

*DE MACROCARPAEAE GRISEBACH (EX GENTIANACEIS)
SPECIEBUS NOVIS IV: ELEVEN NEW SPECIES OF
MACROCARPAEA (GENTIANACEAE: HELIEAE) FROM
CENTRAL AND SOUTH AMERICA, AND THE FIRST REPORT
OF THE PRESENCE OF STIPULES IN THE FAMILY*

JASON R. GRANT¹ AND RICHARD E. WEAVER, JR.²

Abstract. Progress toward a taxonomic revision of *Macrocarpaea* (Gentianaceae: Helieae) has revealed numerous novelties in this morphologically diverse and unexpectedly species-rich genus. Eleven new species are here described and illustrated from Central and South America: Colombia (*M. nicotianifolia* and *M. schultesii*), Costa Rica (*M. auriculata*), Ecuador (*M. subsessilis*), Peru (*M. gracilis*, *M. maguirei*, *M. wurdackii*, and *M. zophoflora*), and Venezuela (*M. ewaniana*, *M. papillosa*, and *M. weaveri*). *Macrocarpaea zophoflora* is notable for being the first species to be described of Gentianaceae that is known, or recognized, to have free deciduous interpetiolar stipules. The family was previously defined as exstipulate without exception.

Keywords: Gentianaceae, Helieae, *Macrocarpaea*, morphology, Neotropics, stipule.

Preliminary work on *Macrocarpaea* by R.E.W. in the early 1980's revealed numerous new species in this morphologically diverse genus. Eleven species identified during those studies are here described for a monograph of the genus being prepared by J.R.G. for *Flora Neotropica*. These species are from Colombia (*M. nicotianifolia*, and *M. schultesii*), Costa Rica (*M. auriculata*), Ecuador (*M. subsessilis*), Peru (*M. gracilis*, *M. maguirei*, *M. wurdackii*, and *M. zophoflora*), and Venezuela (*M. ewaniana*, *M. papillosa*, and *M. weaveri*) (Fig. 1).

The genus has long been underestimated for its species diversity. Hundreds of collections have been made in remote regions of the Neotropics in the past 50 years, yielding over 20 times the number of specimens that were available to Ewan during preparation of the only existing monograph of the genus (Ewan 1948). It is not surprising therefore that by

careful examination of a large number of specimens, that additional and more refined taxonomic groups can be defined.

Colombia

1. *Macrocarpaea nicotianifolia* Weaver & J.R. Grant, *sp. nov.* TYPE: COLOMBIA. Cundinamarca: montes abajo de Salto de Tequendama, cerca a la planada de La Vencedora, 2100 m, planta de 2 m, flores de color amarillo claro, la hoja grande pertenece al nudo de la primera ramificación, March 1966, *Uribe Uribe 5577* (Holotype: US). Fig. 2.

Haec species Macrocarpaeae glabra cui similis, sed foliis grandioribus, inflorescentia paniculatum latis, lobis calyce ovatis, ellipticis vel rotundis, apicibus obtusis rotundatis differt.

Unbranched tree, 1–5 m, hispid to spiculate with short simple hairs on stems, petioles,

This work was supported by a Swiss National Science Foundation grant, No. 3100-052885 to the Université de Neuchâtel, Switzerland. We thank Mary Endress, Peter Endress, Ernest Fortis, Philippe Küpfer, James Luteyn, James S. Pringle, Rolf Rutishauser, Lena Struwe, and Maximilian Weigend who each helped in various ways. Bobbi Angell skillfully prepared the excellent illustrations. Library research by J. R. G. was largely carried out at the Conservatoire et Jardins botaniques de la Ville de Genève, Switzerland. We thank the following herbaria either for the loan of material, photocopies of specimens, data on their collections, or for hospitality extended during visits* by J. R. G. to examine material of *Macrocarpaea*: AAU, ALA*, B, BM, BP, BR, BRIT, BSB, C, CAS, CHR*, COL*, CR, CUVC, CUZ*, DAV, DUKE, E, F, FI, FLAS, G*, GB, GH, GOET, HAC, HAL HAM, HAO*, HUCP, HUT*, IAC, INB, JBSD, JE, K, L, LD, LOJA*, LPB, LS, M, MA*, MANCH, MARY*, MBM*, MER*, MICH, MIN, MO, MOL*, MSB, MY, NA, NO, NY*, NSW*, OXF, P*, PH, PORT*, PR, PRC, Q*, QAP*, QCA*, QCNE*, QPLS*, QUSF*, R*, RB*, S*, SBG*, SEL*, SP, TEX, U, UC, UCWI, UPCB, UPS, US*, USM*, VEN*, W*, WIS, WU*, YU, and Z*.

¹Laboratoire de Botanique Évolutive, Institut de Botanique, Faculté des Sciences, Université de Neuchâtel, rue Émile-Argand 11, Case Postale 2, 2007 Neuchâtel, Switzerland. E-mail: jason.grant@unine.ch; author for correspondence.

²Botany Section, Division of Plant Industry, Department of Agriculture & Consumer Services, Gainesville, Florida 32614, U.S.A.

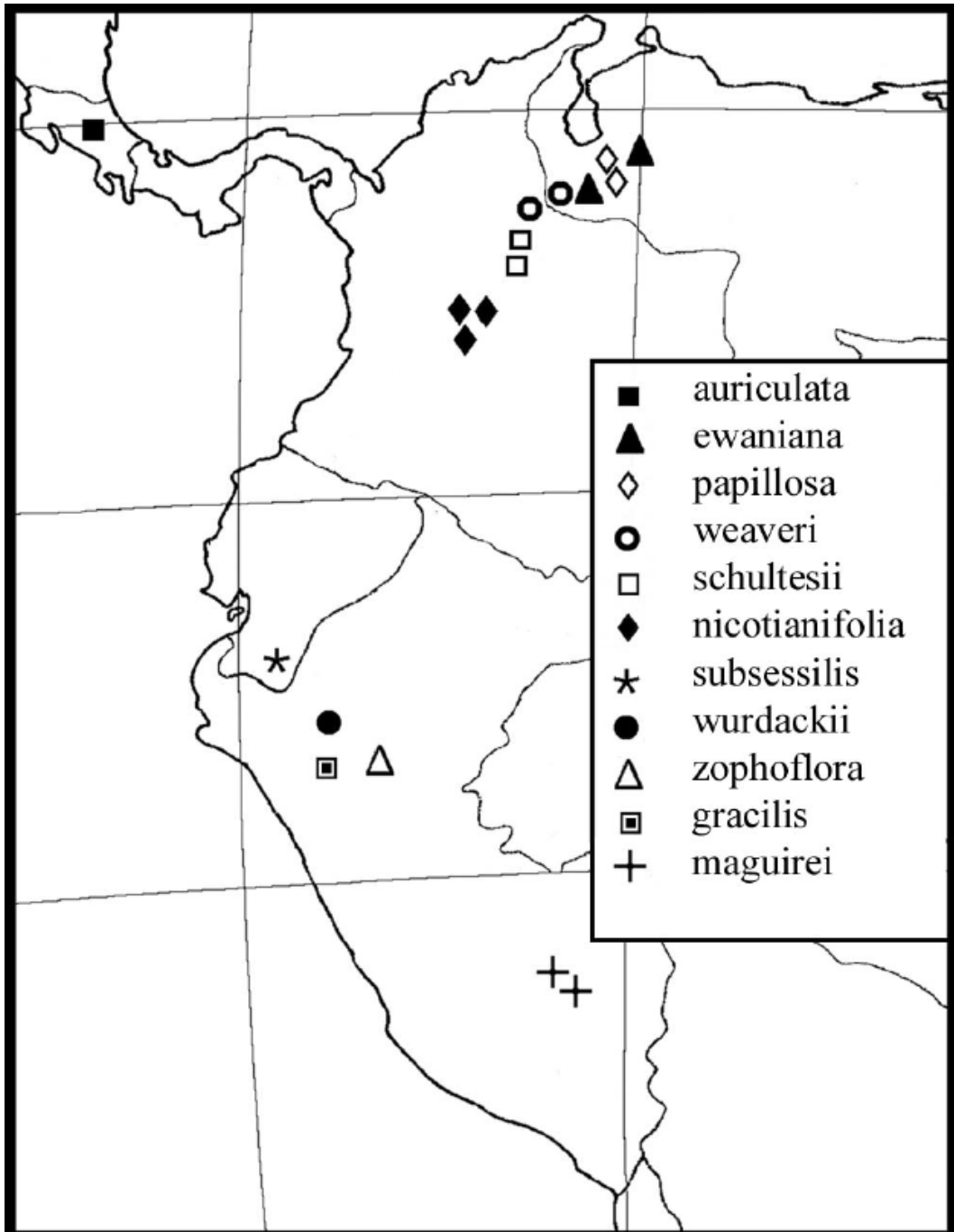


FIGURE 1. Distribution of *Macrocarpaea auriculata*, *M. ewaniana*, *M. gracilis*, *M. maguirei*, *M. nicotianifolia*, *M. papillosa*, *M. schultesii*, *M. subsessilis*, *M. weaveri*, *M. wurdackii*, and *M. zophoflora* in Central America and northwestern South America.

leaves, inflorescences, bracts and calyces. Stems terete to slightly quadrangular above, solid to hollow, 4–15 mm in diameter just below inflorescence. Leaves elliptic to obovate varying to ovate or elliptic, sessile to short-petiolate,

(3.5–)9.0–39.0 cm long; blades (3.5–)9.0–38 × (2–)4.5–16.0 cm, not revolute, papery thin, to thin coriaceous, dark above and conspicuously lighter below, with slightly impressed veins above, and slightly raised veins below, glabrous

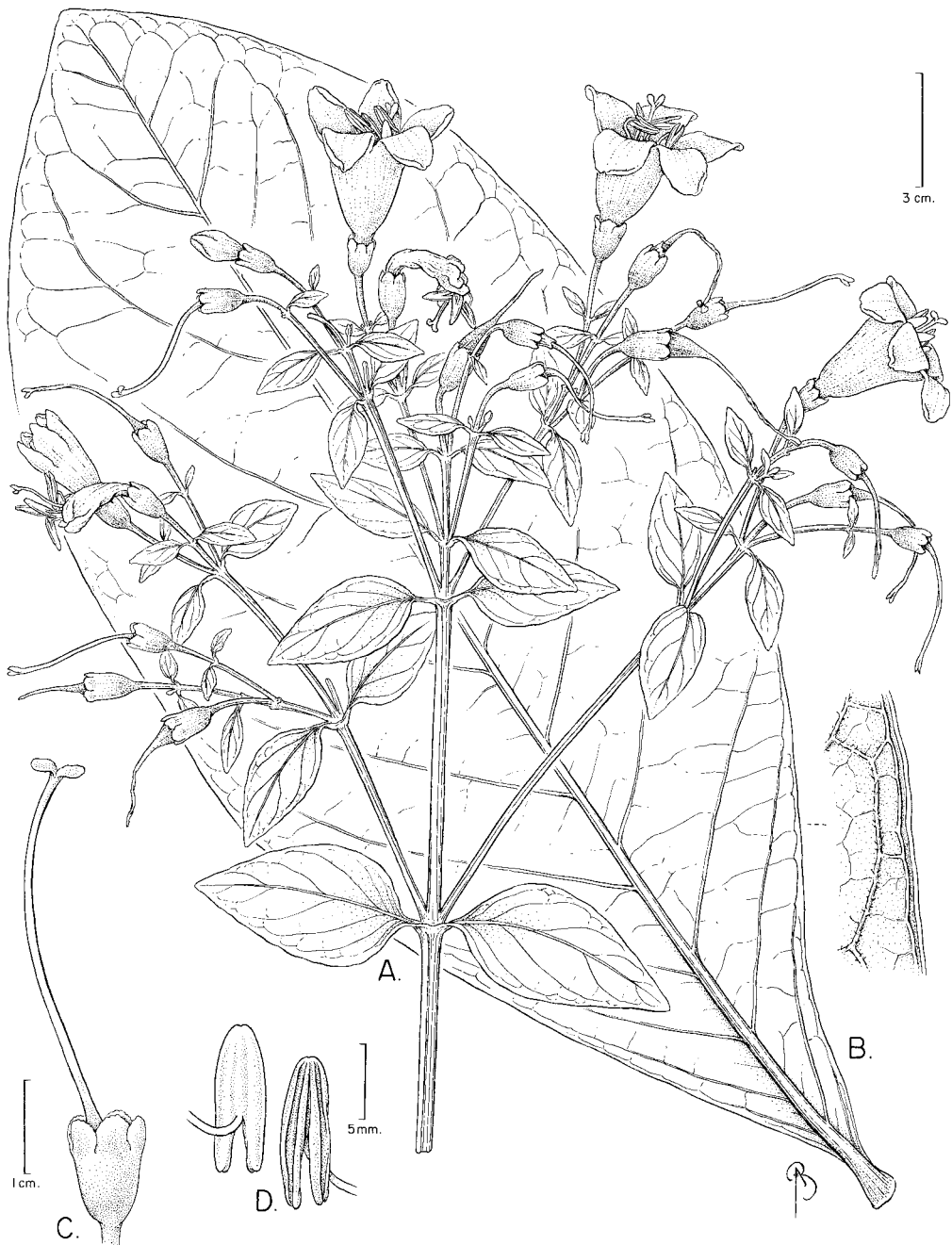


FIGURE 2. *Macroparpea nicotianifolia*. A, habit of flowering stem; B, leaf; C, flower post-anthesis; D, anthers. A–E drawn from Uribe Uribe 5577 (US).

above, hispid to spiculate below, especially along veins; base aequilateral to oblique, cuneate, rounded or short-attenuate, apex acute, obtuse to rounded. Petioles 1–10 mm long, robust with short open vagination one quarter to one-third the

length of the petiole; interpetiolar ridge 1–5 mm high. Inflorescence a much-branched open thyrses, 14–55 cm long; branches 7–50 cm long, 3–15 flowered per branch. Bracts ovate, elliptic, to lanceolate, sessile to short-petiolate, 10–135 ×

5–80 mm; base aequilateral to oblique, cuneate, rounded or short-attenuate, apex acute, obtuse to rounded; bract petioles 0–5 mm long. Flowers pedicellate, erect to nodding; pedicels 7–35 mm long; bracteoles lanceolate, linear, to ovate, 1–20 × 1–9 mm. Calyx narrowly campanulate, 10–13 × 6–8 mm, glabrous, spiculate or hispidulous at the base, green, ecarinate; calyx lobes ovate, elliptic to rotund, 4–5 × 3–5 mm, apex obtuse to rounded. Corolla funnel-shaped, 32–60 × 15–35 mm long, pale yellow, yellow, cream-yellow to pale greenish-yellow, smooth; corolla lobes ovate to elliptic, 6–17 × 6–15 mm, apex obtuse to rounded. Stamens 32–52 mm long; filaments 24–40 mm long, filiform, flattened; anthers linear to linear-elliptic, 8–12 × 2.5–3.5 mm. Pistil 45–57 mm long; ovary 7–10 × 3–4 mm; style 37–45 × 1.0–1.5 mm; stigma lobes spatulate to elliptic, 3–4 × 1–2 mm. Capsules long-ellipsoidal to oblong, 21–37 × 8–11 mm, smooth to very faintly ribbed, tan to light brown, erect to nodding; style remnant 3–10 mm long. Seeds angular to polyhedral (pyramids, tetrahedrons, rectangular prisms, to multi-sided prisms), 2–7-sided, not winged, 0.4–1.1 × 0.2–0.5 mm, straw-colored, rugose, boldly ribbed.

Macrocarpaea nicotianifolia is restricted to the Cordillera Oriental in Cundinamarca, just south of Bogotá (Fig. 1). The only other species of the genus known to occur in Cundinamarca is *M. glabra* from which it differs distinctly in its much larger leaves ([3.5–]9.0–39.0 × [2.0–]4.5–16.0 cm vs. 6–10 × 2–6), broad paniculate inflorescence, and calyx lobes that are ovate, elliptic to rotund with an obtuse to rounded apex (vs. triangular-ovate with sharply acute apex). A typewritten annotation label on *García-Barriga 122061* (COL), probably by Ewan, reads “A unique coll., either a local undescribed sp. of Cundinamarca -which is unexpected from the state of bot explor. there or a natural hybrid, the latter unlikely. Ask Garcia to watch for more of this pl.”

Etymology. Named for the resemblance of its leaves to those of the genus *Nicotiana* (Solanaceae).

Paratypes: COLOMBIA. Cundinamarca: San Miguel, S of Sibaté on road to Fusagasugá, between kilometer markers 35 and 36, shrub 3 m, flowers pale yellow, on steep shrubby slope of canyon, 2600 m, 10 May 1972, *A.S. Barclay et al. 3402* (COL, NA, US); Cordillera Oriental, vertiente occidental, entre San Miguel y Aguadita, 1980–2360 m, arbolito 3.5 m, flores

amarillas, 21 April 1946, *García-Barriga 12061* (COL, US); Carretera a Fusagasugá entre Agua Bonita y la Aguadita, 2300 m, arbolito de 5 m, flores grandes amarillas, 12 January 1968, *García-Barriga & Stout 18875* (COL); Salitre, Taguaté Valley, 6 km west of Gutiérrez, 45 km south of Bogotá, 2625 m, temperate forest, shrub 11 feet, 2 inch DBH, 23 July 1944, *M.L. Grant 9649* (NA, NY, US, WIS); Cordillera Oriental, north side of Quebrada San Roque, Río Blanco Valley, 10 km west of Gutiérrez, 45 km south of Bogotá, 2725 m, temperate forest, tree 12 feet high, corolla pale greenish-yellow, 27 July 1944, *M.L. Grant 9716* (NA); Municipio de Bojacá, veredada de San Antonio, “La Merced”, próximo a la carretera Mosquera-Tena, 2500–2700 m, frútex de 1 m, ramas verde limón, semilustroso, haz verde oscuro brillante, envés verde grisáceo opaco, cáliz verde medio, opaco, bosque nublado con predominio de *Quercus humboldtii*, 16 November 1964, *Lozano-C. & Torres-R. 201* (AAU); Cordillera Oriental, 40 km SW of Bogotá, 2600 m, corolla cream-yellow, 24 January 1949, *Mason 13770* (UC, US); Municipio de Sibaté, Vereda de San Fortunato, arbusto de 3 m, corolla amarilla, 8 March 1972, *Romero-Castañeda 11367* (GH, MO); Bojacá, 2800 m, in trockenem Buschwald, höher Strauch, Blüten gelbgrün, Blütenzipfel zurückgeschlagen, 16 March 1949, *Schneider 801* (US); Santandercito, Laguna de Catarnica, 2050 m, 6 September 1958, *Uribe Uribe 3193* (COL, US); abajo del Salto de Tequendama, monte de El Ermitaño, al SE de Santandercito, 2300 m, arbusto muy ramoso, ramas gruesas, flores de color amarillo verdoso, 14 September 1959, *Uribe Uribe 3367* (COL, MO, US); Cordillera Oriental, abajo del Salto de Tequendama, montes detrás del cerro de El Ermitaño, 2400 m, planta de cerca de 2 m, corolla de color Amarillo algo verdoso, 4 October 1964, *Uribe Uribe 4976* (NY); remnants of cloud forest near San Miguel, on road from Bogotá to Girardot, on south side of road, corolla pale cream-yellow, the lobes recurved, spindly, unbranched “shrubs” to 5 m, stem to 5 cm in diameter, leaves glossy, dark green above, falling as the flowers open, 8 October 1972, *Weaver 2634* (GH, MO); remnant forests in vicinity of San Miguel, 3000 m, occasional tall, unbranched woody plants, 5 m, flowers pale yellow, fleshy, 12 September 1968, *Weaver & Kennedy 1548* (CAS, F, MO, NY).

2. *Macrocarpaea schultesii* Weaver & J.R. Grant, *sp. nov.* TYPE: COLOMBIA. Norte de

Santander: Cordillera Oriental, Páramo de Fontibón, 2600–2750 m, small tree, 3 m, corolla green, 15 October 1941, *J. Cuatrecasas, R.E. Schultes & E. Smith 12271* (Holotype: GH; isotypes: BM, COL, F, MO, U, US). Fig. 3.

A Macrocarpaeae glabra cui affinis, sed foliis oblongis anguste-ellipticis petiolatis, et lobis calyce ellipticis vel rotundis, apicibus rotundatis differt.

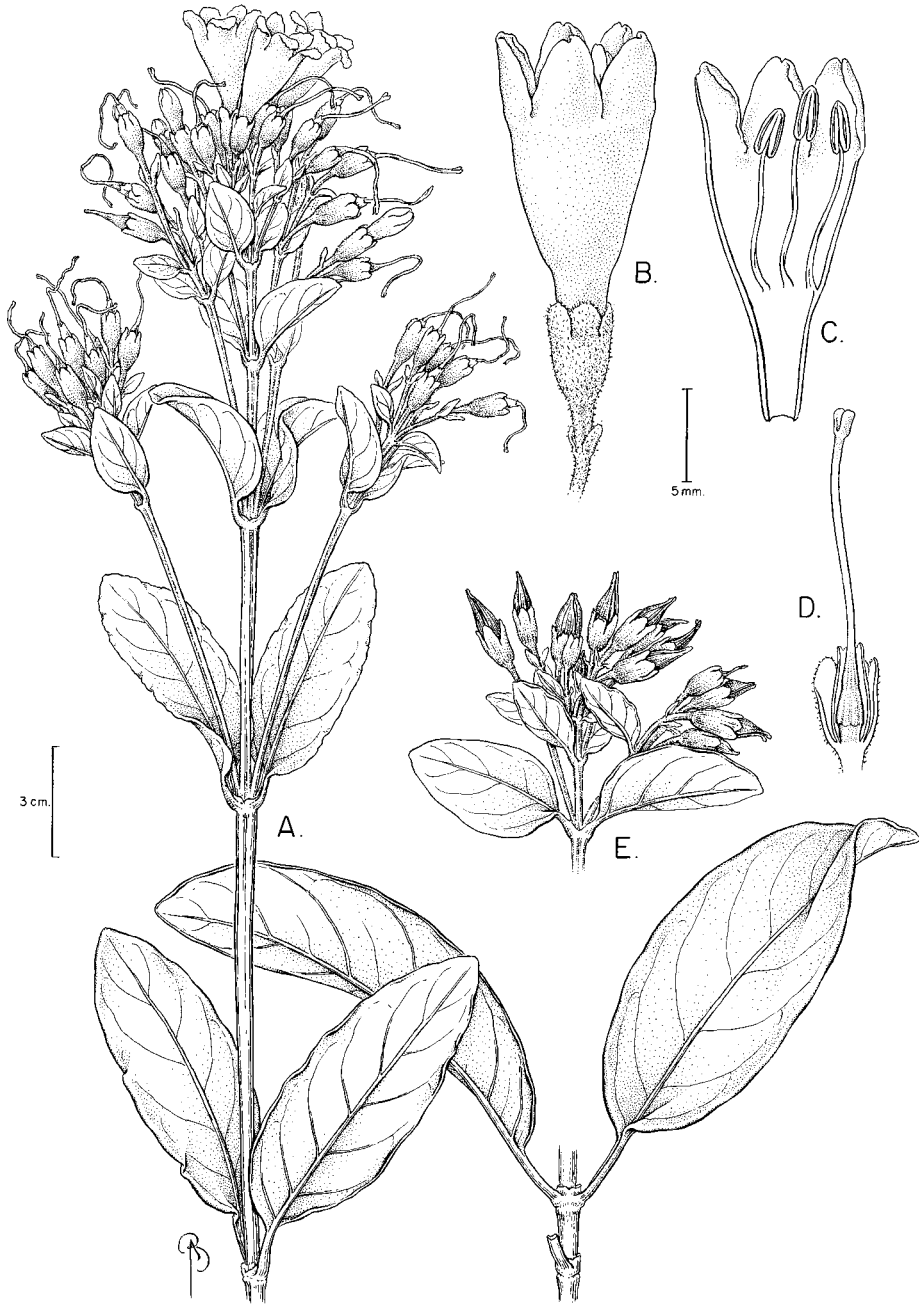


FIGURE 3. *Macrocarpaea schultesii*. A, habit of flowering stem; B, flower; C, internal cross-section of corolla; D, gynoecium; E, habit of fruiting stem. A–D drawn from *Cuatrecasas 12271* (US); E drawn from *Killip & Smith 20613* (NY).

Branched shrub or small tree, 1.5–3.0 m, hispid to spiculate with short simple hairs on stems, inflorescences, bracts and calyces. Stems terete to slightly quadrangular above, solid to hollow, 3–10 mm in diameter just below inflorescence. Leaves oblong to narrowly elliptic, petiolate, (8.5–)13.0–19.0 cm long; blades 6.0–17.0 × (2.7–)5.0–7.0 cm, not revolute, thick, leathery-coriaceous, dark above and below, with slightly raised veins below, glabrous to rarely spiculate below; base aequilateral to oblique, cuneate or rounded, apex obtuse to acute. Petioles 7–22 mm long, slender with very slight vagination; interpetiolar ridge 2–5 mm high. Inflorescence a much-branched open thyrse, 8–31 cm long; branches 4–22 cm long, 6–15 flowered per branch. Bracts oblong, elliptic, ovate to lanceolate, petiolate, 13–92 × 6–40 mm; base aequilateral to oblique, cuneate or rounded, apex obtuse to acute; bract petioles 2–13 mm long. Flowers pedicellate, erect to nodding; pedicels 9–22 mm long; bracteoles linear to lanceolate, 5–8 × 1–5 mm. Calyx narrowly campanulate, 9–14 × 5–7 cm, glabrous, spiculate to hispid, smooth to rugose, ecarinate; calyx lobes ovate, elliptic to rotund, 4–5 × 3–4 mm, apex rounded. Corolla funnel-shaped, 34–40 mm long, 15–25 mm wide at the apex of the tube, green to greenish-yellow, smooth; corolla lobes ovate to elliptic, 7–10 × 5–9 mm, apex obtuse to rounded. Stamens 27–31 mm long; filaments 22–25 mm long, filiform, flattened; anthers elliptic to oblong, 5–6 × 2.0–2.5 mm. Pistil 32–36 mm long; ovary 4–9 × 2–4 mm; style 24–26 × 0.75–1.0 mm; stigma lobes spatulate to elliptic, 2–4 × 1–2 mm. Capsules ovoid to ellipsoidal, 13–20 × 6–10 mm, smooth to faintly rugose, chestnut-tan, nodding; style remnant 4–20 mm long. Seeds angular to polyhedral (pyramids, tetrahedrons, rectangular prisms, to multi-sided prisms), 2–7-sided, not winged, 0.3–0.9 × 0.2–0.6 mm, faint orangish-tan, rugose to colliculate.

Macrocarpaea schultesii is restricted to Santander and Norte de Santander on the Cordillera Oriental in northern Colombia (Fig. 1). It has similarities to *M. glabra*, from further south on the Cordillera Oriental in Cundinamarca, but differs in its oblong to narrowly elliptic leaves with prominent petioles (vs. broadly ovate to elliptic, sessile to short-petiolate), and calyx lobes that are elliptic to rotund with a rounded apex (vs. triangular-ovate with sharply acute apex). Most specimens of *Macrocarpaea schultesii* have been previously referred to or annotated as *M.*

polyantha Gilg [= *M. glabra*] or *M. glabra* (L.f.) Gilg, e.g. in Ewan (1948).

Etymology. Named in honor of Richard Evans Schultes (1915–2001) of Harvard University, eminent Neotropical ethnobotanist and co-collector of the type.

Paratypes: COLOMBIA. Norte de Santander: Pamplona, Chopá, 1400 m, fleurs d'un jaune livide, April 1843, *Linden 1345* (BM, OXF, P, W); Road from Pamplona to Toledo, crossing the divide between Río La Teja (Maracaibo drainage) and Río Mesme (Orinoco drainage), 2500–2800 m, thickets along stream, shrub or small tree, corolla and filaments greenish yellow, anthers white, 28 February 1927, *Killip & Smith 19818* (GH [2 sheets], NY, US); Páramo de Hatico, en route from Toledo to Pamplona, 2900 m, erect shrub, 5–7 ft, branched above, fruit green, corolla wilted, 12 March 1927, *Killip & Smith 20613* (GH [2 sheets], NY, US). Santander: En montaña abierta, con arbustos en suelos arenosos y húmedos al este de Bucaramanga, 2400 m, árbol de 2 m con frutos verdes, 18 December 1948, *Molina & Barkley 18-S361* (NO, US).

Costa Rica

3. *Macrocarpaea auriculata* Weaver & J.R. Grant, *sp. nov.* TYPE: COSTA RICA. Heredia: forests of Rio Vueltas, 2100 m, tree 6–8 m tall, profusely branching, flowers yellow, waxy, 23 May 1969, *L.D. Gomez 2265* (Holotype: GH; isotypes: F [2 sheets], MO, NY). Fig. 4.

Prima facie paulla differentia species novae Macrocarpaeae macrophylla vel M. valerii, tamen investigationis singularis indicant species plerumque Monteverdensis est, cum foliis obovatis, basi attenuatis auriculatis, calycibus reniformibus brevioribus, et corollis grandioribus differt.

Branched shrub or tree, 1.7–8.0 m, glabrous to spiculate on stems, petioles, leaves (especially along veins on the lower surface), inflorescences, pedicels, and calyces. Stems terete to quadrangular, solid to hollow, 6–14 mm in diameter just below inflorescence. Leaves obovate varying to elliptic, ovate to oblanceolate, sessile to short-petiolate, (7–)18–34 cm long; blades (7–)18–34 × (3.5–)8.0–14.0 cm, not revolute, papery thin, to thin coriaceous, dark above and conspicuously lighter below, with slightly impressed veins above, and slightly raised veins below; base aequilateral to oblique, broadly attenuate to a slightly auricu-



FIGURE 4. *Macrocarpaea auriculata*. A, habit of flowering stem; B, interpetiolar ridge; C, internal cross-section of corolla; D, flower in bud; E, fruiting stem. A, C–D drawn from Wilbur & Almeda 16828 (DUKE); B drawn from Gómez 2265 (F).

late, apex acuminate. Petioles 0–12 mm long, usually absent, but rarely a short robust petiole with strong open vagination present; interpetiolar ridge 3–5 mm high. Inflorescence a much-branched open thyrse, 24–42 cm long; branches 9–38 cm long, 5–25 flowered per branch. Bracts ovate, elliptic, lanceolate to oblanceolate, sessile to petiolate, 13–180 × 10–65 mm; base oblique or aequilateral, attenuate to a slightly auriculate, apex acuminate; bract petioles 0–3 mm long. Flowers pedicellate, erect to spreading, pedicels 4–22 mm long; bracteoles ovate, elliptic, lanceolate to oblanceolate, 6–19 × 3–10 mm. Calyx campanulate, 7–12 × 5–8 mm, glabrous, spiculate or hispidulous, green, ecarinate; calyx lobes ovate, elliptic to reniform, 3–5 × 3–7 mm, the base slightly auriculate, apex rounded to obtuse. Corolla funnel-shaped, 30–43 mm long, 17–21 mm wide at the apex of the tube, pale yellow, yellow-cream, cream, white, to pale greenish-yellow, smooth; corolla lobes ovate to elliptic, 7–12 × 5–8 mm, apex obtuse to rounded. Stamens 21–27 long; filaments 17–21 mm long, filiform, flattened; anthers linear to linear-elliptic, 4–6 × 1.5–3.0 mm. Pistil 31–36 mm long; ovary 5–7 × 2–4 mm; style 24–26 × 0.75–1.0 mm; stigma lobes spatulate to oblong 2–3 × 1–3 mm. Capsules ellipsoidal

to ovoid, 12–18 × 6–11 mm, smooth to ribbed, straw-colored, erect, not nodding; style remnant 3–9 mm long. Seeds angular to polyhedral (pyramids, tetrahedrons, rectangular prisms, to multi-sided prisms), 2–7-sided, not winged, 0.2–0.6 × 0.2–0.4 mm, dark orangish-tan, reticulate to foveate.

Macrocarpaea auriculata is a local endemic best represented from collections from the Monteverde forest reserve in Costa Rica (Fig. 1). *Macrocarpaea valerii* is a common and frequently collected species also endemic to Costa Rica (Alajuela, Cartago, Heredia, Puntarenas, and San José). *Macrocarpaea macrophylla* is restricted to the Cordillera Occidental of Colombia (Antioquia, Cauca, Chocó, Nariño, Risaralda, Valle), and the Darién of Panama. *Macrocarpaea auriculata*, *M. macrophylla*, and *M. valerii* are sometimes difficult to distinguish from another morphologically. Nevertheless, recent molecular data (Grant & Struwe, unpublished) shows that the three species are not only distinct from another, but not even sister species. Morphological parallelism or convergent evolution may explain how these species developed similar morphological characters. The differences are subtle, but three well-defined species may be characterized and best differentiated in the following key:

- 2a. Leaves obovate varying to elliptic, ovate to lanceolate, blades (7–)18–34 × (3.5–)8.0–14.0 cm, sessile to rarely short-petiolate, leaf bases long-attenuate, often auriculate; calyx short and narrow (7–12 × 5–8 mm), lobes reniform, ovate to elliptic, the base slightly auriculate; corolla long and narrow (30–43 × 17–21 mm). . . . *M. auriculata*
- 2b. Leaves broadly elliptic to broadly obovate, typically long-petiolate, leaf bases oblique to rounded or short-attenuate; calyx long and broad (calyx 9–14 × 7–12 mm), lobes ovate, elliptic to oblong, the base never auriculate; corolla short and broad (25–36 × 18–25 mm). . . . 2
- 2a. Calyx glabrous, tubular-campanulate, the sides typically parallel to another, lobes short, erect, not spreading; pedicels thin and slender; fruits generally smooth. . . . *M. valerii*
- 2b. Calyx spiculate, broadly campanulate, the sides angled, lobes long, spreading; pedicels thick and robust; fruits generally rugose-spiculate *M. macrophylla*

Macrocarpaea macrophylla is based on herbarium material from the Páramo de Almaguer, Cauca, Colombia (Humboldt, Bonpland & Kunth 1819). Since then, it has been variously interpreted, typically as a wide-ranging species (from Colombia and Panama to Costa Rica). Standley (1938) described *M. valerii* from Costa Rica, but did not compare it to any other species in the genus. Weaver (1972) recognized three species to occur in Costa Rica (*M. acuminata*, *M. subcaudata*, and *M. valerii*), and stated that *M. valerii* and *M. macrophylla* “...are virtually identical, except that the calyx of *M. valerii* is glabrous, while that of *M. macrophylla* is spiculate”. Sytsma

(1987) recognized three species to occur in Panama, (*M. browallioides*, *M. subcaudata*, and *M. macrophylla*), reducing *M. valerii* to synonymy under *M. macrophylla*. Our studies in preparation for the monograph have revealed surprising variability among these species. Not only has the molecular data consistently supported the recognition of both *M. macrophylla* and *M. valerii* as separate and distinct species, but *M. auriculata* is also well-supported. Six taxa of *Macrocarpaea* occur in Central America: *M. acuminata* (CR), *M. auriculata* (CR), *M. browallioides* (CR, PAN), *M. macrophylla* (PAN), *M. subcaudata* (CR, PAN), and *M. valerii* (CR).

Etymology. This species is named for its slightly auriculate leaf bases.

Paratypes: Costa Rica. Alajuela: Fila Volcán Viejo, San Carlos, 1800–2000 m, plantas de 1.7 m alt, flores amarillo pálido, 11–14 February 1986, *Gomez-Laurito 11059* (F). Heredia: Wet wooded slopes, vegetation low and shrubby about 12 km NNE of San Rafael and about 2 km east of Cerro Chompipe, 2074–2135 m, infrequent 2 m shrub, corolla pale greenish-yellow, 22 May 1972, *Wilbur & Almeda 16828* (DUKE, F, GH). Puntarenas: Reserva Biológica Monteverde, Refugio Veracruz, Finca Los Salazar, Río Veracruz, Vertiente Pacífica, 10° 15' N, 84° 48' W, 1500 m, arbusto en claro del bosque, flor crema, cáliz verde, 9 January 1990, *Bello 1715* (CR, MO); Monteverde, reserve, divide, 1600 m, small tree, flowers white, 26 May 1979, *Haber 336* (GH, MO); Reserva Biológica Monteverde, sendero brillante, 1500 m, arbusto en bosque enano, 3 m de alto, flores una campana color amarillo-crema, 25 August 1985, *Haber & Bello 2455* (F, MO); Guacimal, Río Veracruz, Zona Monteverde, Finca Hermanos Morales, Vertiente Pacífica, 10° 15' N, 84° 47' W, 1500 m, hierba en claro del bosque, frutos secos, 7 August 1987, *Haber & Bello 7389* (MO); Monteverde Cloud Forest Reserve, road to TV towers, Pacific slope, lower montane wet forest and rain forest, 10° 20' N, 84° 50' W, 1600 m, treelet in second growth, flower yellow, 23 April 1986, *Haber ex Bello & Lierheimer 4539* (MO).

Ecuador

4. *Macrocarpaea subsessilis* Weaver & J.R. Grant, *sp. nov.* TYPE: ECUADOR. Loja: Between Tambo Cachiyacu, La Entrada, and Nudo de Sabanilla, 2500–3500 m, shrub 4 feet tall, leaves erect, coriaceous, pale green above, 7 October 1943, *Steyermark 54436* (Holotype: US; isotypes: F, NY [2 sheets]). Fig. 5–6A–C.

Species novae Macrocarpaeae arborescens affinis, sed fruticis parvis e basi ramosis, foliis in sicco viridi-flavus, inflorescentiis subsessilibus parvis, floribus breve-pedicellatis erectis nec cernuis nec nutans, bracteolis spatulatis, et corollis brevioribus differt.

Shrub much branching from the base, the middle or above, 0.5–1.5(–3.0) m, glabrous throughout. Trunk to 1.5 cm in diameter, wood always solid. Stems terete to slightly quadrangular, solid, 2–5 mm in diameter just below inflorescence. Leaves obovate varying to ellip-

tic, petiolate, 2.5–9.0 cm long; blades 2.0–8.5 × (1.5–)2.5–5.0 cm, not revolute, thick, leathery-coriaceous, dark green above, light green below, drying yellowish green in herbarium material, midrib yellow to orange, lateral veins scarcely visible either above or below, glabrous; base aequilateral to oblique, rounded, apex obtuse to rounded, to rarely slightly mucronulate. Petioles 3–9 mm long, robust with short open vagination one quarter to one-third the length of the petiole; interpetiolar ridge 1–3 mm high. Inflorescence a few-branched nearly sessile thyrses, 3–11 cm long; branches 1–7 cm long, 2–8 flowered per branch. Bracts obovate, elliptic to rotund, petiolate, 12–30 × 6–19 mm; base aequilateral to oblique, rounded, apex obtuse to rounded, to rarely slightly mucronulate; bract petioles 2–4 mm long. Flowers pedicellate, erect to slightly spreading, but never nodding; pedicels 1–6 mm long; bracteoles spatulate, 10–22 × 4–11 mm. Calyx narrowly campanulate, 8–13 × 4–7 mm, glabrous, smooth, green, ecarinate; calyx lobes elliptic, 3–6 × 3–4 mm, apex rounded. Corolla funnel-shaped, 21–35 mm long, 11–25 mm wide at the apex of the tube, pale yellow, yellowish-green, greenish-yellow, cream to white, smooth; corolla lobes ovate to elliptic, 7–12 × 4–10 mm, apex obtuse, rounded to retuse. Stamens 9–24 mm long; filaments 11–21 mm long, filiform, flattened; anthers linear to linear-elliptic, 3–4 × 1.5–2.0 mm. Pistil 13–23 mm long; ovary 4–6 × 1–3 mm; style 14–16 × 0.75–1.0 mm; stigma lobes spatulate to elliptic 2–3 × 1–2 mm. Capsules ovoid to ellipsoidal, 11–15 × 6–10 mm, smooth, pusticulate to rugose, straw-colored, erect to nodding; style remnant 3–9 mm long. Seeds angular to polyhedral to flattened (pyramids, tetrahedrons, rectangular prisms, to multi-sided prisms), 2–5-sided, not winged, 0.3–1.3 × 0.3–0.6 mm, dark orangish-tan, rugose-reticulate to wrinkled.

Macrocarpaea subsessilis is a narrow endemic of Loja, Ecuador (Fig. 1). Its habitat at its most frequently collected site, the hillside road from Yangana to Cerro Toledo has been seriously degraded by recent successive years of burning. However, young shoots do appear to sprout from the burned base of plants, and mature to flower and fruit (J.R. Grant, pers. obs). It belongs to a group of species with thick coriaceous ovate to obovate leaves including at least *M. arborescens* Gilg, *M. loranthoides* (Griseb.) Maas, and *M. stenophylla* Gilg. Pringle (1995) referred herbarium specimens of

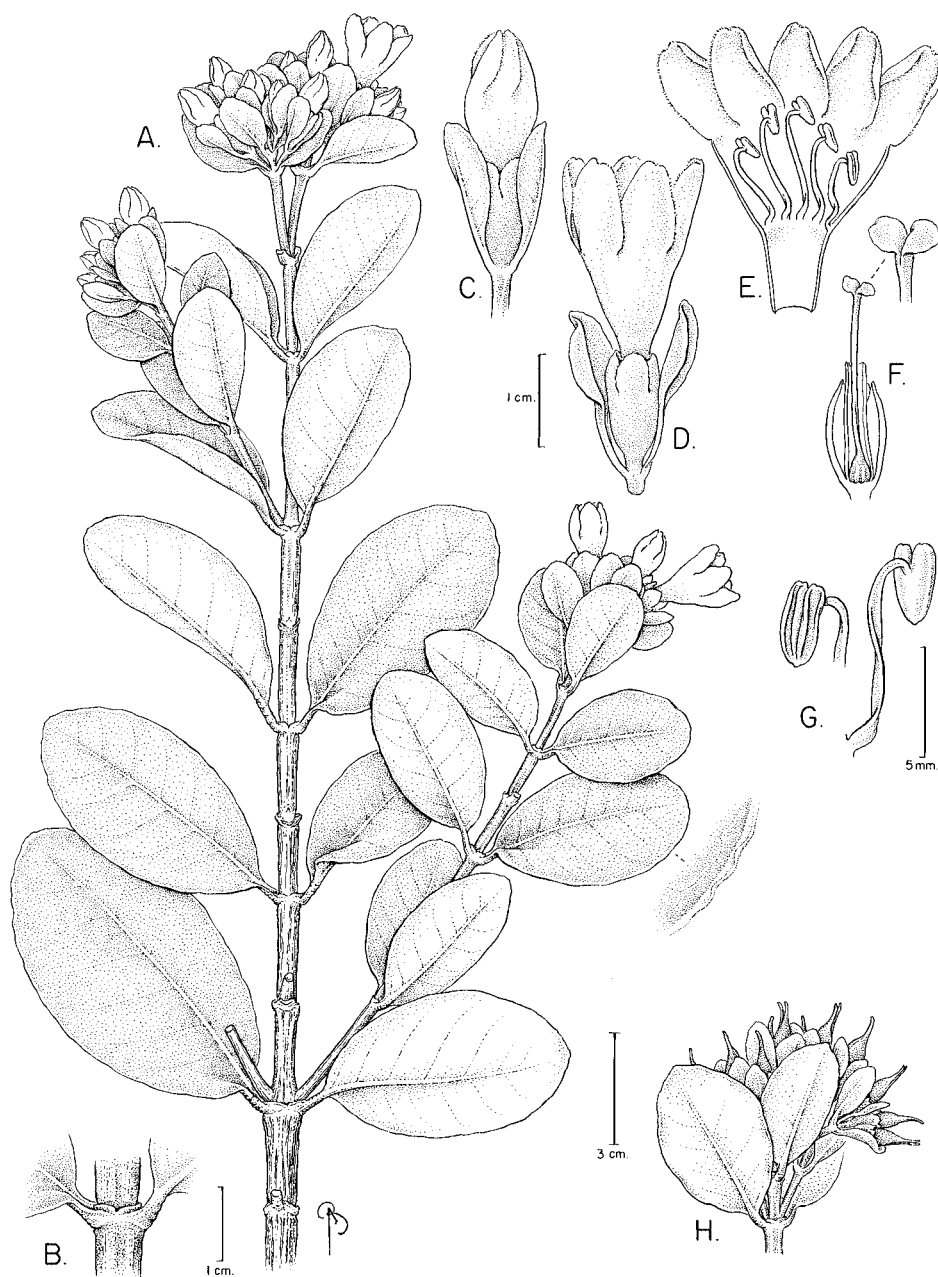


FIGURE 5. *Macroparpea subsessilis*. A, habit of flowering stem; B, interpetiolar ridge; C, flower in bud with distinctive bracteoles; D, flower; E, internal cross-section of corolla; F, gynoecium; G, anthers, H, habit of fruiting stem. A–C drawn from *Luteyn & Clements 7978* (NY); D–G drawn from *Balslev 1288* (NY); H drawn from *Steiermark 54436* (NY).

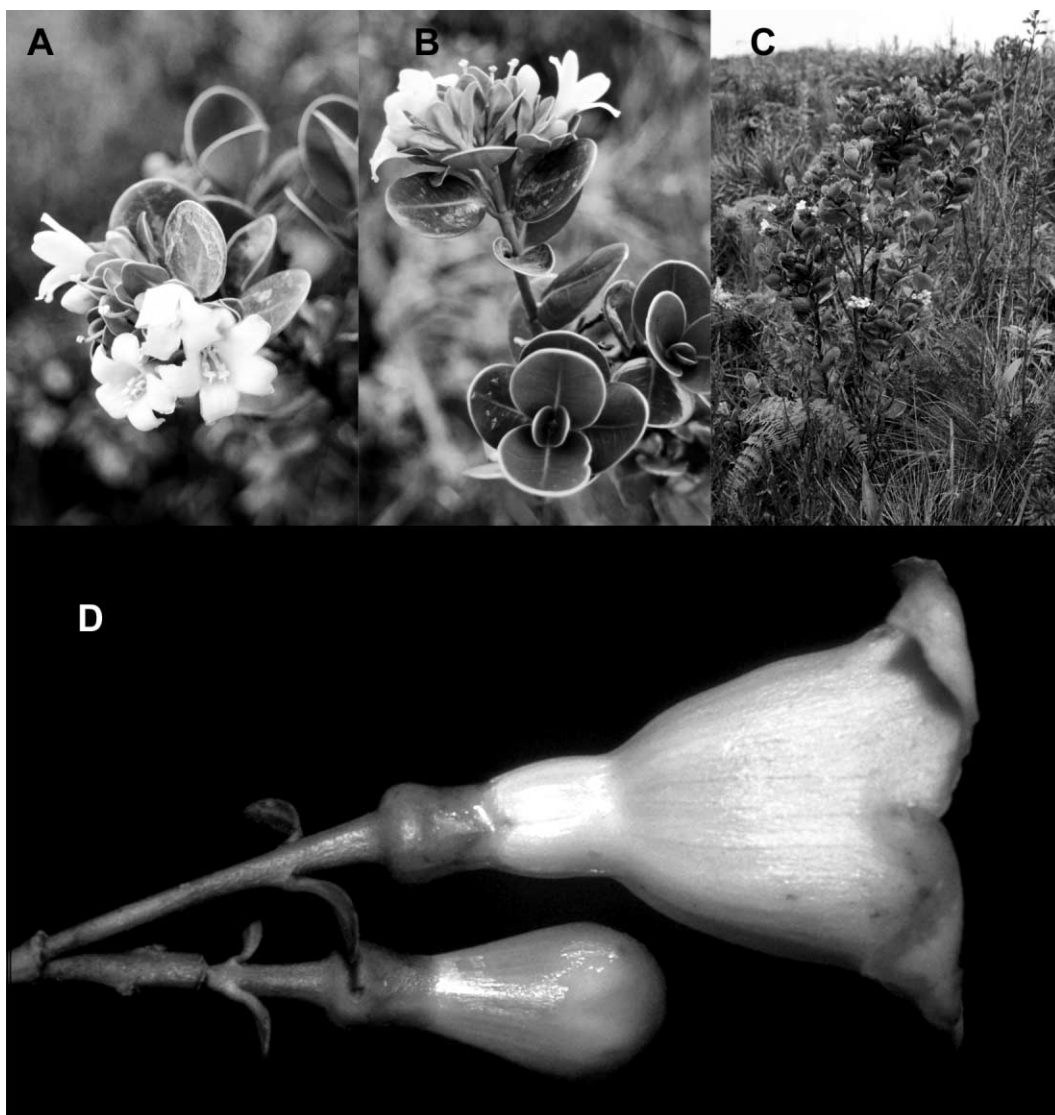


FIGURE 6. *Macrocarpaea* species. A, *Macrocarpaea subsessilis*. Open corollas. Photo by Jason R. Grant, Loja, Ecuador, February 2001, Yangana to Cerro Toledo, 2 November 2002, *J.R. Grant et al.* 02-4267; B, *Macrocarpaea subsessilis*. Short, subsessile inflorescence. Photo by Jason R. Grant, Loja, Ecuador, February 2001, Yangana to Cerro Toledo, 2 November 2002, *J.R. Grant et al.* 02-4267; C, *Macrocarpaea subsessilis*. Habit as a small shrub. Photo by Jason R. Grant, Loja, Ecuador, February 2001, Yangana to Cerro Toledo, 2 November 2002, *J.R. Grant et al.* 02-4267; D, *Macrocarpaea papillosa*. Lateral view of corolla. Photo by Paul Maas, Mérida, Venezuela, 14 November 1980, *Maas & Tillett* 5302.

M. subsessilis to *M. ovalis* Ruiz & Pavon, a name recently excluded from use (Grant 2003).

Macrocarpaea subsessilis can be easily identified by its short, subsessile inflorescence, short-pedicellate flowers, large spatulate bracteoles, and leaves that become light-greenish yellow with yellow to orange midribs when dried as herbarium specimens. It is similar to *M. arborescens*, also restricted to southern

Ecuador, yet differs in its short petiolate leaves, flowers that remain erect to horizontal when flowering (vs. pendent, see photo of *M. arborescens* in Grant 2003: 429), and shorter corollas. It is a small 0.5–1.5(–3.0) m tall shrub that branches from the base, middle or above, while *M. arborescens* is a single-stemmed shrub to tree to 3–5 m tall that profusely branches at or above the middle (photo in Grant 2003: 429).

Etymology. This species is named for its nearly sessile inflorescences that often do not extend much further beyond the pair(s) of leaves that subtend them.

Paratypes: ECUADOR. Loja: Yangana-Zumba road, km 15-20, N slopes of Cordillera de Sabanilla, patches of grassland in cloud forest, 2550 m, shrub to 1 m high, loosely branching, 31 December 1980, *Balslev 1288* (AAU, NY); Río Catamayo Drainage, ridge between Quebrada Amarilla and Quebrada Agua Corra, eastern slope of Cordillera de Santa Rosa, Hacienda Guaycopamba, 21 km S of Vilcabamba, open brushy rocky ridge, 04° 27' S, 79° 13' W, low shrub 0.7 m, leaves stiff, flowers pale yellow-green, 16 February 1945, *Fosberg & Giler 23097* (NO, US); de la carretera Yangana-Valladolid, antes del refugio de Quebrada Honda, 2720 m, 8 October 1995, *Garmendia & Paredes 678* (QCNE); de la carretera Yangana-Valladolid, antes del refugio de Quebrada Honda, 2720 m, 8 October 1995, *Garmendia & Paredes 684* (QCA, QCNE); Nudo de Sabanilla, 21.5 km S of Yangana, 04° 25' S, 079° 09' W, 10 February 2001, *J.R. Grant & Struwe 3982* (LOJA, NEU, QCNE); Km 8.9 on road from Yangana to Cerro Toledo, 04° 23' S, 079° 09' W, 14 February 2001, *J.R. Grant & Struwe 4020* (G, LOJA, MO, NEU, NY, QCA, QCNE, S, SBG, US [2 sheets]); Km 9.5 on road from Yangana to Cerro Toledo, 04° 22' S, 079° 09' W, 14 February 2001, *J.R. Grant & Struwe 4025* (LOJA, NEU, NY QCNE); Km 8.9 on road from Yangana to Cerro Toledo, 04° 23' S, 079° 09' W, 2 November 2002, *J.R. Grant et al. 02-4267* (MO, NEU, NY, US); Cerro Bangala, ca. 10 km east of Yangana, open slopes and remnants of ceja forest, 2500-2700 m, shrub 1-3 m, corolla pale yellow, 18 October 1988, *Harling 25318* (GB); Nudo de Sabanilla, western slope on road to Yangana, disturbed forest, 2600 m, shrub ca. 0.75 m, perianth greenish-yellow, 6 February 1985, *Harling & Andersson 21731* (GB, QCA); Nudo de Sabanilla, western slope ca. 10 km above Yangana on road to Valladolid, rain forest with open bog-like areas, 2500 m, shrub 0.5-1.0 m tall, corolla pale yellow, 3 April 1985, *Harling & Andersson 23593* (GB, QCA); Cerro Toledo, road to "La Torre", ca. 7 km southeast of Yangana, forest and old clearings, 2500 m, shrub ca. 0.5 m tall, corolla greenish-yellow, 7 April 1985, *Harling & Andersson 23848* (GB, QCA); Yangana-Nudo de Sabanilla, dry and low mountain forest, 2500-2600 m, shrub 1.5 m

tall, corolla pale to yellowish green, 16 October 1988, *Harling & E. Madsen 25261* (AAU, GB); Yangana-Nudo de Sabanilla, dense shrub forest and open scrub, 2200-2400 m, shrub 1.5 m, corolla sulphur yellow, 13 February 1993, *Harling & Ståhl 26373* (GB, QCA, S); Yangana-Cerro Toledo, burned area, pastures and shrubby vegetation, 04° 23' S, 79° 08' W, 2750-2850 m, shrub 1 m, corolla wax white, 28 December 1988, *Jørgensen & J. Madsen 65728* (AAU, QCA, QCNE); Yangana-Cerro Toledo, burned area with secondary vegetation, 04° 21' S, 79° 07' W, 2510 m, shrub to 0.8 m, corolla light yellow, 14 November 1990, *Jørgensen et al. 92722* (AAU, QCA, QCNE); Road S out of Loja ca. 14 km S of Yangana, lower slopes of Nudo de Sabanilla, open marshy field along edge of forest, 2460 m, shrub 0.5 m, corolla pale yellowish-green, infrequent, 16 January 1981, *Luteyn & Clements 7978* (NY); Cordillera de Sabanilla, ca. 15 km S of Yangana, wet montane forest, 2480 m, shrub to 1.5 m or more, calyx green, corolla cream, 31 December 1980, *Madison & Besse 7497* (SEL); Beside the road from Yangana to 'Cerro Toledo', 2500 m, January 1998, *Matt 12* (ER); Beside the road from Yangana to 'Cerro Toledo', 2500 m, January 1998, *Matt 13* (ER); Límite del P.N. Podocarpus, carretera Yangana-Cerro Toledo, 2450 m, January 1995, *Palacios 13016* (QCNE); Between Nudo de Sabanilla and Río Cachiayacu at Tambo Cachiayacu, in dry soto-bosque, shrub 2-3 feet tall, leaves coriaceous, corolla pale creamy as are the filaments, 3000-3500 m, 17 October 1943, *Steyermark 54758* (F); western slopes of Cordillera de Condor and northwest slopes of Nudo de Sabanilla, around Tambo Cachiayacu, along Río Cachiayacu, about 2 leagues southeast of Yangana, 2000-3000 m, shrub 3 feet tall, corolla pale creamy yellow with larger corolla and larger leaves than described species, 19 October 1943, *Steyermark 54805* (F).

Peru

Four new species are described here from Peru, *Macroparapea gracilis*, *M. maguirei*, *M. wurdackii*, and *M. zophoflora*. Peru is the center of species diversity for several difficult species groups, and has the largest number of species in the genus. Two of the new species described below, both from Amazonas Province represent the currently known floral morphological extremes of the genus.

Macrocarpaea wurdackii has by far the smallest flowers in the genus (corollas 13–21 × 5–9 mm), and *M. zophoflora* the largest (corollas 65–72 × 30–55 mm). *Macrocarpaea zophoflora* is also notable in being the first member of the Gentianaceae to have stipules. These two species geographically fall within the Amotape-Huancabamba Zone of northern Peru and southern Ecuador (Weigend 2002). This is an area of high endemism and plants in this area often show a trend towards the development of novel morphological traits.

5. *Macrocarpaea gracilis* Weaver & J.R. Grant, *sp. nov.* TYPE: PERU. Locality unknown (probably Cajamarca, see below), 1909–1914, *Weberbauer 6116* (Holotype: F [2 sheets, #627868 flowering, # 627867 fruiting]). Fig. 7.

A Macrocarpaeae loranthoides cui affinis, sed foliis tenui-coriaceis, et corollis angustecampanulatis vel hypocrateriformibus differt.

Shrub glabrous throughout. Stems terete, solid to hollow, 2–3 mm in diameter just below inflorescence. Leaves ovate to ovate-elliptic, petiolate to nearly sessile in upper leaves, (2–)6–11 cm long; blades (2–)5–9.5 × (0.8–)2–5 cm, slightly revolute, thin coriaceous, dark above and conspicuously lighter below, with slightly impressed veins above, and slightly raised veins below, glabrous above and below; base aequilateral to slightly oblique, short-attenuate, apex acute. Petioles 1–12 mm long, slender with strong open vagination nearly equaling the length of the petiole; interpetiolar ridge 1–2 mm high. Inflorescence a few-branched open thyrse, 5–6 cm long; branches 2–3 cm long, 7–16 flowered per branch. Bracts ovate to lanceolate, sessile, 10–15 × 5–7 mm; base aequilateral, short-attenuate, apex acute to acuminate. Flowers pedicellate, erect to spreading; pedicels 12–20 mm long; bracteoles narrowly ovate to lanceolate, 9–11 × 3–4 mm. Calyx narrowly campanulate, 6–8 × 4–5 mm, glabrous, smooth, ecarinate; calyx lobes rounded to obtuse, 1–2 × 1–2 mm. Corolla narrowly funnel-shaped, 29–35 mm long, 8–10 mm wide at the apex of the tube, smooth; corolla lobes ovate, 6–9 × 3.5–5.0 mm, apex obtuse to rounded. Stamens 20–25 mm long; filaments 17–22 mm long, filiform, terete; anthers linear to linear-elliptic, 3.0–3.5 × 1.5–2.0 mm. Pistil 25–28 mm long; ovary 3–4 × 2.5–3.0 mm; style 22–24 × 0.5

mm; stigma lobes spathulate, 2–3 × 0.5–1.0 mm. Capsules ellipsoidal to slightly obovoid, 13–16 × 5–6 mm, evenly pustulate, light brown, erect to nodding; style remnant 4–9 mm long. Seeds unknown.

Macrocarpaea gracilis is likely an endemic of Cajamarca in northern Peru (Fig. 1). A handwritten note (probably by J. Ewan) on F sheet 627868 reads “Singular collection, tentatively *Macrocarpaea revoluta* (R. & P.) Gilg, [Weberbauer #] 6120 collected E of Huancabamba, Cajamarca, Peru; 6116 may be from same region”. Without any further information, and no reason to discredit the note, we may take the information at face value.

The corolla of *Macrocarpaea gracilis* is one of its most unique features. It is narrowly funnel-shaped, a rare condition in the genus where most species are broadly funnel-shaped. However, the flowers on the single known collection are rather young, so they may actually slightly change in shape once fully mature. The only other species known with a similar morphology is *M. loranthoides* of Amazonas, Peru. Nevertheless the two species are clearly differentiated, where *M. gracilis* can be differentiated from *M. loranthoides* in its thin coriaceous leaves (vs. thick leathery coriaceous), and narrowly funnel-shaped corolla (vs. a salver-shaped corolla where the corolla tube is long with parallel sides, ending in flared lobes).

Etymology. The name derives from the Latin *gracilis*, for its slender, gracile pedicels.

6. *Macrocarpaea maguirei* Weaver & J.R. Grant, *sp. nov.* TYPE: PERU. Cuzco: Paucartambo, in valley of Paucartambo along road between Cuzco and Pilcopata, 3150 m, single-stemmed tree to 10 m high, flowers yellow-green, 27 September 1968, *Maguire & Maguire 61569* (Holotype: NY; isotype GH). Fig. 8.

Species novae cui Macrocarpaeae cochabambensis affinis, sed plantis cuzcoensis, foliis et bracteis oblongis vel ellipticis, et lobis calyce ovatis ellipticis, apicibus rotundis differt.

Tree to 2–10 m (*Maguire & Maguire 61569*), spiculate, hispid to velutinous with short simple hairs on stems, petioles, leaves, inflorescences, bracts and calyces. Stems terete to quadrangular, solid to hollow 12–15 mm in diameter just below inflorescence. Leaves oblong to elliptic, rarely narrowly ovate, petiolate, (21–)27–34 cm long; blades (18–)24–28 × (7–)12–14 cm,

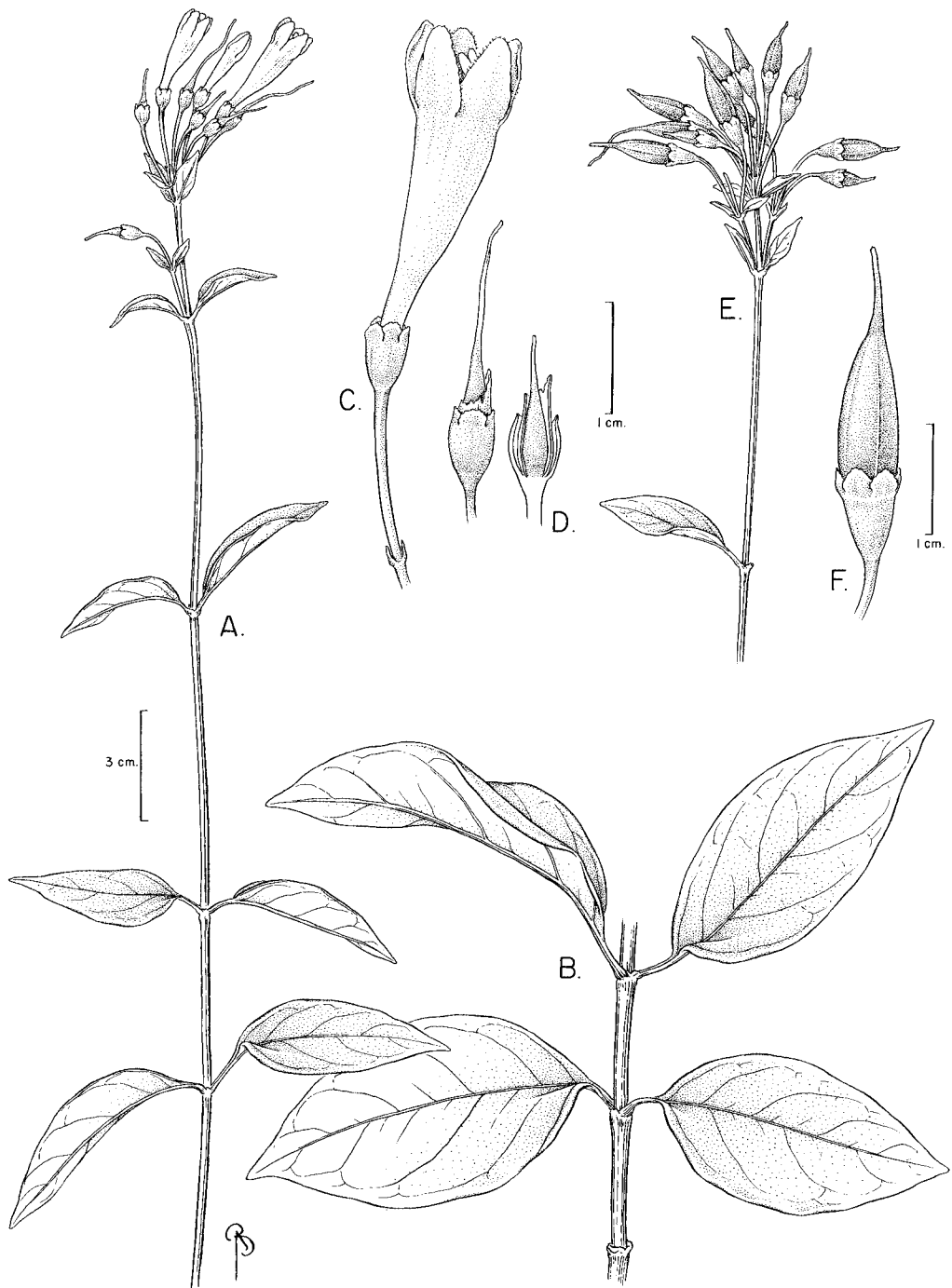


FIGURE 7. *Macrocarpaea gracilis*. A, habit of flowering stem; B, leaves; C, flower; D, gynoecium; E, habit of fruiting stem; F, fruit. A–F drawn from Weberbauer 6116 (F).

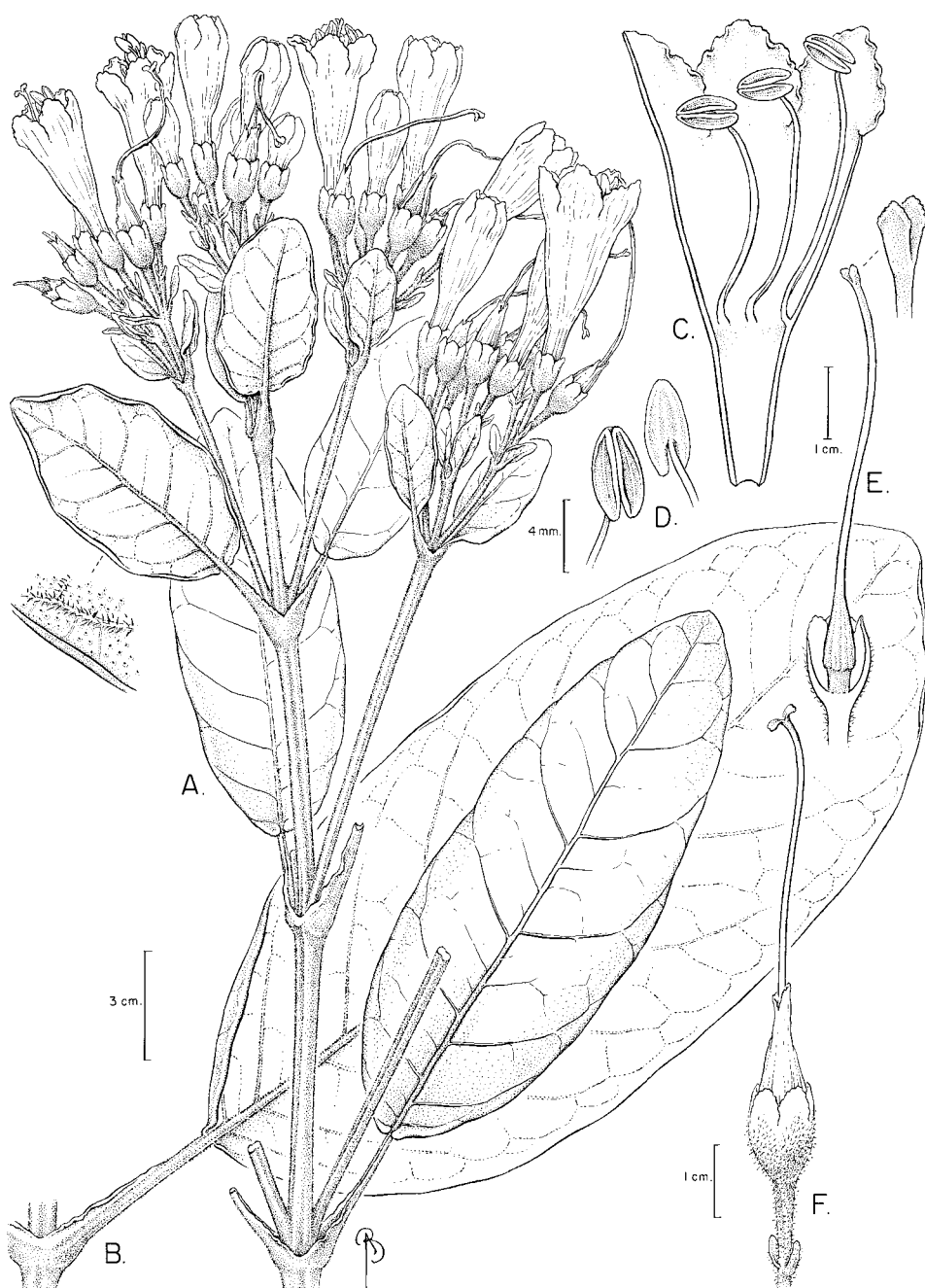


FIGURE 8. *Macroparpaea maguirei*. A, habit of flowering stem; B, leaf; C, internal cross-section of flower; D, anthers; E, gynoecium; F, flower post-anthesis. A, C–F drawn from *Maguire 61569* (NY); B drawn from *Weigend 2000/242* (NY).

not revolute, papery thin, to thin coriaceous, dark above and conspicuously lighter below, with slightly impressed veins above, and slightly raised veins below; base aequilateral to oblique, rounded or cuneate to clasping the stem and slightly cordate, apex rounded to obtuse. Petioles 30–55 mm long, robust with strong open vagination nearly equaling the length of the petiole; interpetiolar ridge 4–10 mm high. Inflorescence a much-branched open thyrse, 28–32 cm long; branches 6–28 cm long, 3–15 flowered per branch. Bracts oblong, elliptic, obovate, to oblanceolate, sessile to petiolate, 17–140 × 6–50 mm; base aequilateral to oblique, rounded or cuneate to clasping the stem and slightly cordate, apex rounded to obtuse; bract petioles 0–17 mm long. Flowers pedicellate, erect to slightly spreading, but never nodding; pedicels 4–25 mm long; bracteoles linear, oblong, lanceolate to oblanceolate, 2–14 × 1–4 mm. Calyx campanulate, 9–14 × 7–11 mm, velutinous, green, ecarinate; calyx lobes ovate, elliptic to rotund, 4–6 × 4–7 mm, apex rounded. Corolla funnel-shaped, (40–)55–62 mm long, 20–35 mm wide at the apex of the tube, yellow to yellow-green (*Maguire & Maguire 61569*), smooth; corolla lobes ovate to elliptic, 8–13 × 9–15 mm, apex obtuse to rounded. Stamens 38–45 mm long; filaments 31–38 mm long, filiform, flattened; anthers elliptic to oblong, 7–9 × 2.5–4.0 mm. Pistil 54–57 mm long; ovary 10–12 × 2–3 mm; style 41–43 × 0.75–1.0 mm; stigma lobes spatulate to elliptic 2–3 × 2 mm. Capsules long-ellipsoidal to oblong, 20–32 × 8–12 mm, smooth to faintly rugose, tan to light brown, erect to nodding; style remnant 2–16 mm long. Seeds angular to polyhedral to flattened (typically flattened rectangular prisms), 2–5-sided, winged to unwinged, 0.9–1.6 × 0.2–0.5 mm, faint orangish-tan, reticulate to ribbed.

Macrocarpaea maguirei is a distinct narrow endemic of Cuzco Province in southern Peru (Fig. 1). It can be easily identified by its spiculate, hispid to velutinous condition throughout, broad oblong to elliptic leaves, and inflorescences with minute bracteoles (2–14 × 1–4 mm). There are few species of *Macrocarpaea* in southern Peru and adjacent areas in Bolivia, notably the three Bolivian endemics *M. bangiana* Gilg, *M. cinchonifolia* (Gilg) Weaver, and *M. cochabambensis* Gilg-Benedict. *Macrocarpaea maguirei* may be related to *M. cochabambensis* due to similarities in their pubescence and minute bracteoles, yet differ

distinctly in the shape of the leaves (oblong to elliptic in *M. maguirei* vs. elliptic to obovate in *M. cochabambensis*), and the shape of the calyx lobes (ovate, elliptic to rotund with a rounded apex, vs. reniform, flattened obovate to flattened rotund with a broadly rounded to rounded-truncate apex).

Etymology. Named in honor of Bassett Maguire (1904–1991) of the New York Botanical Garden who collected extensively in South America.

Paratypes: PERU. Cuzco: Paucartambo, Acjanaco, Parque Nacional del Manu, flores verdes, bosque en límite con pajonal, arbusto 3–4 m, abundante, 3000–3100 m, 7 May 1990, *Cano 3562* (MA, USM); Paucartambo, Pillahuata, alrededores, Tres Cruces, +/- 130 km de Cuzco en el camino hacia Pilcopata, 13° 05' S, 71° 30' W, 2000 m, arbusto 2 m, frutos verdes, 4 April 1987, *Núñez 7790* (USM); Paucartambo, road from Paucartambo to Pilcopata, after turn-off to Tres Cruces, 13° 11' S, 071° 36' W, 2800–3000 m, cloud forest, only a few sterile plants in one are of undisturbed but semi-open cloud-forest vegetation, 10 February 2000, *Weigend & Weigend 2000/242* (NY); Paucartambo, Pillahuata, habitat bajada de la puna, Akonacu, flores amarillas verdosas, carnosas, partes interiores blancas, 3000 m, 13 December 1952, *Woytkowski s.n.* (NY, USM).

7. *Macrocarpaea wurdackii* Weaver & J.R. Grant, *sp. nov.* TYPE: PERU. Amazonas: Bongará, *jalca* zone along Yambrasbamba-Pomacocha trail between Yanayacu and Pomacocha, 2300–2400 m, 0.3–1.5 m, occasional, corolla dull greenish yellow, 26 June 1962, *J.J. Wurdack 1071* (Holotype: US; isotypes: NY, USM). Fig. 9.

Haec species Macrocarpaeae stenophylla cui similis, sed foliis grandioribus, inflorescentia paniculatum, et calycibus et corollis molto brevioribus differt.

Low slender shrub branching from the base, 0.3–1.5 m, glabrous, spiculate to hispidulous on stems, petioles, leaves (veins on the lower surface), inflorescences, and pedicels. Trunk to 0.5–1.0 cm in diameter, wood always solid. Stems terete to slightly quadrangular above, solid, 1–3 mm in diameter just below inflorescence. Leaves elliptic, obovate, oblanceolate, lanceolate to nearly suborbicular, petiolate, (1.4–) 4–8 cm long; blades (1.2–)3.5–7.0 ×

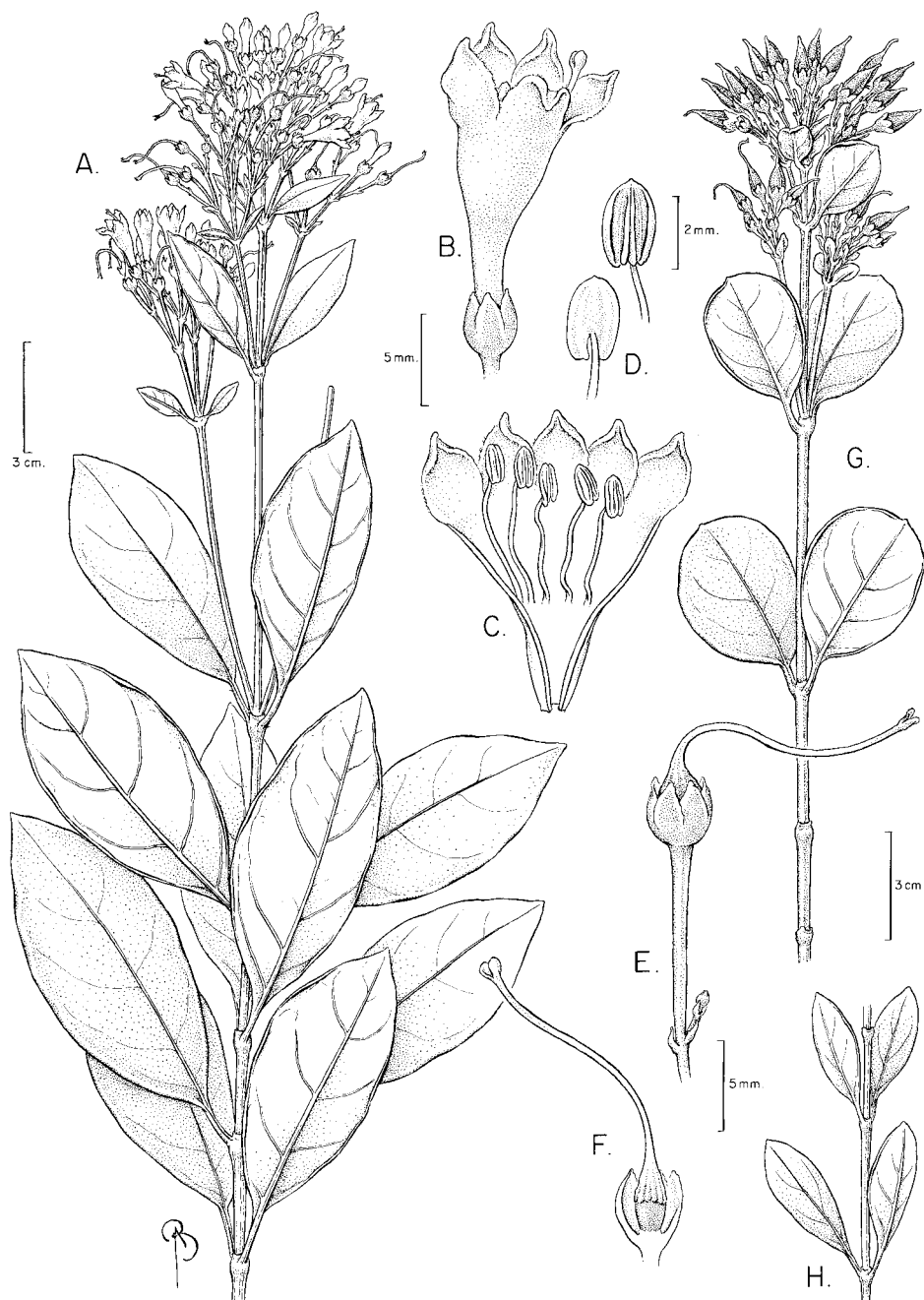


FIGURE 9. *Macrocarpaea wurdackii*. A, habit of flowering stem; B, flower; C, internal cross-section of corolla; D, anthers; E, flower post-anthesis; F, gynoecium; G, habit of fruiting stem; H, additional stem leaves. A–F drawn from *D.N. Smith 4793* (U); G–H drawn from *Wurdack 1071* (US).

(0.6–)1.6–4.0 cm, slightly revolute, leathery-coriaceous, dark above and conspicuously lighter below, with slightly impressed veins above, and slightly raised veins below; base aequilateral, attenuate and decurrent on the petiole, apex acuminate to apiculate. Petioles 2–9 mm long, slender with very slight vagination; interpetiolar ridge 1–3 mm high. Inflorescence a much-branched open thyrses, 3–19 cm long; branches 2–13 cm long, 5–16 flowered per branch. Bracts ovate, elliptic, obovate, oblanceolate to suborbicular, petiolate, 7–22 × 2–19 mm; base aequilateral to oblique, short-attenuate and decurrent on the petiole, apex acuminate to apiculate; bract petioles 1–2 mm long. Flowers pedicellate, erect to slightly spreading, but never nodding; pedicels 7–20 mm long; bracteoles linear to lanceolate, 1–10 × 0.5–3.0 mm. Calyx campanulate to urceolate, 2–5 × 3–4 mm, glabrous, spiculate or hispidulous at the base, green, ecarinate, to faintly carinate on the back of some calyx lobes; calyx lobes ovate to elliptic, 1.5–3.5 × 1.5–2.5 mm, apex acute. Corolla narrowly funnel-shaped, 13–21 mm long, 5–9 mm wide at the apex of the tube, pale yellow, yellow, to dull greenish-yellow, smooth; corolla lobes ovate, elliptic to lanceolate, 3–5 × 2–3 mm, apex acute. Stamens 6.5–9.0 mm long; filaments 5–7 mm long, filiform, flattened; anthers linear to linear-elliptic, 1.5–2.0 × 0.8–1.0 mm. Pistil 14–19 mm long; ovary 3–5 × 1.5–2.0 mm; style 13.0–17.5 × 0.33–0.5 mm; stigma lobes spatulate to suborbicular 1.0–1.5 × 0.5 mm. Capsules ovoid to ellipsoidal, 7–12 × 4–6 mm, smooth, tan, erect to slightly nodding; style remnant 2–6 mm long. Seeds angular to polyhedral to flattened (pyramids, tetrahedrons, rectangular prisms, to multi-sided prisms), 2–5-sided, not winged, 0.3–0.9 × 0.2–0.5 mm, faint orangish-tan, rugose-reticulate.

Macrocarpaea wurdackii occurs in low exposed jalca to pajonal vegetation in Amazonas and adjacent San Martín (Fig. 1). It is a short slender shrub that branches from the base, similar to that of *M. stenophylla* (Peru) and *M. subsessilis* (Ecuador). The flowers are unique in that they are the smallest known to date in the genus. *Macrocarpaea stenophylla* occurs in the same type of habitat, near Molinopampa, Mendoza and Chachapoyas, also in Amazonas, Peru. *Macrocarpaea wurdackii* may be differentiated from *M. stenophylla* in its larger leaves, paniculate (vs. subsessile) inflorescence, and smaller flowers.

Etymology. Named in honor of John Julius

Wurdack (1921–1998) of the Smithsonian Institution, Washington, D.C., pre-eminent specialist of the Melastomataceae.

Paratypes: PERU. San Martín: Rioja Prov., Pedro Ruíz-Moyobamba road, km 368, Campamento García, 77° 43' W, 5° 45' S, 2200 m, pajonal vegetation, a vegetation type developing due to exposure and poor soil, here found on ridges, exposure more important than substrate, shrub 1.2 m, flower yellow, fruit green, 14 August 1983, *D.N. Smith 4793* (NEU, U, USM); Rioja Prov., km 385 Moyobamba-Bagua road, 77° 39' W, 5° 41' S, 1850 m, exposed ridge, roadsides, high montane rain forest, shrub 90 cm tall, flowers pale yellow, fruit green, 17 February 1984, *D.N. Smith 5996* (USM).

8. *Macrocarpaea zophoflora* Weaver & J.R. Grant, *sp. nov.* TYPE: PERU. Amazonas: Chachapoyas, moist scrub forest on south side of Molinopampa-Diosan pass, 2700–3100 m, tree 2.5–6.0 m, occasional, shoot leaves to 60 × 45 cm, with stipular flaps at nodes, corolla green, “tabaco caspi”, leaf decoction used topically for backaches, 8 August 1962, *J.J. Wurdack 1618* (Holotype: US; isotypes: F, GH, K [2 sheets], NY [2 sheets], P, S, UC, USM). Fig. 10–11.

Species nova a speciebus aliis foliis stipularia distinguenda.

Tree to 2.5–6.0 m, spiculate, hispid to tomentose with short simple hairs on stems, petioles, leaves, inflorescences, bracts and calyces. Stems terete to quadrangular, hollow, 10–20 mm in diameter just below inflorescence. Leaves broadly ovate to elliptic, petiolate, 19–43(–60) cm long; blades 16–35(–52) × 14–29(–45) cm, not revolute, dark above and conspicuously lighter below, with slightly impressed veins above, and slightly raised veins below, glabrous above, hispid to spiculate below most densely so along the principal veins of mature leaves; base aequilateral to oblique, cordate, apex obtuse to rounded, papery thin to thin coriaceous. Petioles 30–80 mm long, robust with strong open winged vagination nearly equaling the length of the petiole; interpetiolar ridge 5–12 mm high, both sides with a single deciduous interpetiolar “stipule” (Fig 16), that is, a lunate (half-moon or “Pacman” shaped) 7–10 × 11–12 mm feature with the convex side facing downward in a flap-like manner, attached in a broad “v” shape to the interpetiolar ridge, (about as broad as the stem itself). Inflorescence



FIGURE 10. *Macroparpea zophoflora*. A, habit of flowering stem; B, leaf; C, flower post-anthesis; D, internal cross-section of corolla; E, gynoecium. A, C–E drawn from *Wurdack 1618* (S); B from *Wurdack 1618* (US).

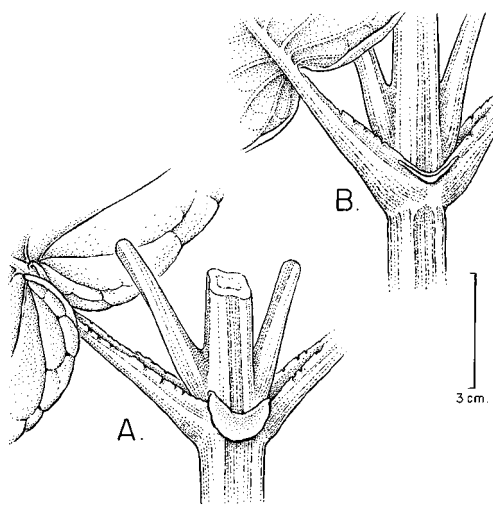


FIGURE 11. *Macrocarpaea zophoflora*. A, free deciduous interpetiolar stipule; B, free deciduous interpetiolar stipule scar. A drawn from Wurdack 1618 (F); B from Wurdack 1618 (US).

a much-branched open thyrse, total length unknown as too long to fit on a single herbarium sheet, yet at least long as the longest branch (47 cm long); branches 8–47 cm long, 5–16 flowered per branch. Bracts ovate, oblong, elliptic to lanceolate, sessile to petiolate, 15–140 × 4–85 mm; base aequilateral to oblique, cordate to cuneate, apex obtuse to acute; bract petioles 0–20 mm long. Flowers pedicellate, erect to slightly spreading, but never nodding; pedicels 8–35 mm long; bracteoles narrowly ovate, lanceolate to linear, 4–10 × 1–4 mm. Calyx broadly campanulate, 15–20 × 12–18 mm, straw-colored to hispid to spiculate, ecarinate; calyx lobes ovate to lunate, 4–7 × 8–11 mm, apex obtuse to rounded. Corolla funnel-shaped, 65–72 mm long, 30–55 mm wide at the apex of the tube, green, smooth; corolla lobes lunate to ovate, 12–17 × 14–29 mm, apex broadly rounded. Stamens 45–52 mm long; filaments 37–40 mm long, filiform, flattened; anthers elliptic to oblong, 8–12 × 4–7 mm. Pistil 52–60 mm long; ovary 11–12 × 7–10 mm; style 35–42 × 2–3 mm; stigma lobes spatulate, 5–8 × 3–4 mm. Capsules and seeds unknown.

Macrocarpaea zophoflora is known only from its type material, collected in the species rich Amazonas province, near Chachapoyas (Fig. 1). It is a highly distinctive species having nearly the largest leaves in the genus, tomentose pubescence, free deciduous interpetiolar

stipules, and thick, fleshy green corollas with lobes that are broader than long. The corolla has similarities to *M. luna-gentiana* J.R. Grant & Struwe of southern Ecuador in the same green color and shape of the corolla lobes. The large pubescent leaves are reminiscent of *M. apparata* J.R. Grant & Struwe also of southern Ecuador. However, no other species in the genus known to date has a stipule.

Vernacular name: tabaco caspi (Wurdack 1618).

Etymology. From the Greek *zophos*, darkness or dusk, and the Latin *flora*, flower, alluding to the presumed night blooming nature of the plant.

Gentianaceous stipule. The interpetiolar ridge of *Macrocarpaea zophoflora* possesses a singular feature thus-so-far unknown to any other species of the Gentianaceae, free deciduous interpetiolar stipules. It is lunate (half-moon or “Pacman” shaped), 7–10 × 11–12 mm, with the convex side facing downward in a flap-like manner, attached in a broad “v” shape to the interpetiolar ridge, about as broad as the stem itself. Even the collector of the material, renowned morphologist John Wurdack, noted on his herbarium labels that the leaves have “stipular flaps at nodes”. As dried on herbarium material, these stipules are clearly visible, and illustrated here as Fig. 13.

Venezuela

The Venezuelan Andes are the north-eastern-most extent of the Andes mountains in South America. From the Cordillera Oriental (or Eastern Cordillera) of Colombia, an eastern spur reaches into Venezuela, the Cordillera de Mérida. Four species of *Macrocarpaea* are present on this range, three of which are newly described here. One is a comparatively wide-ranging species that is notable in the genus for its foliose calyx lobes and bracteoles, *M. bracteata* Ewan (Lara, Mérida, and Trujillo). The three new species appear to be relatively narrow endemics, *M. ewaniana* (disjunct between Táchira and Trujillo), *M. papillosa* (Mérida), and *M. weaveri* (known from the Venezuelan-Colombian border, Táchira and Mérida, Venezuela, and Norte de Santander, Colombia). As is typical in sympatric or nearly sympatric species of *Macrocarpaea*, none of these species appear to be closely related to another. Four other species of *Macrocarpaea* occur in Venezuela, but in the Guayana Highlands: *M. autanae* Weaver, *M. marahua-cae* L. Struwe & V.A. Albert, *M. neblinae* Maguire & Steyerl., and *M. rugosa* Steyerl.

KEY TO THE SPECIES OF *MACROCARPAEA* IN THE VENEZUELAN ANDES

- 1a. Bracteoles leafy, broadly spatulate, reniform, fan-shaped, crisped, (4–10 mm long); sepal lobes often becoming leafy as in the bracteoles *M. bracteata*
- 1b. Bracteoles typically bract-like, linear, lanceolate, ovate, elliptic, oblanceolate to obovate, (2–21 mm long); sepal lobes never becoming leafy 2
- 2a. Leaves elliptic, lanceolate, ovate to narrowly elliptic, base attenuate, apex acuminate, light green, iridescent *M. papillosa*
- 2b. Leaves ovate, elliptic, obovate to oblanceolate, base cuneate or short-attenuate to rounded, dark green, dull 3
- 3a. Leaves broadly ovate to elliptic, base cuneate to rounded, apex acute; calyx lobes ovate, obtuse to rounded, 5–8 mm long. *M. ewaniana*
- 3c. Leaves elliptic, obovate to oblanceolate, base short-attenuate to rounded, apex rounded, obtuse to acute; calyx lobes oblong, ovate to circular, 3–5 mm long *M. weaveri*

9. *Macrocarpaea ewaniana* Weaver & J.R. Grant, *sp. nov.* TYPE: VENEZUELA. Trujillo: Dto. Urdaneta, Guirigay, hacia Peña Blanca, 3300 m, arbol de unos 5 m alto, n.v. "Totumillo", August 1958, *Aristeguieta & Medina 3590* (Holotype: VEN; isotypes: NO, NY, US). Fig. 12.

Species novae Macrocarpaeae duquei cui affinis, sed foliis crassis ovatis vel ellipticis, lobis calyce manifeste longioribus, et pedicellis

cristatis in parte calyces connatis extendens differt.

Tree to 4–5 m, generally glabrous throughout especially when mature, yet sparsely spiculate on stems, peduncles, petioles, pedicels, bracts, calyces and leaf veins, particularly on lower surfaces. Trunk to 10 cm in diameter. Stems terete to slightly quadrangular, solid, 4–10 mm in diameter just below inflorescence. Leaves broadly ovate to elliptic, petiolate, 4–13 mm

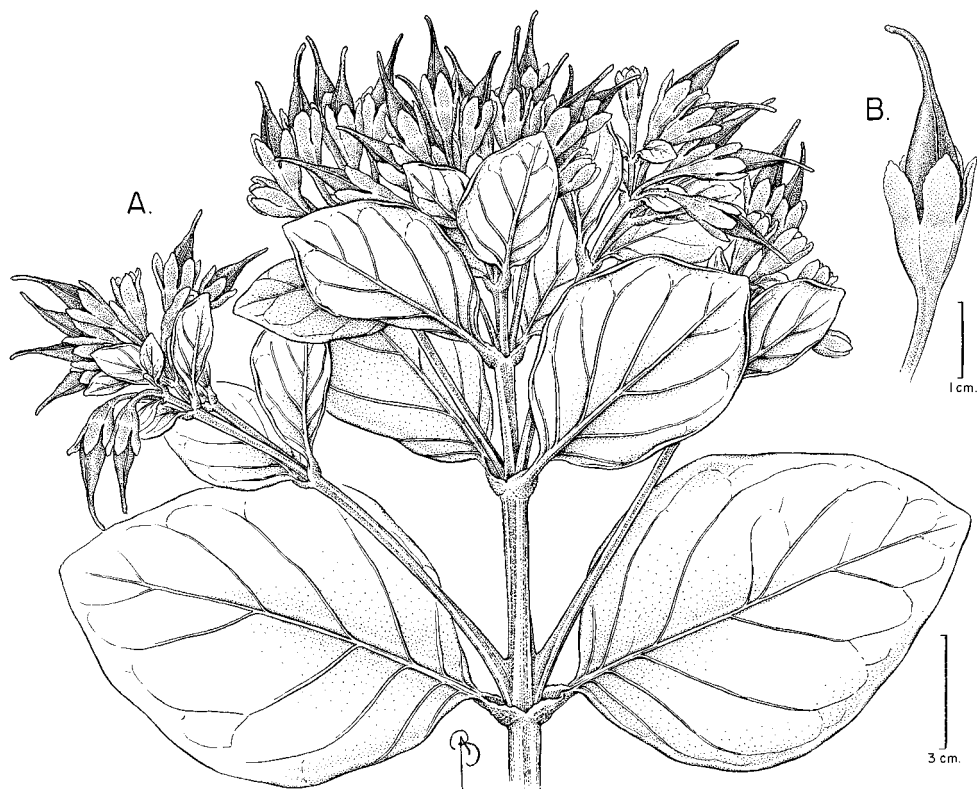


FIGURE 12. *Macrocarpaea ewaniana*. A, habit of fruiting stem; B, fruit showing distinctive ridges on calyx. A–B drawn from *Bernardi 10905* (VEN).

long; blades 3.5–12.0 × 3.0–8.5 cm, slightly revolute, thick, leathery-coriaceous, olive-green, with slightly impressed veins above, and strongly raised veins below, sparsely spiculate on the midvein above and below, otherwise glabrous; base aequilateral to oblique, cuneate to rounded, apex acute. Petioles 5–15 mm long, robust with strong open winged vagination nearly equaling the length of the petiole; interpetiolar ridge 2–5 mm high. Inflorescence a much-branched open thyrse, 7–25 cm long; branches 4–17 cm long, 5–18 flowered per branch. Bracts ovate to elliptic, sessile to petiolate, 35–86 × 24–57 mm; base aequilateral to oblique, cuneate to rounded, apex acute, obtuse to rounded; bract petioles 0–11 mm long. Flowers pedicellate, erect to spreading; pedicels 9–20 mm long, spiculate, prominently 5-angled, the ridges extending onto the calyx to the sinuses of the lobes; bracteoles lanceolate to ovate, 6–21 × 3–13 mm. Calyx broadly campanulate, 9–16 × 6–10 mm (in fruit, not at anthesis), rugose, inconsistently spiculate, ecarinate, yet the calyx tube distinctly 5-ridged and extending to pedicel; calyx lobes ovate, 5–8 × 5–7 mm, apex obtuse to rounded. Corolla funnel-shaped, 35–38 mm long, 10–12 mm wide at the apex of the tube, greenish-yellow, smooth; corolla lobes ovate, 7–9 × 6–9 mm, apex obtuse to rounded. Stamens and Pistil unknown. Capsules ellipsoidal, 12–20 × 6–9 mm, wrinkled to rugose, dark brown, erect to nodding; style remnant 10–15 mm long. Seeds unknown.

Macrocarpaea ewaniana is known from two collections, one from Trujillo and the other from Táchira (Fig. 1), though it will probably eventually be found in between in Mérida. It is one of the most distinct species in the genus, readily identifiable by its thick coriaceous ovate leaves and large calyx, the lobes of which are much longer in respect to the calyx tube (in comparison to most species in the genus). It also has a distinctive ridge that extends from the calyx tube onto the pedicel. It has affinities to *Macrocarpaea duquei* Gilg-Benedict of Colombia (Valle), but differs in its thick, broadly ovate to elliptic leaves (vs. thinner, obovate, varying to elliptic to ovate), longer calyx lobes, and unique pedicel characters.

Vernacular name: Totumillo (*Aristeguieta* & *Medina* 3590).

Etymology. Named in honor of Joseph Andorfer Ewan (1909–1999) of Tulane University, who prepared the only monograph

to date of *Macrocarpaea*: “A revision of *Macrocarpaea*, a neotropical genus of shrubby gentians. Contr. U.S. Natl. Herb. 29(5): 209–250. 1948”. On specimen *Aristeguieta* & *Medina* 3590 (NO) of *M. ewaniana*, Ewan placed an annotation label that reads “3590 *Macrocarpaea* n. sp., need flowering material, Determined by Joseph Ewan 1983”. Named for Ewan as he was first to recognize this as a new species.

Paratype: VENEZUELA. Táchira: La Grita, Páramo del Rosal, 2800–3200 m, arbuscula 4–5 metralis, 10 cm in diameter, floribus luteo-*viridellis*, cymosis terminalibus, 8 October 1965, *Bernardi* 10905 (F, MO, NY, US).

10. *Macrocarpaea papillosa* Weaver & J.R. Grant, *sp. nov.* TYPE: VENEZUELA. Mérida: Road to La Carbonera, 10–19 km from the guard station, rare shrub along road through cloud forest, to 3 m tall and the stem in diameter to 3 cm, corolla greenish-cream, upper surface of the leaves iridescent, 25 September 1972, *Weaver* 2611 (Holotype: GH; isotypes: BM, G, MO, WIS). Fig. 13, 6D.

Species novae a Macrocarpaeae affinis similis, sed foliis breve-petiolatis pallide viridis, calycibus brevioribus, et capsulis brevioribus et latioribus.

Unbranched or sparsely branched erect shrub, to viny and rambling, 2–4 m, glabrous, spiculate to hispidulous on stems, petioles, leaves (especially along veins on the lower surface), inflorescences, and pedicels. Stems terete, solid to hollow, 4–10 mm in diameter just below inflorescence. Leaves elliptic, lanceolate, ovate to narrowly elliptic, petiolate, 4–24 cm long; blades 2–22 × 1.5–10.5 cm, not revolute, papery thin to thin coriaceous, dull green above with an iridescent sheen when fresh (surface being covered with numerous reflective papillae), becoming satin-like when dry, below lighter green, sparsely spiculate on the midvein and the primary laterals, otherwise glabrous; base aequilateral, attenuate and decurrent on the petiole, apex acuminate. Petioles 5–20 mm long, slender with very slight vagination; interpetiolar ridge 1–3 mm high. Inflorescence a much-branched open thyrse, 12–30 cm long; branches 3–23 cm long, 5–20 flowered per branch. Bracts ovate, lanceolate to linear, sessile to petiolate, 8–120 × 1–65 mm; base aequilateral, attenuate and decurrent on the petiole, apex acuminate; bract petioles 0–10 mm long. Flowers pedicellate, erect to

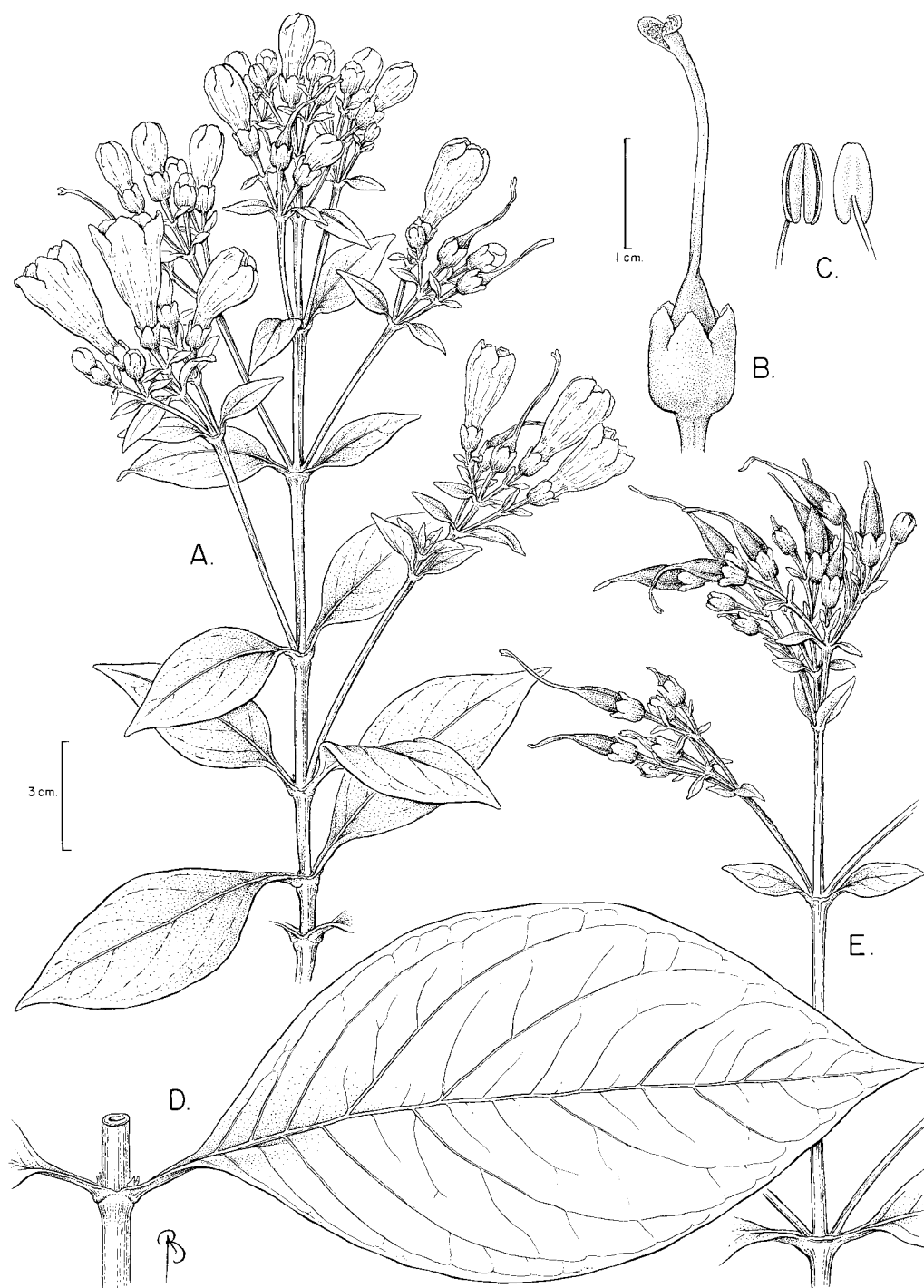


FIGURE 13. *Macrocarpaea papillosa*. A, habit of flowering stem; B, flower post-anthesis; C, anthers; D, leaf and interpetiolar ridge; E, habit of fruiting stem. A Drawn from Weaver 2611 (WIS); B–C drawn from Weaver 2611 (MO); D drawn from Maas & Tillett 5302 (K); E drawn from Maas & Tillett 5302 (NY).

spreading; pedicels 7–23 mm long; bracteoles linear to lanceolate to ovate, 2–14 × 1–4 mm. Calyx campanulate, abruptly constricted to the pedicel, the base appearing bulbous when dry, 6–10 × 5–7 mm, glabrous, viscid, green, ecarinate; calyx lobes unequal, the inner ones oblong, the outer ones suborbicular, transverse-elliptic, 3–5 × 4–6 mm, apex obtuse. Corolla funnel-shaped, 30–44 mm long, 22–27 mm wide at the apex of the tube, yellow-cream, yellowish green, greenish-white, greenish-cream, pale green to green, smooth; corolla lobes ovate, oblong-ovate to broadly ovate, 7–12 × 9–11 mm, apex obtuse to rounded. Stamens 25–33 mm long; filaments 21–26 mm long, filiform, linear to linear-elliptic; anthers 4–7 × 2.0–3.5 mm. Pistil 34–38 mm long; ovary 7–9 × 3–5; style 23–25 × 1.0–1.5; stigma lobes spatulate 2.5–3.5 × 1.5–2.0. Capsules ovoid to ellipsoidal, 15–23 × 7–9 mm, smooth to rugose, orangish-tan, erect to nodding; style remnant 5–17 mm long. Seeds angular to polyhedral (pyramids, tetrahedrons, rectangular prisms, to multi-sided prisms), 2–7-sided, winged to unwinged, 0.3–0.8 × 0.2–0.6 mm, faint orangish-tan, rugose-reticulate.

Macrocarpaea papillosa is a common species of Mérida (Fig. 1). It is readily identifiable by the iridescent sheen of its leaves. It appears similar to *Macrocarpaea affinis* Ewan (Santander, Colombia), and *M. nicotianifolia* Weaver & J.R. Grant (Cundinamarca, Colombia). It shares the same general leaf shape (elliptic, lanceolate, ovate to narrowly elliptic) and inflorescence architecture with *M. affinis*, yet differs in its shorter-petiolate iridescent light green leaves (vs. opaque dark green), shorter calyces (6–10 × 5–7 vs. 8–11 × 7–10 mm), and shorter and broader capsules (15–23 × 7–9 vs. 32–35 × 4–8 mm).

Etymology. This species is named for the reflective papillae covering the upper surface of the leaf blades, imparting to them an iridescent sheen unique in the genus.

Paratypes: VENEZUELA. Mérida: Dto. Campo Elias, entre Las Cruces e inmediaciones de la Carbonera, 1000 m, trepadora, flores amarillo-crema, 5 estambres, estigma bífido, 17 August 1972, *Benítez de Rojas 1505* (F, MY); Faldas inferiores del Toro, 2300 m, 22 November 1952, *Bernardi 14* (NY); Selva nublada del Cerro El Toro, de frente a Mérida, 2100 m, arbusto sarmentoso, 30 January 1955, *Bernardi 1878* (NY); Páramo de Las Coloradas, entre La Capilla y El Aserrucho

(Santa Cruz de Mora-El Molino), 2700–2750 m, hierba erguida, hojas verde claras, corollas verdoso-pálidas, 27 May 1980, *Cuatrecasas et al. 28997* (NY, US 2 sheets); Sierra del Norte, 2400 m, lisière de forêt (selva nublada), liane, fl. vert-jaunâtre, corolle vineuse extérieurement, 6–8 October 1952, *Humbert 26685* (P, VEN); 18 km above La Azulita, montane forest, forest margin, 2200 m, branched shrub, 4 m high, calyx sticky, green, corolla green, ovary dark green, style pale green, 14 November 1980, *Maas & Tillett 5300* (COL, GH, K, MO, NY, S, U, VEN); 24 km above La Azulita, montane forest, 2300 m, unbranched or branched shrub, calyx and corolla green, 14 November 1980, *Maas & Tillett 5302* (GH, K, MO, NY, U, VEN); Between La Cumbre, San José, and Mucutuy, 1820–2590 m, shrub 4 feet tall, leaves dull green above, paler dull green below, firmly subcoriaceous, 3 May 1944, *Steyermark 56239* (F); Bosque de la Mucuy, Zabay, 2200–2500 m, hierba de tallos fistulosos, 14 November 1958, *Trujillo 4020* (MY); Forests along the Teleferico de Mérida, near the station La Montaña, 2400 m, rare shrub along trail, to 2 m tall, mature flowers not seen, but buds yellow-green, leaves iridescent above, 4 October 1972, *Weaver 2629* (GH 2 sheets, MO).

11. *Macrocarpaea weaveri* J.R. Grant, *sp. nov.*
TYPE: VENEZUELA. Táchira: Base of Páramo de Tamá, above the settlement of Betania, 2800–3100 m, common in a narrow zone just below the páramo, trees to 6 m tall, with a trunk in diameter to 7 cm, corolla cream-colored, 27 September 1972, *Weaver 2613* (Holotype: GH; isotypes: BM, G, MO, WIS). Fig. 14.

Species novae a Macrocarpaeae wurdackii cui affinis pro indicii molecularibus, sed foliis latis, et floribus molto grandibus, et a alius species novae tamen inedita Boyacá et Santander Colombiense (typus Orozco 1060) foliis ellipticis obellipticis obovatis vel oblanceolatis, calycibus angustis, et inflorescentia multifloribus differt.

Branched shrub to tree, 3–7 m, glabrous, spiculate to hispidulous on stems, petioles, leaves (especially along veins on the lower surface), inflorescences, and pedicels. Trunk to 7 cm in diameter. Stems terete, solid, 3–12 mm in diameter just below inflorescence. Leaves elliptic, obovate to oblanceolate, petiolate, 6–27 cm long; blades 5.5–24.0 × 2.5–12.0 mm,



FIGURE 14. *Macroparpaea weaveri*. A, habit of flowering stem; B, flower; C, gynoecium; D, internal cross-section of corolla; E, habit of fruiting stem. A–D drawn from *Luteyn* 5349 (NY); E drawn from *Weaver* 2613 (NY).

slightly revolute, coriaceous, deep green, shiny to dull, and glabrous above, paler green, dull, and hispidulous on the midvein and the primary laterals below, otherwise glabrous; base aequilateral to oblique, short-attenuate to rounded, apex rounded, obtuse to acute. Petioles 5–35 mm long, robust with strong open vagination one quarter to one-third the length of the petiole; interpetiolar ridge 2–7 mm high. Inflorescence a much-branched open thyrses, 11–30 cm long; branches 9–28 cm long, 8–20 flowered per branch. Bracts rotund, elliptic, ovate, obovate, lanceolate to oblanceolate, petiolate, 12–110 × 7–55 mm; base aequilateral to oblique, short-attenuate to rounded, apex rounded, obtuse to acute; bract petioles 2–13 mm long. Flowers pedicellate, erect to spreading; pedicels 7–21 mm long; bracteoles obovate, elliptic, oblanceolate to lanceolate, 3–17 × 1–5 mm. Calyx narrowly campanulate, 8–13 × 4–8 mm, glabrous, spiculate to hispidulous, smooth to papillate, green, olive green, ecarinate; calyx lobes oblong, ovate to circular, 3–5 × 3–4 mm, apex obtuse to rounded. Corolla funnel-shaped, 18–30 mm long, 10–12 mm wide at the apex of the tube; pale green with pale yellow lobes, olive-green with dull yellow corolla lobes, intense yellow, yellow-cream, to cream-colored, smooth; corolla lobes narrowly ovate to elliptic, 5–8 × 3–8 mm, apex obtuse to rounded. Stamens 11–17 mm long; filaments 8–13 mm long, filiform, flattened; anthers ovate to oblong, 3.5–5.0 × 1.5–2.0 mm. Pistil 21–24 mm long; ovary 5–9 × 2–4 mm; style 13–14 × 0.5–1.0 mm; stigma lobes spatulate 1.5–2.0 × 0.5–1.0 mm. Capsules ovoid to ellipsoidal, 12–20 × 4–6 mm, smooth, pusticulate to rugose, faint-orangish tan, erect to nodding; style remnant 6–11 mm long. Seeds angular to polyhedral, (3–)5–8-sided, not winged, 0.4–1.0 × 0.2–0.6 mm, light orange to translucent amber-colored, slightly rugose.

Macrocarpaea weaveri occupies a narrow range on both sides of the Venezuelan-Colombian border (Fig. 1). It is known best from the Páramo de Tamá, an area rich in endemics including the spectacularly flowered *Lagenanthus princeps* (Lindl.) Gilg (Gentianaceae).

From the molecular work undertaken, *Macrocarpaea weaveri* is sister to *M. wurdackii* of Peru (Amazonas, San Martín) (Grant & Struwe, unpublished). It differs distinctly, however, in its broader leaves, and slightly larger flowers (18–30 vs. 13–21 mm). Based on morphological similarities, *Macrocarpaea*

weaveri is most closely related to an undescribed species from Colombia (Boyacá, Santander), for which the type will be *Orozco 1060* (COL). The undescribed species occurs further southwest on the Andean Cordillera in Colombia (Santander and Boyacá), and we have not been able to sequence it. *Macrocarpaea weaveri* has elliptic, obovate to oblanceolate leaves with aequilateral, oblique, short-attenuate to rounded bases, that are typically shiny on the upper surface vs. broadly obovate leaves with rounded apices, long-cuneate to attenuate bases that are dull on the upper surface in the undescribed species.

Etymology. Named in honor of Richard E. Weaver (1943–), student of the Gentianaceae who prepared a treatment of the genus *Macrocarpaea* in Costa Rica (Weaver 1972), and is a co-author of this paper. Some herbarium material has been annotated by Weaver as “*Macrocarpaea parviflora* Weaver, ined”.

Paratypes: COLOMBIA. Norte de Santander: Municipio de Herrán, Parque Natural Nacional Tamá, Sector Orocué, hacia al Alto del Pesehre, 2650–3020 m, arbusto hasta 3.50 m, flores crema, 2 April 1987, *Lozano C. et al.* 5559 (MA); Municipio de Toledo, Páramo de Santa Isabél hacia la finca de Palo Colorado, Finca de Don David Fernández, 2300 m, arbolito de 4 m, flores amarillas, frutos verdes, en bosque, 4 November 1994, *Orozco et al.* 3000 (COL 2 sheets). VENEZUELA. Mérida: Municipio San José y Mucutuy, Distrito Campo Elías, Páramo del Cupis, Zona de Pozo Negro, 3000 m, arbusto inerme, 4–5 m, 23 March 1967, *Ruíz et al.* 3892 (VEN) [this specimen is sterile, and while tentatively placed here, the only other species it could be (as the genus is presently understood) might be *M. ewaniana* as it is certainly not *M. papillosa*]. Táchira: Páramo de Taimá, 3000–3250 m, in silva montana uda, 2500–3000 m, arbol 4–5 m alt, flores verdes-amarillos, 12 November 1976, *Charpin & Jacquemoud* 13226 (U); Hoya del Río Táchira, Cabeceras de la Quebrada de El Reposo, 2800–3000 m, [planta] 6–7 m alta, hojas crasas, subcoriáceas, verde amarillentas semioscuras, algo brillantes haz verde claros envés, ramas verde amarillento pálidas, cálices verde claros, corollas amarillos-cremas con un punto de verde, 16 January 1973, *Cuatrecasas et al.* 28346 (US 2 sheets); Dto. Junín, entre el Páramo de Tamá y Betania, 2800–3000 m, arbusto de flores amarillas, 18 March 1973, *Fernández 2103* (MY); En el camino entre

Betania (Valle del Tamá) hacia San Vicente de la Revancha, zona paramera, un sector del Páramo de Tamá, 2750 m, arbolito de 3.3 m de alto, inflorescencias cimosas, flores con corollas de color amarillo intenso, 5 January 1983, *López-Figueiras 29854* (US); Trail leading to summit of Páramo de Tamá, virgin cloud forest to páramo, 2500–3200 m, small tree 5 m, corolla pale green, lobes pale yellow, 29 January 1978, *Luteyn et al. 5349* (GH, NY, VEN); rich moist woods at base of Páramo de Tamá, 4–10 km above Betania, 2500–2895, shrub 8 feet tall, leaves coriaceous, deep green

above, paler green below, 15 July 1944, *Steyermark 57317* (F); subpáramo y bosque enano, faldas inmediatamente debajo del Páramo de Tamá, cerca de la frontera Colombo-Venezolana, 2750–2950 m, shrub 3 m, leaves coriaceous, subrevolute, dark green above, pale green below, calyx olive green with yellow-olive green lobes, corolla lobes dull yellow, the tube olive green, peduncles olive yellow green, beginning of ericaceous subpáramo and dwarf shrubs and openings, 20 May 1967, *Steyermark & Dunsterville 98555* (NY, US); *Steyermark & Dunsterville 80684* (VEN).

LITERATURE CITED

- EWAN, J. 1948. A revision of *Macrocarpaea*, a neotropical genus of shrubby gentians. *Contr. U. S. Natl. Herb.* 29(5): 209–250.
- GRANT, J. R. 2003. De Macrocarpaeae Grisebach (ex Gentianaceis) speciebus novis II: Typification of the Ruiz & Pavon names. *Harvard Pap. Bot.* 7(2): 423–436.
- GRANT, J. R. AND L. STRUWE. 2000. Morphological evolution and neotropical biogeography in *Macrocarpaea* (Gentianaceae: Helieae). *Amer. J. Bot.* 87 (suppl.): 131.
- AND ———. 2001. De Macrocarpaeae Grisebach (ex Gentianaceis) speciebus novis I: An introduction to the genus *Macrocarpaea* and three new species from Colombia, Ecuador, and Guyana. *Harvard Pap. Bot.* 5: 489–498.
- AND ———. 2003. De Macrocarpaeae Grisebach (ex Gentianaceis) speciebus novis III: Six new species of moon-gentians (*Macrocarpaea*, Gentianaceae: Helieae) from Parque Nacional Podocarpus, Ecuador. *Harvard Pap. Bot.* 8(1): 61–81.
- DE HUMBOLDT, A., A. BONPLAND, AND C. S. KUNTH. 1815–1925. *Nova genera et species plantarum*. Paris: Sumtibus Librariae graeco-latino-germanicae.
- PRINGLE, J. S. 1995. Gentianaceae. Pages 1–132 in G. HARLING AND L. ANDERSSON, EDs., *Flora of Ecuador 53*. Department of Systematic Botany, Göteborg University, Göteborg.
- STANDLEY, P. C. 1938. *Flora of Costa Rica*. Publ. Field Mus. Nat. Hist. Chicago Bot. Ser. 18: 928.
- STRUWE, L., J. W. KADEREIT, J. KLACKENBERG, S. NILSSON, M. THIV, K. B. VON HAGEN, AND V. A. ALBERT. 2002. Systematics, character evolution, and biogeography of Gentianaceae including a new tribal and subtribal classification. Pages: 210–309. In: STRUWE, L. AND V. A. ALBERT, EDs. 2002. *Gentianaceae: Systematics and Natural History*. Cambridge University Press, Cambridge.
- SYTSMA, K. J. 1987. The shrubby gentian genus *Macrocarpaea* in Panama. *Ann. Missouri Bot. Gard.* 74 (2): 310–313.
- WEAVER, R. E. 1972. The genus *Macrocarpaea* in Costa Rica. *J. Arnold Arb.* 53(4): 553–557.
- WEIGEND, M. 2002. Observations on the Biogeography of the Amotape-Huancabamba Zone in Northern Peru. *Bot. Rev.* 68(1): 38–54.