

DE MACROCARPAEAE GRISEBACH (EX GENTIANACEIS)
SPECIEBUS NOVIS XI: FIVE NEW SPECIES FROM
THE ANDES OF ECUADOR AND COLOMBIA

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Abstract. Five new species are described from Andean regions of Colombia and Ecuador including *M. catherineae*, *M. cortinae*, *M. illuminata*, *M. pacifica*, and *M. umbellata*. *Macrocarpaea stenophylla* is reported as a range extension from Peru to Ecuador.

Keywords: *Macrocarpaea*, Gentianaceae, Helieae, Ecuador

In a recent monograph of *Macrocarpaea* Gilg from Ecuador (Grant, 2014), seven new species were indicated. Five of these species are formally described here including *M. catherineae* J.R. Grant, *M. cortinae* J.R. Grant, *M. illuminata* J.R. Grant, *M. pacifica* J.R. Grant, and *M. umbellata* Weaver & J.R. Grant. This study has been prepared within a broader context to prepare a full monograph of the genus (Grant, 2003, 2004, 2005, 2007, 2008, 2011, 2014; Grant and Struwe, 2001, 2003; Grant and Trunz, 2011; Grant and Weaver, 2003).

1. *Macrocarpaea catherineae* J.R. Grant, *sp. nov.* TYPE: ECUADOR. Zamora-Chinchipe: Road from Chuchumbeza, Quimi and Tundayme towards the Condor Mirador, 16 km from end of road at Military camp “Condor Mirador,” 03°36'32.7"S, 078°28'18.3"W, 1059 m, 15 February 2011, Grant, J.R. & J. Vieu 11-4695 (Holotype: NY; isotypes MO, NEU, QCA, QCNE). Fig. 1. E–G.

Macrocarpaea catherineae is a new species endemic to the Cordillera del Condor that differs from the widespread *Macrocarpaea micrantha* in being an unbranched shrub with larger and broader leaves that are smooth, coriaceous and yellowish green in color.

Unbranched *shrub* to small tree, 2–3 m tall, glabrous throughout. *Stems* terete to quadrangular, hollow, 5–7 mm in diameter just below the inflorescence. *Leaves* ovate to elliptic, long-petiolate, 11–28 cm long. *Petioles* 10–60 mm, slender with slight vagination, interpetiolar ridge 1–2 mm. *Blades* 10–22 × 5–11 cm, entire, not revolute, yellowish green with slightly impressed veins above, and slightly raised veins below, glabrous above and below, thin coriaceous; base aequilateral to oblique, rounded to cuneate; apex acuminate. *Inflorescence* a much diffusely branched open thyrse 25–36 cm long; branches 10–24 cm long, 5–9 flowered per branch. *Bracts* ovate to elliptic, sessile to

petiolate, 5–87 × 2.5–40 mm; base aequilateral to oblique, rounded to cuneate; apex acute to acuminate; bract petioles 0–6 mm. *Flowers* pedicellate, erect to slightly spreading; pedicels 15–20 mm long; bracteoles linear to lanceolate, 2–8 × 0.25–0.5. *Calyx* campanulate, 6–9 × 5–6 mm, glabrous, smooth, green, ecarinate, ovate; calyx lobes 3–4 × 3–4 mm, rounded to obtuse. *Corolla* unknown. *Capsules* ellipsoidal 29–35 × 6–7 mm, smooth to faintly ribbed, erect; style remnant 7–12 mm long. *Seeds* “Perimetrically winged type,” flattened, roughly 3–4 sided in outline, yet appearing as myriads of different puzzle pieces, 0.5–1.0 × 0.4–0.8 mm, bicolored, testa tan to dark orange, wings translucent cream, testa reticulate, wings ribbed.

Distribution and habitat: *Macrocarpaea catherineae* occurs on the Cordillera del Condor in southern Ecuador.

Eponymy: Named for Belgian Catherine Vits, renowned ornithologist and owner of the fabulous Copalinga Ecolodge in Zamora, Ecuador. <http://www.copalinga.com>

Additional specimens examined: ECUADOR. Zamora-Chinchipe: Région de la Cordillera del Cóndor, vertiente occidental, Cantón El Pangui, parroquia Tundayme, Valle del Río Quimi, Bosque húmedo premontano, arbustivo de 3 m de alto, flores campanulares color blanco-crema, 03°35'05"S, 078°27'07"W, 900 m, 8 July 2007, *Quizhpe, W. 2706* (MO, QCNE); El Pangui, Cordillera del Cóndor, vertiente occidental, cuenca del Río Quimi, zona de la futura mina de cobre de la compañía Ecuacorriente, Formación rocosa arenisca, suelo arenoso, bosque muy húmedo montano bajo y bosque arbustivo. Arbusto de 304 m, hojas carnosas, flores con pecíolos amarillos, 03°34'55"S, 078°26'10"W, 1400–1670 m, 19 March 2006, *Quizhpe, W. & F. Luisier 1977* (QCNE); Cordillera del Cóndor, vertiente occidental, cuenca del Río Quimi, zona de la futura mina de cobre de la compañía Ecuacorriente, 03°34'55"S, 078°26'10"W, 1400–1670 m, 19 March 2006, *Quizhpe, W. & F. Luisier 1981* (LOJA, QCNE).

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FIGURE 1. *Macrocarpaea pacifica* (A–D) and *M. catherineae* (E–G). A, lower leaf; B, flowering stem; C, bud; D, fruiting stem; E, lower leaves; F, fruiting stem; G, capsule. A–D drawn from Grant 4704 (3 unmounted sheets), E–G from Grant 4695 (unmounted specimens).

Macrocarpaea catherineae belongs to a group of closely related species restricted to the Amotape-Huancabamba zone including *M. catherineae*, *M. claireae*, *M. dies-viridis*, *M. illuminata*, *M. lenae*, *M. micrantha*, *M. pacifica*, *M. quizhpei*, and *M. xerantifulva*. *Macrocarpaea catherineae* is immediately recognized as distinct from the other species in this complex by its smooth, coriaceous and yellowish green leaves. It is sympatric with *M. micrantha* and *M. opulenta*, and may be confused with *M. micrantha* in the field (yet this species is a much-branched plant with thin leaves). The yellowish-green color and coriaceous texture of the leaves of *M. catherineae* is also reminiscent of roadside populations of *M. xerantifulva*.

2. *Macrocarpaea cortinae* J.R. Grant, *sp. nov.* TYPE: ECUADOR. Sucumbios: 4 km N of Río Chigual ridge at km 44 from Lumbaqui, 00°16'46.7"N, 077°27'39.6"W, 767 m, 7 February 2013, Grant, J.R. & J. Cortina 13-5116 (Holotype: NY; isotypes G, MO, NEU, QCA, QCNE). Fig. 2. A–F, 3, 4.

Macrocarpaea cortinae is a new species from northern Ecuador and southern Colombia that differs from *Macrocarpaea pringleana* in having stouter more compact cymes composed of flowers with shorter pedicels, leaves that dry almost translucent thin, and calyces with an orange coloration of the dorsal side of the lobes.

Unbranched *shrub* to tree 1–5 m tall, glabrous throughout. *Stems* terete below to quadrangular above, hollow, 6–12 mm in diameter just below the inflorescence. *Leaves* ovate to ovate-elliptic, sessile to long-petiolate, (16)21–47 cm long. *Petioles* 0–60 mm, slender with very slight vagination; interpetiolar ridge 1–2 mm. *Blades* 16–41 × 9–20 cm, entire, not revolute, bright green, with slightly impressed veins above, and slightly raised veins below, glabrous above and below, papery thin; blade base aequilateral to slightly oblique, cuneate to attenuate and decurrent on the petiole to the base of the leaf; blade apex acute to acuminate. *Inflorescence* a much branched open thyrse 75+ cm; branches 10–60 cm long, 5–12 flowered per branch. *Bracts* ovate to lanceolate, sessile, 7–210 × 2–105 mm; bract base aequilateral to oblique, cuneate to rounded; bract apex acuminate. *Flowers* pedicellate, erect; pedicels 10–18 mm long; bracteoles inconspicuous, linear to lanceolate, 1–5 × 0.5–1.0 mm. *Calyx* campanulate, 7–9 × 6–7 mm, glabrous, smooth, green, ecarinate, but colored orange on the dorsal surface; calyx lobes ovate to elliptic, 3–4 × 3–4 mm, rounded to obtuse. *Corolla* funnel-shaped, 30–34 mm long, 12–20 mm wide at the apex of the tube, yellow, smooth; corolla lobes ovate to elliptic, 8–11 × 7–10 mm, obtuse to rounded. *Stamens* 21–26 mm long; filaments 18–22 mm long, filiform, flattened; anthers elliptic to oblong, 3–4 × 1.5–2.0 mm, sagittate, versatile; pollen glabra-type. *Pistil* 27–33 mm long; ovary 7–9 × 2–3 mm; style 17–20 × 0.5–0.75 mm; stigma lobes spatulate, 3–4 × 1–2 mm. *Capsules* linear-long to narrowly ellipsoidal, never arched upwards, 25–30 × 5–8 mm, smooth to ribbed, chestnut-tan, erect; style remnant 5–8 mm. *Seeds* “Perimetrically winged type,” flattened, roughly 3–4 sided in outline, yet appearing

as myriads of different puzzle pieces, 0.4–0.7 × 0.8–1.3, bicolored, testa orangish-brown, wings straw-colored, testa reticulate, wings ribbed.

Distribution and habitat: *Macrocarpaea cortinae* occurs on Amazon-facing slopes of the Andes in northern Ecuador (Napo and Sucumbios) and southern Colombia (Caquetá, Nariño, and Putumayo).

Eponymy: Named for Swiss Jimmy Cortina (1986–), co-collector of the type.

Additional specimens examined: ECUADOR. Napo: Valle alto del Río Quijos, 5 km al Sur de Cuyuja, Finca Agroecologica Antisana, 00°28'S, 078°03'W, 2850, 16 June 1998, Vargas, H. et al. 1851 (MO, NY, QCNE). Sucumbios: Río Bermejo to Cerro Sur Pax, Cofan community of Alto Bermejo, access from Bermejo oil field of Pozo 1, NW between Lumbaqui and Cascales, vicinity of Vista Camp, 00°18'13.8"N, 077°24'32.0"W, 100–1200 m, 29 July 2001, Aguinda, R. et al. 1204 (F); Sinangoe Station, Río Cuccono Chico, affluent of Río Due, SW of Puerto Libre, NW of Lumbaqui, access trail from Río Sieguayo, vicinity of Cuccono beach camp, 00°07'48.5"N, 077°33'19.9"W, 940–1000 m, 8 August 2001, Aguinda, R. et al. 1585 (F); Gonzalo Pizarro Canton, Parroquia Reventador, 1800 m, 23 May 1990, Cerón, C. & Ayala 9988 (MO, QCNE); 13 km NW of La Bonita on road towards Santa Barbara, 00°32'14.7"N, 077°31'53.6"W, 2016 m, 7 February 2013, Grant, J.R. & J. Cortina 13-5114 (NY); 6 km south of La Bonita, 00°27'27.1"N, 077°32'20.8"W, 1903 m, 7 February 2013, Grant, J.R. & J. Cortina 13-5115 (NY). COLOMBIA. Caquetá: Comisaría del Caquetá, Cordillera Oriental, vertiente oriental, Sucre, orillas del Río Hacha, matorrales, 1000 m, 3 April 1940, Cuatrecasas, J. 9034 (COL [2 sheets], US); San José de la Fragua, Serranía de Los Churumbelos, Vereda Las Palmas, parte alta de Río Yuruyaco, 01°20'55"N, 76°6'11"W, 900 m, 20 September 2000, Mendoza, H. et al. 9173 (FMB). Nariño: Munic. Barbacoas, Correg. Junín, vía Junín-Barbacoas, 960–1100 m, 14 March 1995, Lozano, G. et al. 6996 (COL). Putumayo: Mun. de Mocoa, carretera Mocoa-Sibundoy, entre “Las Mesas” y poco después del “Mirador,” Vertiente amazónica de Colombia, 76°38'W, 1°12'N, 1300–2000 m, 4 May 1994, Betancur, J. et al. 5501 (COL); Mun. de Mocoa, Vereda de San Carlos, Serranía del Churumbelo, camino entre el Río Mocoa y la cima de la Serranía, 01°03'51.6"N, 76°37'22.7"W, 400–700 m, 13 December 1999, Cárdenas, D. et al. 11756 (COL; COAH); Mun. de Mocoa, Vereda Medio Afán, camino Serranía El Churumbelo, sector Nororiental, 520–900 m, 4 October 2000, Cárdenas, D. et al. 12223 (COAH); Mun. de Mocoa, Corregimiento de San Antonio, vereda Alto Campucana, finca La Mariposa, 1350 m, 21 April 1994, Fernández-Alonso, J.L. 10753 (COL [2 sheets]); Mun. de Mocoa, Corregimiento de San Antonio, vereda Alto Campucana, finca La Mariposa, 76°38'W, 1°12'N, 1350 m, 20 April 1994, Franco, P. et al. 5502 (COL); Mun. de Mocoa, Vereda del Afán, Alto del Afán, 1200–1450 m, 25 September 1972, Mora, L.E. et al. 6120 (COL); Bank of river Pepino, upstream of the camp Pepinó, 800 m, 29 August 1963, Soejarto, D.D. 535 (GH).



FIGURE 2. *Macrocarpaea cortinae*. A, lower leaf; B, habit of flowering stem; C, flower, face view, and flower and bud, side view; D, corolla l.s.; E, calyx and pistil, l.s. of same; F, infructescence. All drawn from Grant 5116 (unmounted specimens, pickles and photos).



FIGURE 3. *Macrocarpaea cortinae*. Habit of flowering plant with co-collector of the type, Jimmy Cortina.



FIGURE 4. *Macrocarpaea cortinae*. Branch of the inflorescence, notice orange coloration on the dorsal portion of each calyx lobe.

Macrocarpaea cortinae belongs to a species complex comprising four species, two of which occur on Pacific-facing slopes of the Andes (*M. sodiroana* and *M. umbellata*), and two on Amazon-facing slopes of the Andes (*M. pringleana* and *M. cortinae*). The main character that united this group are leaves that are generally long-decurrent on the petiole, but the group is also strongly supported by molecular characters (Vieu & Grant in prep). The leaves of *M. cortinae* have perhaps the shortest petioles in the group, being generally decurrent to the base of the petiole. *Macrocarpaea cortinae* is most closely related to *M. pringleana* yet is unique in having an orange coloration on the dorsal side of the calyx lobes, still faintly visible on herbarium specimens.

3. *Macrocarpaea illuminata* J.R. Grant, *sp. nov.* TYPE: ECUADOR. Zamora-Chinchi: Cordillera del Condor region, from the road from Zumbi to Paquisha, 8 km south on the road towards Guayzimi, (just W of Paquisha), 03°58'02.1"S, 079°41'09.9"W, 910 m, 11 Feb 2011, Grant, J.R. & J. Vieu 11-4687 (Holotype: NY; isotypes G, MO, NEU, QCA, QCNE). Fig. 5. A–E.

Macrocarpaea illuminata is a new species from lowlands areas in the Cordillera del Condor region of southern Ecuador that differs from *Macrocarpaea dies-viridis* which occurs at higher elevations in the same area in being shorter, entirely glabrous, with a slightly smaller calyx (7–8 × 6–7 mm vs 7–10 × 7–9 mm) and shorter calyx lobes (2–4 × 2 mm vs. 3–5 × 4–5 mm).

Unbranched *shrub* to small tree 2–3 m tall, glabrous throughout. *Stems* terete to slightly quadrangular, hollow, 4–8 in diameter just below the inflorescence. *Leaves* oval to elliptic, long-petiolate, 26–42 cm long; petioles 40–60 mm, slender with slight vagination; interpetiolar ridge 1–3 mm high. *Blades* 22–36 × 9–25 mm, entire, not revolute, dark green, with slightly impressed veins above, and slightly raised veins below, glabrous above and below, papery thin; blade base aequilateral to oblique, rounded to cuneate and slightly decurrent on the petiole; blade apex acute to acuminate. *Inflorescence* a much branched open thyrse 40+ cm high; branches 6–30 cm long; 5–9 flowered per branch. *Bracts* ovate to lanceolate, sessile to short-petiolate, 10–75 × 4–50; base aequilateral to oblique, rounded to cuneate; apex acute to acuminate; bract petioles 0–5 mm. *Flowers* pedicellate, erect to spreading; pedicels 8–24 mm long; bracteoles linear to lanceolate, 1–4 × 0.25–0.5 mm. *Calyx* campanulate, 7–8 × 6–7 mm, glabrous, green, ecarinate; ovate to rotund; calyx lobes 2–4 × 2 mm, rounded to obtuse. *Corolla* funnel-shaped, 38–40 mm long, 18–20 mm wide at the apex of the lobe, yellow, smooth; corolla lobes ovate 11–13 × 9–12, apex obtuse to rounded. *Stamens* 21–28 mm long; filaments 18–23 mm long, filiform, flattened; anthers ovate, 3–5 × 1.5–2.5 mm, sagittate, versatile; pollen glabra-type. *Pistil* 25–28 mm long; ovary 5–6 × 2–3 mm; style 18–19 × 0.5; stigma lobes spatulate, 2–3 × 1–2 mm. *Capsules* ellipsoidal, 32–40 × 8–10 mm, smooth to faintly ribbed, faint-orangish tan, erect to slightly spreading; style remnant 1–3 mm long. *Seeds* “Perimetrically winged type,”

flattened, roughly 3–4 sided in outline, yet appearing as myriads of different puzzle pieces, 0.9–1.0 × 0.9–1.0 mm, bicolored, testa tan, wings straw-colored, testa reticulate, wings ribbed.

Distribution and habitat: *Macrocarpaea illuminata* occurs on the Cordillera del Condor in southern Ecuador.

Etymology: From the Latin, *illuminata*.

Additional specimens examined: ECUADOR. Zamora-Chinchi: Cordillera del Condor, 9.3 km E of Paquisha (measured from the church in the central square), 1394 m, 7 January 2008, Grant, J.R., C. Agier, C. Arnold & M.L. Cheung 08-4529 (G, LOJA, MO, NY); Cordillera del Condor region, from the road from Zumbi to Paquisha, 8 km south on the road towards Guayzimi, (just W of Paquisha), 03°58'055"S, 078°41'133"W, 1022 m, 25 January 2009, Grant, J.R., B. Angell, W. Grant & V. Trunz 09-4560 (NY).

Macrocarpaea illuminata belongs to a group of closely related species restricted to the Amotape-Huancabamba zone including *M. catherineae*, *M. claireae*, *M. dies-viridis*, *M. illuminata*, *M. lenae*, *M. micrantha*, *M. pacifica*, *M. quizhpei*, and *M. xerantifulva*. *Macrocarpaea illuminata* and *M. dies-viridis* represent one of the most complicated and cryptic species pairs in southern Ecuador. Indeed my original description of *M. dies-viridis* was partially based on specimens from both of these species. However, after multiple collection trips to the region, the differences between the two species became clear. *M. illuminata* is shorter, glabrous, and lowland, while *M. dies-viridis* is taller, with puberulent calyces, and occurs at higher elevations. The characters of the calyx are diagnostic where *M. illuminata* has a slightly smaller calyx (7–8 × 6–7 mm vs. 7–10 × 7–9 mm), the difference mainly in the shorter calyx lobes (2–4 × 2 mm vs. 3–5 × 4–5 mm). The two species are well distinguished on molecular characters.

4. *Macrocarpaea pacifica* J.R. Grant, *sp. nov.* TYPE: ECUADOR. El Oro: Piñas, Bosque Protector Buenaventura, Fundación de Conservación Jocotoco, 03°39'02.4"S, 079°44'53.0"W, 925 m, 16 February 2011, Grant, J.R. & J. Vieu 11-4704 (Holotype: NY; isotypes G, MO, NEU, QCA, QCNE). Fig. 1. A–D.

Macrocarpaea pacifica is a new species from Pacific-facing slopes of the Andes in southern Ecuador that differs from *Macrocarpaea lenae* of Amazon-facing slopes in having slightly spiculate calyces and leaves that are decurrent on the petiole.

Unbranched *shrub* to small tree 1.5–2.5 m tall, glabrous throughout. *Stems* terete to slightly quadrangular, solid to hollow, 5–12 mm in diameter just below the inflorescence. *Leaves* ovate to oval, long-petiolate, 30–46 cm long. *Petioles* 20–70 mm long, slender with slight vagination; interpetiolar ridge 1–2 mm. *Blades* 28–39 × 13–23 cm, entire, not revolute, dark green, with slightly impressed veins above, and slightly raised veins below, glabrous above and below, papery thin; leaf base aequilateral to slightly oblique, cuneate to attenuate and decurrent on the petiole; leaf apex acute to acuminate. *Inflorescence* a much branched open thyrse 60+ cm high; branches 20–50

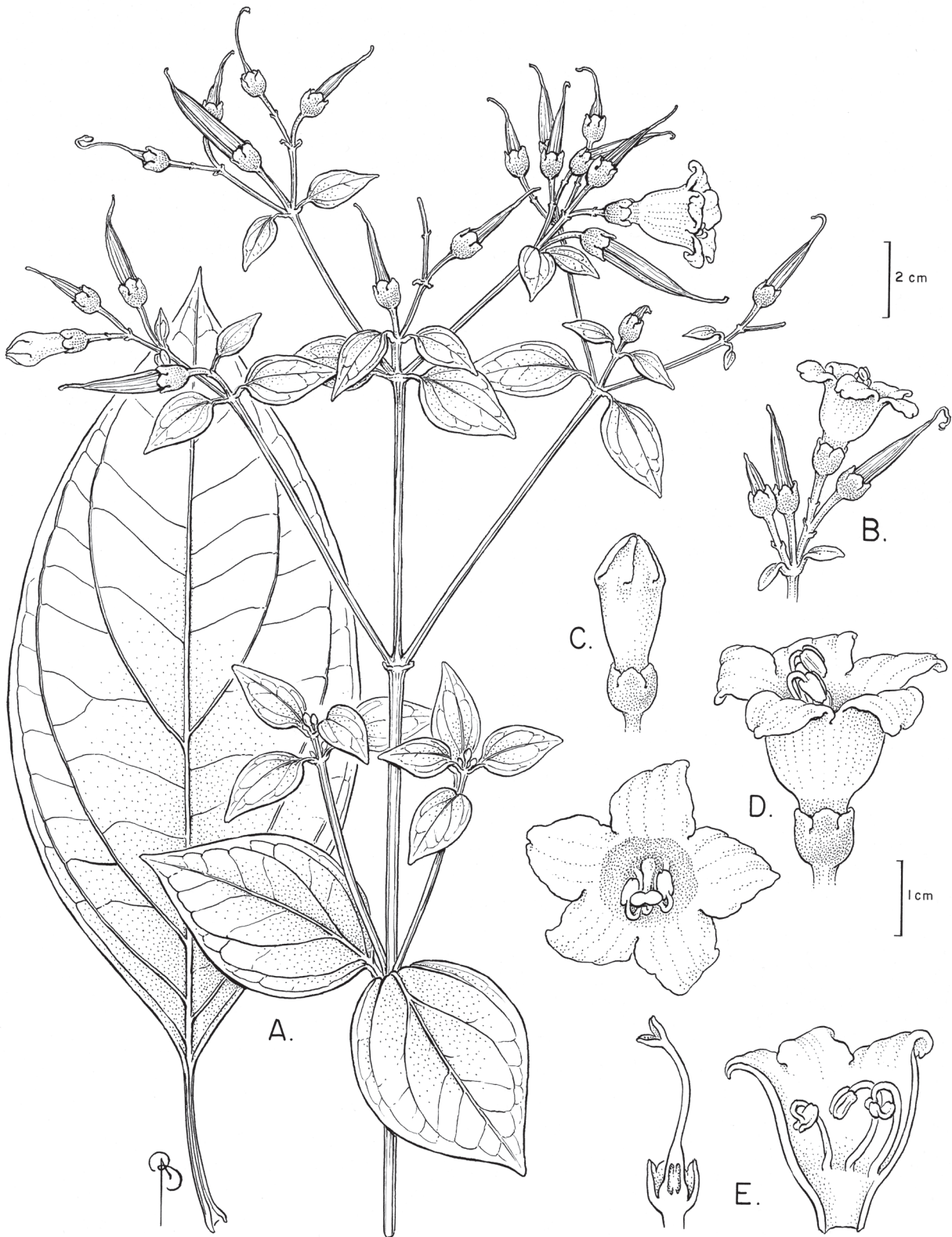


FIGURE 5. *Macrocarpaea illuminata*. A, habit of flowering stem; B, cyme; C, bud; D, flower; E, dissected flower. A drawn from Grant 4687 (NY), B-E from Grant 4650 (NY).

cm long; 7–15 flowered per branch. *Bracts* ovate to oval, short-petiolate, 18–300 × 5–130 mm; base aequilateral to slightly oblique, cuneate to attenuate and decurrent on the petiole; apex acute to acuminate; bract petioles 2–20 mm. *Flowers* pedicellate, erect to spreading; pedicels 17–25 mm long; bracteoles linear to lanceolate to ovate, 3–13 × 1–4 mm. *Calyx* campanulate, 6–9 × 6–9 mm, slightly spiculate to glabrous, dark green, ecarinate, ovate; calyx lobes 3–4 × 4.5–5.0 mm, rounded to obtuse. *Corolla* unknown. *Capsules* ellipsoidal, 28–35 × 6–8 mm, smooth to ribbed, faint-orange tan, erect to slightly nodding; style remnant 2–10 mm. *Seeds* “Perimetrically winged type,” flattened, roughly 3–4 sided in outline, yet appearing as myriads of different puzzle pieces, 0.8–1.0 × 0.5–1.0 mm, bicolored, testa tan, wings straw-colored, testa reticulate, wings ribbed.

Distribution and habitat: *Macrocarpaea pacifica* occurs on Pacific-facing slopes of the Andes in El Oro province in southern Ecuador. It is the southernmost species of *Macrocarpaea* on Pacific-facing slopes of the Andes; all other species are located much further north, for example *M. sodiroana*, *M. gattaca*, and *M. umbellata* on Pacific slopes from near Quito northwards, and *M. gulosa* and *M. maryae* in the Chocó of Colombia. *Macrocarpaea pacifica* is protected at the Reserva Biológica Buenaventura, Fundación de Conservación Jocotoco.

Etymology: Named for its occurrence on Pacific-facing slopes of the Andes.

Additional specimens examined: ECUADOR. El Oro: Piñas, Moromoro, Reserva Biológica Buenaventura (Fundación de Conservación Jocotoco), bosque Moscos, Quebrada obscura, 03°39'17"S, 079°44'32"W, 940–1050 m, 28 May 2011, Clark, J.L. et al. 12283 (NY); Parroquia El Placer, Reserva Buenaventura, propiedad de la Fundación Jocotoco, recorrido por el sendero desde la estación hasta el bosque Puma, bosque secundario con relictos de bosque primario, bosque humedo pre-montano, 03°38'41"S, 079°45'46"W, 1000 m, 4 April 2005, Vargas, H. et al. 5191 (MO); Piñas, Parroquia El Placer, Reserva Ecológica Buenaventura, propiedad de la Fundación Jocotoco, sendero al Jardín Botánico, entrada por la Cripta de la Virgen, bosque primario, bosque humedo pre-montano, 03°39'33"S, 079°44'25"W, 1220 m, 8 April 2005, Vargas, H. et al. 5344 (MO, NY).

Macrocarpaea pacifica belongs to a group of closely related species restricted to the Amotape-Huancabamba zone including *M. catherineae*, *M. claireae*, *M. dies-viridis*, *M. illuminata*, *M. lenae*, *M. micrantha*, *M. pacifica*, *M. quizhpei*, and *M. xerantifulva*. It appears most closely related to *M. lenae* in overall shape and form, including calyces that dry dark green (to nearly black in *M. lenae*), yet differs in having slightly spiculate calyces, and leaves that are decurrent on the petiole.

5. *Macrocarpaea umbellata* Weaver & J.R. Grant, sp. nov. TYPE: COLOMBIA. Valle: Cordillera Occidental, vertiente occidental, hoyo del Río Digua, lado izquierdo, Piedra de Moler, bosques, 900–1180 m, arbolito mas menos 5 m, ramas terminales verdes, herbaceas, caliz verde claro,

corolla amarillo manteca, 19 August 1943, J. Cuatrecasas 14986 (Holotype: F [3 sheets]; isotypes US [2 sheets]; VALLE). Fig. 6. A–F.

Macrocarpaea umbellata is a new species from Pacific-facing slopes of the Andes on the Cordillera Occidental in eastern Colombia and northern Ecuador that differs from Ecuadorian *Macrocarpaea sodiroana* in leaves that are larger, thinner-textured, with less prominent venation, long-attenuate at the base and long-acuminate at the apex, cymes that are generally more congested, and shorter pedicels.

Unbranched *shrub* to tree 1–5 m, glabrous throughout. *Stems* terete to slightly quadrangular above, hollow, 6–14 mm in diameter just below inflorescence. *Leaves* ovate, elliptic, rhombic, to nearly obovate, sessile to long-petiolate, 13–59 cm long. *Petioles* 0–90 mm, slender with very slight vagination; interpetiolar ridge 1–5 mm. *Blades* 13–59 × 6–26 cm, entire, not revolute, dark green, with slightly impressed veins above, and slightly raised veins below, glabrous above and below, papery thin to thin coriaceous; leaf base aequilateral to slightly oblique, cuneate to attenuate and decurrent on the petiole to the base of the leaf; leaf apex acuminate. *Inflorescence* a much branched open thyrse 50+ cm high, branches 8–40 cm long; 5–12 flowered per branch. *Bracts* ovate to lanceolate, sessile to short-petiolate, 8–130 × 2–75 mm; bract base aequilateral to oblique, cuneate to rounded; bract apex acuminate; bract petioles 0–5 mm. *Flowers* pedicellate, erect; pedicels 8–28 mm long; bracteoles inconspicuous, linear to lanceolate, 1–8 × 0.5–2.0 mm. *Calyx* campanulate, 6–10 × 6–8 mm, glabrous, smooth, green, ecarinate, ovate; calyx lobes 3–5 × 4–6 mm, obtuse to rounded. *Corolla* funnel-shaped, 27–36 mm long, 12–20 mm wide at the apex of the tube, yellow, smooth; corolla lobes ovate to elliptic, 7–11 × 6–7 mm, obtuse to rounded. *Stamens* 20–25 mm long; filaments 16–20 mm long, filiform, flattened; anthers elliptic to oblong, 4–5 × 1.5–2.0 mm, sagittate, versatile; pollen glabra-type. *Pistil* 28–34 mm long; ovary 8–9 × 2–3 mm; style 17–21 mm long; stigma lobes spatulate, 3–4 × 2.0–2.5 mm. *Capsules* shaped like an elephant's tusk (that is, linear-long to narrowly ellipsoidal yet always arched upwards), (10)30–37 × 6–12 mm, smooth to ribbed, chestnut-tan, erect to slightly spreading; style remnant 4–11 mm. *Seeds* “Perimetrically winged type,” flattened, roughly 3–4 sided in outline, yet appearing as myriads of different puzzle pieces, 0.4–0.7 × 0.8–1.3 mm, bicolored, testa orangish-brown, wings straw-colored; testa reticulate, wings ribbed.

Distribution and habitat: *Macrocarpaea umbellata* occurs on Pacific-facing slopes of the Cordillera Occidental from Valle, Cauca, Nariño, and Putumayo in Colombia to Carchi in northern Ecuador.

Etymology: Named for the sub-umbellate structure of the cymes in the inflorescence.

Additional specimens examined: COLOMBIA. Mutis 334 (US). Cauca: Santa Martha, Bota Caucana, en la via Mocoa-Pitalito, ca. 5 km del puente del Río Caquetá, 1100 m, 25 January 1990, Ramos, J.E. et al. 2501 (CUVC, MO, U); Mun. Santa Rosa, Corregimiento Descanse, Vereda Génova, en cercanía de la quebrada La Isla, Finca La Isla, 1100 m,



FIGURE 6. *Macrocarpaea umbellata*. A, leaf; B, habit of fruiting stem; C, fruit; D, flowering stem; E, flower. A–E drawn from Cuatrecasas 14986 (US), B–C from Madison et al. 4795 (F), and D–E from Croat 38605 (MO).

8 April 1995, *Rubiano, L.J. & Moreno O. 644* (COL). Nariño: Res. Nat. La Planada, 7 km de Chucunes, 1800 m, 15 November 1987, *Benavides, O. de 8953* (MO); Trayecto Pialapi-La Planada, 1300-1700 m, 23 July 1988, *Benavides, O. de 10122* (MO); 2-8 km E of Junin on Tumaco-Tuquirres rd, 1100 m, 26 July 1986, *Gentry, A. et al. 55232* (MO, U); Mpio. de Ricaurte, Resguardo Indígena Nulpe Medio, Orillas del río Nulpe, 715 m, 6 January 1996, *González & Ramírez P. 1554* (QCA); Altaquer, 1000 m, 14 June 1986, *Maas, P.J.M. et al. 6528* (U); Mpio. de Ricaurte, Trayecto La Planada-San Isidro, 1500-2700 m, 16 November 1991, *Ramírez, B.R. 4270* (MO); Ricárte, 1300 m, 7 April 1941, *von Sneidern 512* (S). Valle: Cali-Buenaventura hwy, 28 km beyond the junction with the new hwy, 1400-1420 m, 28 August 1976, *Croat, T.B. 38605* (MO); Río Anchicaya near CVC hydroelectric plant, 400-500 m, 15 December 1981, *Gentry, A. 35666* (COL, MO). ECUADOR. Between Rio Verde and Rio Blanco, 7 January 1962, *Dodson, C.H. & L.B. Thien 1925* (AAU, MO, NY); *Verleysen s.n.* (QPLS). Carchi: Camaña El Corazón y alrededores Carchi, 2200 m, 11 February 1997, *Anton 320* (QCA, QCNE); Tulcán-Maldonado highway, Chical Trail, 1500 m, 26 January 1977, *Boeke, J.D. 845* (AAU, MO, NY, QCA); Along road from El Chical to Tulcán, 7.4 km E of El Chical, 1393 m, 19 February 2004, *Croat, T.B. 94939* (MO, NY, QCNE); Road from La Carolina (between Ibarra and San Lorenzo) northeast towards El Chical, 00°54'56.3"N, 078°12'04.6"W, 1497 m, 6 February 13, *Grant, J.R. & J. Cortina 13-5107* (NY); Vic. of Maldonado, 1600-1900 m, 13 April 1977, *Madison, M.T. 3956* (NY); Environs of Chical, 12 km below Maldonado, 1200 m, 30 May 1978, *Madison, M.T. et al. 4795* (F, QCA, SEL); Peñas Blancas, 20 km below Maldonado on the Río San Juan, 900-1000 m, 27 May 1978, *Madison, M.T. et al. 4614* (F, QCA, SEL); Environs of Chical, 12 km below Maldonado, 1200 m, 30 May 1978, *Madison, M.T. et al. 4795* (F, QCA, SEL); Tulcan, Res. Indígena Awá, 1800 m, 15 June 1991, *Rubio et al. 1636* (MO, QCNE); Reserva Golondrinas, recorrido por el sendero de las mulas hasta la casa de la Fundación Golondrinas en Santa Rosa. Bosque muy húmedo montano, bosque primario, arbusto de 2 m, tallos huecos, flores amarillo-verdosas, 00°50'N, 078°08'W, 1790 m, 26 January 2004, *Vargas, H. et al. 4469* (MO, NY, QCNE).

Macrocarpaea umbellata belongs to a group of closely related species with leaves that are generally long-decurrent on the petiole including *M. cortinae*, *M. pringleana*, *M. sodiroana*, and *M. umbellata*. It can be easily identified by its large thin leaves with a sessile to long-attenuate base and acuminate apex, cymes congested so as to form sub-umbels of flowers, squat and deeply cleft calyces, extremely reduced bracteoles. *Macrocarpaea umbellata* has previously been identified as *M. sodiroana*, which is now recognized as a narrow endemic of Pichincha, Ecuador (Grant 2003; 2014). The two species are similar in their general leaf morphology and inflorescence architecture, but *M. umbellata* differs in leaves that are larger, thinner-textured, with less prominent venation, long-attenuate at the base and long-acuminate at the apex, cymes that are generally more congested, and shorter pedicels.

6. *Macrocarpaea stenophylla* Gilg, Bot. Jahrb. Syst. 22: 337. 1896. Fig. 7. E-G.

This is the first report of *Macrocarpaea stenophylla* in Ecuador, or even on the Cordillera del Condor. It was previously only known from the Chachapoyas region of northern Peru, but this range extension is not surprising since other species known best from northern Peru have been found here recently. At 30-50 cm tall, *Macrocarpaea stenophylla* is perhaps the shortest of all species in the genus, other than its most closely related species of similar stature, *M. wurdackii* of northern Peru. It was collected in low scrub vegetation on summits of the Cordillera del Condor that have been burned, so it is possible that larger plants may occur outside of burn areas.

It was first thought that these collections represented a new species provisionally called *M. "lilliputiana"* (Grant 2014). However, subsequent morphological studies indicate this the material falls within the currently understood circumscription of *M. stenophylla*, as is the same case of *M. "zumbae"* for *M. harlingii* (Fig. 7 A-D). *Macrocarpaea stenophylla* is part of a group of closely related group with smooth leathery leaves where the secondary leaf veins are absent or scarcely visible including *M. abiseo*, *M. harlingii*, and *M. pajonalis*. In Ecuador, *M. stenophylla* is superficially similar to *M. subsessilis* that prospers and resprouts on burned slopes of the Yangana-Cerro Toledo road. *Macrocarpaea stenophylla* can be differentiated from *M. subsessilis* in its shorter leaves (2-5 vs. 2.5-9.0 cm), much smaller calyx (6-8 mm vs. 8-13 mm), and shorter capsules (10-13 vs. 11-15 mm).

Additional specimens examined: ECUADOR. Zamora-Chinchipe: Paquisha Cantón, Cordillera del Cóndor, Machinaza plateau summit area, adjacent to obelisk-shaped border marker, at end of trail from upper Paquisha military post, precisely on Ecuador-Peru border, nearly level sandstone plateau with low scrub vegetation, charred stems and regrowth indicate that area was burned about 15 years previously, small shrub or subshrub, 30-50 cm tall, growing on bare sandstone rock plateau, 03°53'50"S, 078°28'49"W, 2420 m, 15 March 2008, *Neill, D. & W. Quizhpe 16113* (MO, NY). Paquisha Cantón, Cordillera del Cóndor, the Machinaza plateau, one of the highest-elevation Hollín sandstone plateaus in the Condór region, about 500 m west of the Ecuador-Peru international border, near end of trail from Paquisha Alto military post. Bare sandstone substrate, or quartzite sand derived therefrom, very nutrient poor. Dwarf scrub vegetation, dominated by shrubs to about 1.5 m tall, with occasional small tree to 4 m tall. Vegetation recovering slowly from an extensive burn about 20 years previously, with charred woody stems in abundance on ground, 03°54'06"S, 078°28'57"W, 2315 m, 23 June 2009, *Neill, D. & C. Kajekai 16910* (LOJA, MO, QCNE).



FIGURE 7. *Macroparpaea harlingii* (A–D) and *M. stenophylla* (E–G). A, habit of flowering stem; B, lower leaf; C, flower and bud, side view; D, pistil and calyx; E, habit; F, bud and flower with bracts; G, capsule with bracts. A–D from Grant 4669 (pickles and 2 sheets), E–F from Neill & Quizhpe 16113 (unmounted specimen), G from Neill & Kajekai 16910 (MO).

LITERATURE CITED

- 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.
- . 2004. *De Macrocarpaeae Grisebach (ex Gentianaceis) speciebus novis V*: Twenty-three new species largely from Peru, and typification of all species in the genus. Harvard Pap. Bot. 9(1): 11–49.
- . 2005. *De Macrocarpaeae Grisebach (ex Gentianaceis) speciebus novis VI*: seed morphology, palynology, an infrageneric classification, and another twenty-three new species, largely from Colombia. Harvard Pap. Bot. 9(2): 305–342.
- . 2007. *De Macrocarpaeae Grisebach (ex Gentianaceis) speciebus novis VII*: Four new species and two natural hybrids. Harvard Pap. Bot. 11(2): 129–139.
- . 2008. *De Macrocarpaeae Grisebach (ex Gentianaceis) speciebus novis VIII*: Two new species from Ecuador. Harvard Pap. Bot. 13(2): 253–259.
- . 2011. *De Macrocarpaeae Grisebach (ex Gentianaceis) speciebus novis IX*: A synopsis of the genus in Bolivia. Harvard Pap. Bot. 16(2): 389–397.
- . 2014. Chapter 3: A monographic revision of the neotropical genus *Macrocarpaea* (Gentianaceae) in Ecuador. Pages 37–147 in J. J. RYBCZYNSKI ET AL., EDS. *The Gentianaceae—Volume 1: Characterization and Ecology*. Springer-Verlag Berlin Heidelberg.
- AND L. STRUWE. 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.
- AND V. TRUNZ. 2011. *De Macrocarpaeae Grisebach (ex Gentianaceis) speciebus novis X*: A synopsis of the genus in Montane Atlantic Forests of Brazil. Harvard Pap. Bot. 16(2): 399–420.
- AND R. E. WEAVER. 2003. *De Macrocarpaeae Grisebach (ex Gentianaceis) speciebus novis IV*: Twelve new species of *Macrocarpaea* (Gentianaceae: *Helieae*) from Central and South America, and the first report of the presence of a stipule in the family. Harvard Pap. Bot. 8(1): 83–109.