2.5–5 × 0.5–1 mm wide, narrowly triangular, stiffly spreading, adaxially glabrous, abaxially loosely sericeous; peduncles absent; bracteoles like bracts but only about half as long; bracts and bracteoles persistent in flower; pedicels 9–12 mm long, tomentose or velutinous, strongly circinate in bud, nodding in old flowers. *Sepals* 1.2–1.6 mm long beyond glands, 1.5–1.8 mm wide, obtuse, adaxially glabrous, abaxially sericeous, margin ciliate, the apex recurved at anthesis, all biglandular, glands 1.6–1.8 mm long. *Petals* yellow, glabrous; lateral petals reflexed, claw c.2 mm long, limb 6–6.5 mm in diameter; posterior petal erect, claw c.2.7 mm long, limb c.5 mm in diameter. *Filaments* 1.5–1.7 mm long, hirsute at base, more so adaxially than abaxially; anthers 1.6–1.8 mm long, subequal, glabrous, locules linear, unwinged, free only at apex, connective barely exceeding locules. *Ovary* c.1.5 mm long, glabrous; styles c.2.5 mm long, bent near apex. *Fruit* not seen.

Byrsonima nana, known only from the holotype collected in Meta, Colombia (see Fig. 11), is one of the smallest species in the genus, hence the specific epithet, which means ‘dwarf’. In addition to its small stature, it is distinguished by the combination of linear leaves arising from a woody caudex, completely connate stipules, glabrous anthers and a glabrous ovary. In its habit and linear leaves, *Byrsonima nana* superficially resembles the Brazilian species *B. hatschbachii* of Mato Grosso and *B. linearifolia* of the Brazilian Central Planalto, in which the stipules are connate only in the basal 1/3 to 1/2. *Byrsonima hatschbachii* also differs in its shorter pedicels (to 6 mm long), filaments basally hirsute only adaxially, and sparsely sericeous anthers. *Byrsonima linearifolia* is immediately separated from *B. nana* by its abaxially rufous-tomentose leaves, the vestiture hiding the epidermis, and the rufous-tomentose ovary.

Byrsonima nana is listed as “*Byrsonima* sp. nov. 3” in the *Catálogo de Plantas y Líquenes de Colombia* (Anderson & Anderson, 2016).

TETRAPTERYS

***Tetrapteryx catarinensis* W.R.Anderson, sp. nov.**

Tetrapteryx catarinensis differs from *T. anisoptera* A.Juss., *T. phlomoides* (Spreng.) Nied. and *T. xylostefolia* A.Juss. in its eglandular petioles, laminas adaxially with the veins flush or very slightly impressed, and samaras with the upper and lower wings subequal or slightly unequally long, from the last two additionally in its tightly appressed vestiture. – Type: Brazil, Santa Catarina, Mpio. Campo Alegre, Serra do Quiriri, 1000 m, 27 xii 2004 (fr), Ribas, Labiak & Cordeiro 6558 (holo MICH, iso MBM not seen).

Fig. 14.

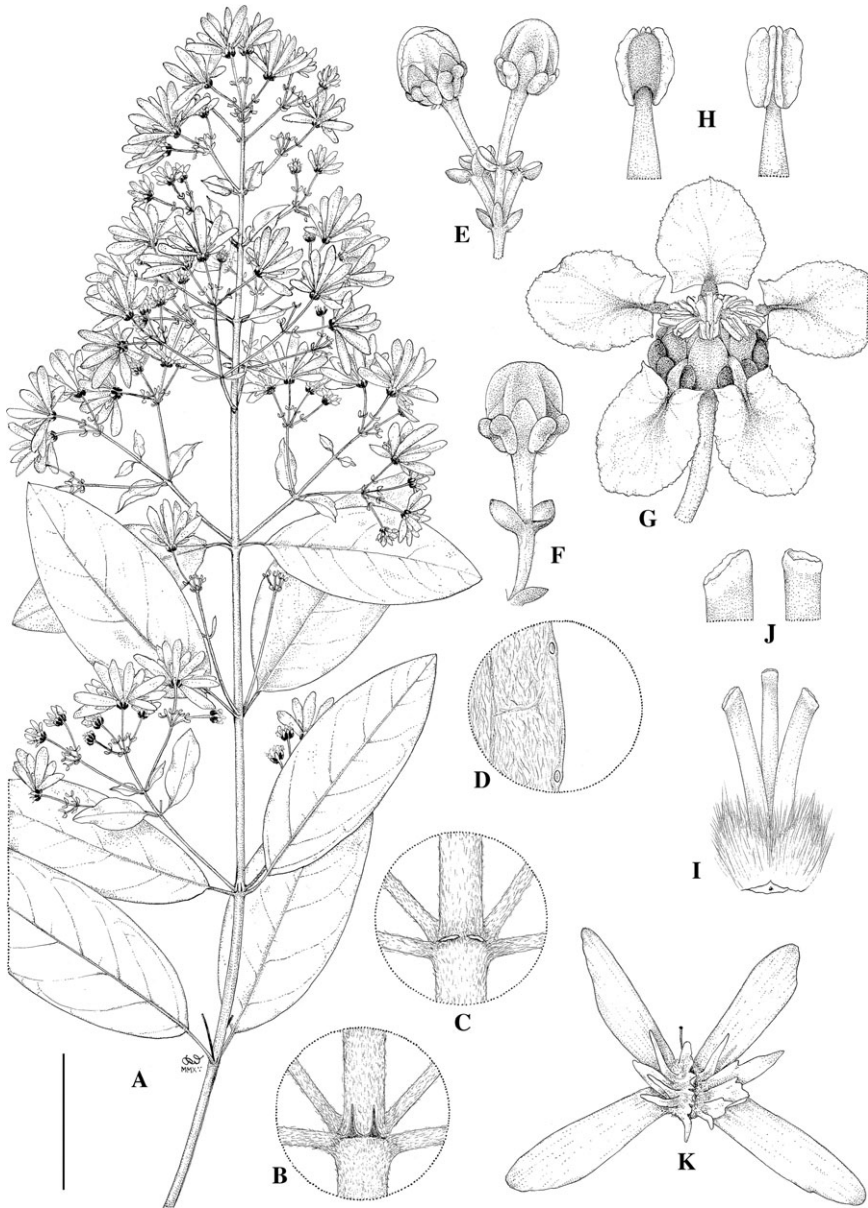


FIG. 14. *Tetrapterys catarinensis* W.R.Anderson, sp. nov. A, Fruiting branch. B, Node with distinct stipules. C, Node with scars after loss of stipules. D, Detail showing abaxial vestiture of lamina and marginal glands. E, Umbel of four flower buds, two removed. F, Flower bud. G, Flower, posterior petal uppermost. H, Distal portions of stamens, abaxial view (left) and adaxial view (right). I, Gynoecium, anterior style in centre. J, Distal portions of styles, posterior style at left, anterior style at right. K, Samara, abaxial view. Scale bar equivalents: A, 4 cm; B and C, 1 cm; D, 4 mm; E, 1 cm; F, 8 mm; G, 4 mm; H and I, 2 mm; J, 0.8 mm; K, 1 cm. Based on: A–D and K, *Silva & Andrade* 5444 (MICH); E–J, *Reitz & Klein* 3813 (MICH). Drawn by Karin Douthit.

Woody vine; stems sericeous when young, soon glabrous. *Laminas* of larger leaves 4.2–8 × 2.4–3.5 cm, elliptical, apex acute, base rounded, adaxially sericeous when young but soon glabrous, abaxially sericeous, the hairs 0.4–1 mm long, sessile, straight to wavy, marginal glands 3–8(–10) on each side in the proximal 1/4 to 1/3 (to 1/2), each gland 0.2–0.3 mm long; petiole 0.6–1.2 cm long, sericeous, eglandular; stipules free, interpetiolar, 1.2–1.6(–2) × c.0.5 mm, narrowly triangular, abaxially sericeous to glabrescent. *Inflorescence* branched, terminating in umbels of 4 flowers, axes sericeous; inflorescence bracts of reduced leaves, petiole 0.5–2.3 mm long, lamina 1.6–7 × 0.3–1 cm; floriferous bracts 1.5–1.8 × 0.6–0.7 mm, elliptical; peduncles 3–4.5 mm long; bracteoles 1–1.6 × 0.8–1 mm, elliptical, inserted at or slightly below apex of peduncle; pedicels 3–4(–5) mm long (to 10 mm in fruit); peduncles, pedicels, and abaxial surface of bracts and bracteoles sericeous. *Sepals* 1.2–1.5 mm long beyond glands, 1.3–1.4 mm wide, apex broadly rounded, abaxially sparsely sericeous to glabrous, the anterior eglandular, the lateral 4 biglandular, glands 1.3–1.5 mm long. *Petals* yellow, the lateral 4 with the claw c.2 × 0.5 mm, limb (3.5–) 4–4.5 mm in diameter, ovate, base minutely sagittate, margin minutely denticulate, teeth to 0.05 mm long; posterior petal with the claw c.2 × 0.8 mm, limb 3.5–4(–4.5) mm in diameter, broadly ovate, base minutely sagittate, margin erose-denticulate. *Filaments* 2–2.2 mm long, glabrous, connate in proximal 1/2; anthers 1–1.1 mm long, equal, glabrous. *Ovary* c.2 mm long, hirsute, crested; anterior style 2–2.2 mm long, posterior styles 1.5–1.7 mm long, glabrous, stigma terminal. *Samara* sparsely sericeous on wings and nut; lateral wings distinct, subequal or slightly unequal, 1.3–1.6 × (0.2–)0.4–0.5 cm; dorsal wing 5–6 × 3–3.5 mm, irregularly and coarsely dentate; nut 3–4 mm in diameter, spherical, between dorsal and lateral wings with linear to oblong and distally dentate winglets to 3.5 mm long; areole 2.5–3 × c.2 mm.

Phenology. Collected in flower in October, in fruit in December.

Distribution and habitat. Brazil (Santa Catarina); in woods and along riverbanks; c.1000 m. Fig. 15.

Additional specimens examined. BRAZIL. **Santa Catarina:** Ibirama, 100 m, 12 x 1956 (fl), Reitz & Klein 3813 (MICH, P); Mpio. Garuva, Serra do Quiriri, 10 xii 2006, Silva & Andrade 5444 (MICH, MBM). – Note: Reitz & Klein 3813 is a mixed collection. The duplicates at MO (MO016111) and RB (RB00043773) are *Aspidosperma* (Apocynaceae).

Tetrapteryx catarinensis is distinctive in the combination of appressed vesture (hair sessile), eglandular petioles, laminas with the veins adaxially flush or nearly so, and samaras with the four wings subequal or slightly unequal. It belongs to the group within *Tetrapteryx* characterised by 4(–6)-flowered umbels as opposed to multiflowered racemes. *Tetrapteryx catarinensis* resembles the more northerly distributed *T. anisoptera* and the sympatric *T. phlomoides* and *T. xylosteifolia*, with which it shares distinct, narrowly triangular stipules, laminas with marginal glands, and winglets or excrescences present on the nut of the samara. All three differ in having the petioles usually biglandular, the laminas adaxially rugose, and the upper pair of wings of the samara notably longer than the lower

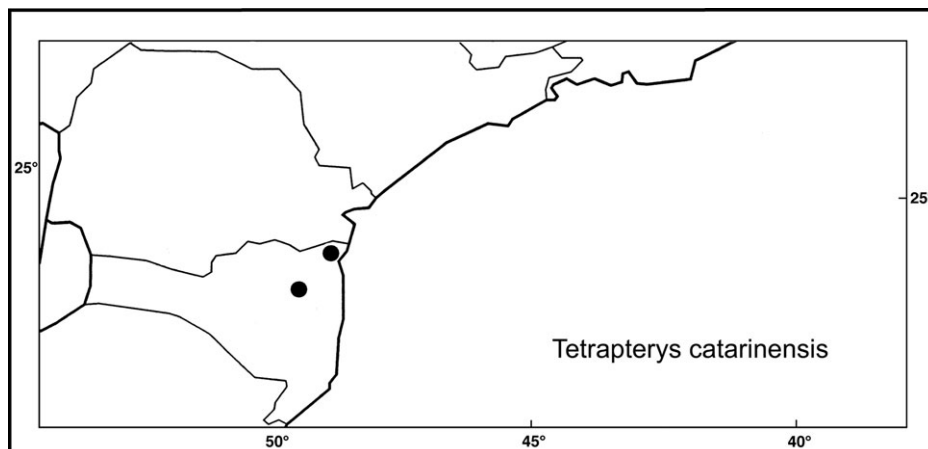


FIG. 15. Distribution of *Tetrapteryx catarinensis*.

pair. Additionally, in *Tetrapteryx phlomoides* and *T. xylosteifolia* the vesture is spreading, composed of V-, Y- and T-shaped hairs.

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