

DE MACROCARPAEAE GRISEBACH (EX GENTIANACEIS)
SPECIEBUS NOVIS VIII: TWO NEW SPECIES FROM ECUADOR

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Abstract. Two new species, *Macrocarpaea claireae* and *M. quizhpei* (Gentianaceae: Helieae), are described from the Huancabamba region of southern Ecuador. *Macrocarpaea claireae* occurs around Valladolid, adjacent to P. N. Podocarpus, and *M. quizhpei* occurs in the Nangaritza watershed. *M. claireae* is closely related to *M. pringleana* and *M. sodiroana*, yet differs notably in its glaucous-green, campanulate-urceolate calyx. *Macrocarpaea quizhpei* has affinities to *M. dies-viridis*, but differs in having a large, diffusely branched, open thyrse to 1.3 m high.

Keywords: *Macrocarpaea*, Gentianaceae, Helieae, Ecuador

During fieldwork from December 2007–January 2008, a number of taxa of *Macrocarpaea* (Griseb.) Gilg (Gentianaceae: Helieae) were collected in various remote regions in southern Ecuador. Several of these localities were visited to gather fresh material of species previously collected by other botanists that I suspected to be new. Subsequent morphological, ecological, and molecular studies have confirmed these hypotheses. Two new species are described here as a contribution to a genus-wide monograph in preparation (Grant, 2003, 2004, 2005, 2007; Grant and Struwe, 2001, 2003; Grant and Weaver, 2003).

The two new species described here belong to a clade in sect. *Choriophylla* comprised of at least eight species as indicated by morphology and DNA sequences: *Macrocarpaea claireae* J. R. Grant, *M. dies-viridis* J. R. Grant, *M. jensii*

Struwe & J. R. Grant, *M. lenae* J. R. Grant, *M. luctans* J. R. Grant, *M. pringleana* J. R. Grant, *M. quizhpei* J. R. Grant, and *M. sodiroana* Gilg (Grant, 2007; J. R. Grant, unpublished data). Nearly all of these species have been recently described based on freshly collected specimens from the Huancabamba region of southern Ecuador and northern Peru. The following nine species probably belong to this group as well, but formal assignment awaits additional material: *M. angustifolia* J. S. Pringle (Central Peru), *M. dillonii* J. R. Grant (Northern Peru), *M. gravabilis* J. R. Grant (Colombia), *M. kayakifolia* J. R. Grant (Central Peru), *M. kuepferiana* J. R. Grant (Southern Peru), *M. maryae* J. R. Grant (Colombia), *M. quechua* J. R. Grant (Northern Peru), *M. wallnoeferi* J. R. Grant (Central Peru), and *M. xerantifulva* J. R. Grant (Northern Peru).

NEW SPECIES

1. ***Macrocarpaea claireae*** J. R. Grant, *sp. nov.*
TYPE: ECUADOR. Zamora-Chinchi: 2 km N of Valladolid, 04° 32'354"S, 079°07'908"W, 1767 m, 4 Jan 2008, Jason R. Grant, Camille Agier, Claire Arnold & Mei Lin Cheung 08-4528 (Holotype: QCNE; Isotypes: G, LOJA, NY). Fig. 1–2.

A Macrocarpaea pringleana J. R. Grant *cui affinis, sed ramis inflorescentiis brevioribus paucifloribus, pedicellis brevioribus, et calycibus glaucis campanulatis-urceolatis differt.*

Unbranched shrub to small tree, 1.5–2.0 m, glabrous throughout. *Trunk* to 2 cm diam., wood hollow in trunk and in branches, rings scarcely

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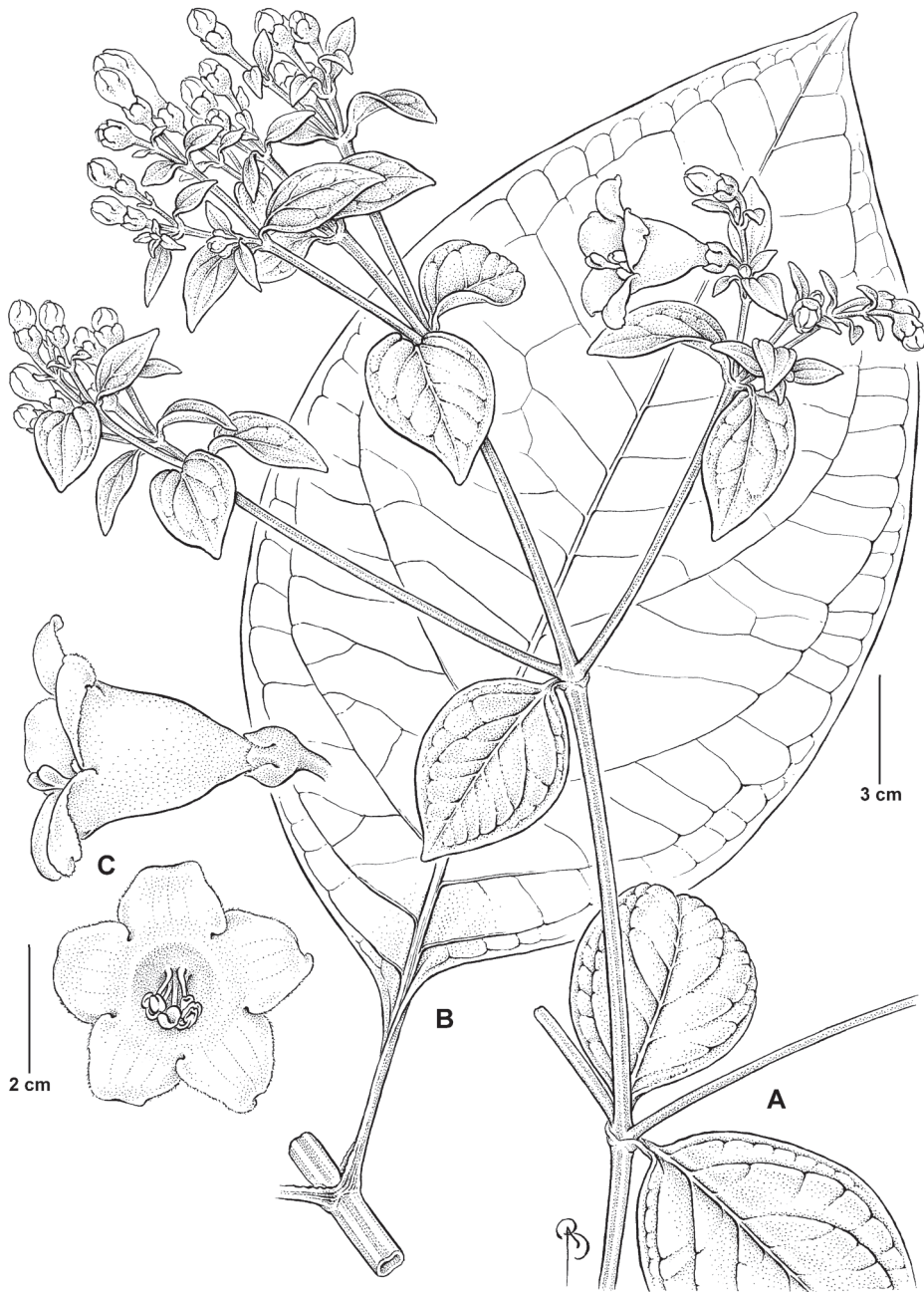


FIGURE 1. *Macroparpea claireae* J. R. Grant. **A**, habit of flowering stem; **B**, leaf; **C**, corolla viewed from front (below) and side (above). Drawn from *Grant et al. 08-4528* by Bobbi Angell.



FIGURE 2. Three sympatric species of *Macroparpaea*. **A**, from left to right: *M. noctiluca*, *M. apparata*, *M. claireae*. **B**, from left to right: *Macroparpaea apparata*, *M. noctiluca*, and *M. claireae*. **C–D**, *M. claireae*. Photos by Jason R. Grant.

visible; bark papery-thin, outer surface smooth to rugose, tan to greenish. *Stems* terete to quadrangular, hollow, 6–8 mm diam. just below the inflorescence. *Leaves* oval, elliptic to ovate, petiolate, (17–)26–35 cm long. Petioles (20–)35–50 mm, slender with slight vagination; interpetiolar ridge 1–3 mm high. Blades (15.0–)22.5–30.0 × (8.5–)11.5–17.5 cm, entire, not revolute, dark-green though yellowing along the margins of all major veins, with slightly impressed veins above, and slightly raised veins below, glabrous above and below, papery-thin; base aequilateral to oblique, rounded to cuneate and slightly decurrent on the petiole; apex acuminate to acute. *Inflorescence* a few-branched, open thyse, 75+ cm long; branches 10–24 cm long; 5–9 flowered per branch. Bracts ovate, sessile to short-petiolate, 10–60(–120) × 5–65 mm; base aequilateral to oblique, cuneate to rounded; apex acute to acuminate; bract petiole 0–6 mm. *Flowers* pedicellate, erect to slightly spreading; pedicels 10–22 mm long; bracteoles linear to lanceolate, 3–11 × 0.5–3.0 mm. Calyx campanulate-urceolate, 7–8 × 6–8 mm, glabrous to faintly scabrous, glaucous-green, ecarinate, reniform to ovate; calyx lobes 3–4 × 4.0–5.5 mm, apex rounded to obtuse. Corolla funnel-shaped, 30–33 mm long, 20–23 mm wide at the apex of the tube, light green, smooth; corolla lobes ovate, 10–12 × 8–10 mm; apex obtuse to rounded. Stamens 25.5–28.0 mm long; filaments 22–24 mm long, filiform, flattened; anthers elliptic to oblong, 3.5–4.0 × 1.5–2.0 mm, sagittate, versatile; pollen Glabra-type (sensu Nilsson, 1968; and Grant 2005). Pistil 30–32 mm long; ovary 6–8 × 2–3 mm; style 21–22 × 0.5–1.0 mm; stigma lobes spatulate, 2–3 × 1–2 mm. Capsules and seeds unknown.

Eponymy: named for Dr. Claire Elvire Arnold (1968–), co-collector of the type, a Swiss plant population biologist at the Université de Neuchâtel, Switzerland (NEU), who first sighted this species.

Macrocarpaea claireae is related to *M. pringleana* and *M. sodiroana* but differs from both in having fewer flowers per branch (5–9 vs. 3–18) and a glaucous-green, more campanulate-urceolate calyx. In particular, the new species differs from *M. pringleana* in having generally shorter branches in the inflorescence (10–24 vs. 6–40 cm) and shorter pedicels (10–22 vs. 11–27 mm); and from *M. sodiroana* in a smaller

diameter of the stem just below the inflorescence (6–8 vs. 4–15 mm) and light green (vs. whitish-yellow) corolla.

Macrocarpaea claireae is geographically isolated from its most closely related species *M. pringleana* (Amazon-facing slopes of southern to northern Ecuador) and *M. sodiroana* (Pacific-facing slopes of northwestern Ecuador and southwestern Colombia). *Macrocarpaea claireae* is found just north of Valladolid in the Zamora-Chinchipec province in southern Ecuador, even further south than *M. pringleana*, and might be expected to also occur in northern Peru. Although most species of *Macrocarpaea* that occur in the Huancabamba region are restricted to either the Ecuador side or the Peru side, several are more widespread and occur in both southern Ecuador and northern Peru including: *M. bubops* J. R. Grant & Struwe, *M. harlingii* J. S. Pringle, *M. innarrabilis* J. R. Grant, *M. luctans* J. R. Grant, *M. micrantha* Gilg, and *M. noctiluca* J. R. Grant & Struwe.

Two other species that are nearly sympatric with *Macrocarpaea claireae* are *M. apparata* J. R. Grant & Struwe and *M. noctiluca*, though both belong to another species complex comprised of *M. bubops*, *M. elix* J. R. Grant, and *M. harlingii*, and possibly more. *Macrocarpaea claireae* can be easily differentiated from *M. apparata* and *M. noctiluca* by differences in their calyx and corolla morphology and coloration as seen by photos in the field (Fig. 2). *Macrocarpaea claireae* has a smaller, light green corolla and broad, flattened calyx lobes, while both *M. apparata* and *M. noctiluca* have larger, yellow-cream corollas, and calyx lobes that are thickened dorsally.

2. *Macrocarpaea quizhpei* J. R. Grant, *sp. nov.*
TYPE: ECUADOR. Zamora-Chinchipec: Nangaritza, Región de la Cordillera del Cóndor, cuenca del alto Río Nangaritza, Las Orquídeas, bosque muy húmedo, en colina, suelo arcilloso, 04° 13' 15" S, 078° 40' 54" W, 1100 m, arbusto de 3–4 m, flores de color verde-crema y/o amarillento, 11 Feb 2006, *Wilson Quizhpe & Fabienne Luisier 1913* (Holotype: LOJA; Isotypes: MO, NY, QCNE). Fig. 3.

A Macrocarpaea dies-viridis J. R. Grant *cui affinis, sed inflorescentiis diffusis grandioribus, et ramis inflorescentiis et pedicellis longioribus differt.*

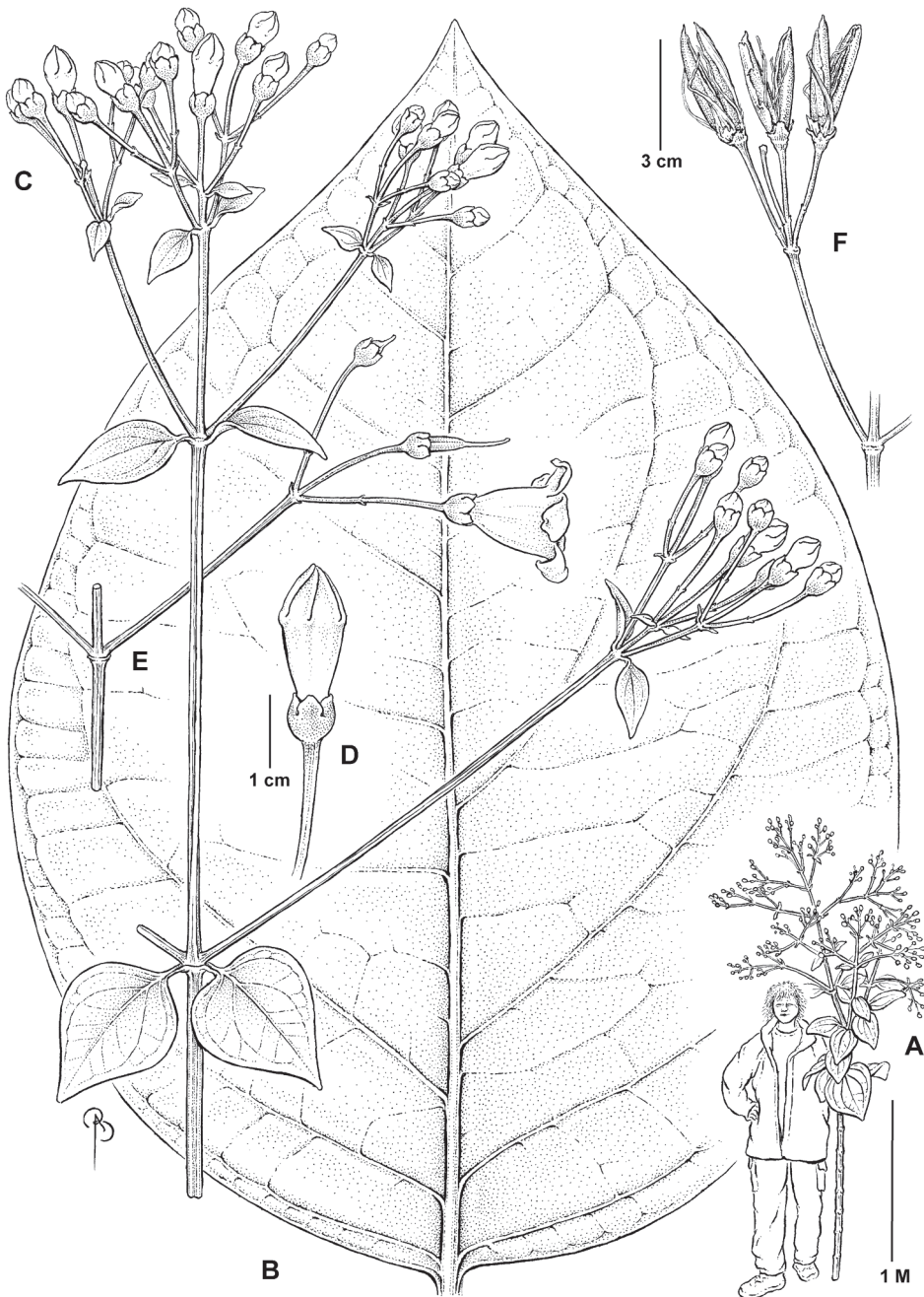


FIGURE 3. *Macrocarpaea quizhpei* J. R. Grant. **A**, habit of tree in the field (Claire Arnold holding plant); **B**, leaf; **C**, habit of flowering stem; **D**, bud; **E**, flowering stem; **F**, fruits. A–D, F drawn from *Grant et al. 08-4537*, E drawn from *Quizhpe & Luisier 1913* by Bobbi Angell.

Unbranched shrub to small tree, 1–3 m, glabrous throughout. *Trunk* to 2 cm diam., wood hollow in trunk and in branches, rings scarcely visible; bark papery-thin, outer surface smooth to rugose, tan to greenish. *Stems* terete to quadrangular, hollow, 6–13 mm diam. just below the inflorescence. *Leaves* broadly ovate to elliptic, long-petiolate, (16–)39–46 cm long. Petioles 50–110 mm, slender with slight vagination; interpetiolar ridge 2–3 mm high. Blades (14–)30–36 × (9–)23–26.5 cm, entire, not revolute, dark green, with slightly impressed veins above, and slightly raised veins below, glabrous above and below, papery-thin; base aequilateral to oblique, rounded to nearly truncate; apex acute to acuminate. *Inflorescence* a much diffusely branched, open thyrse to 1.3 m; branches 10–60+ cm long, 3–9 flowered per branch. Bracts broadly ovate, ovate to lanceolate, short-petiolate, 18–62(–160) × 5–45(–90) mm; base aequilateral to oblique, rounded to nearly truncate; apex acuminate to acute; bract petioles 1–5 mm. *Flowers* pedicellate, erect to slightly spreading; pedicels 20–52 mm, long; bracteoles linear to lanceolate, 1–10 × 0.5–2.0 mm. Calyx campanulate, 7–9 × 7–8 mm, glabrous, smooth, green, ecarinate, ovate; calyx lobes 2.5–5.0 × 3.5–4.0 mm, apex rounded to obtuse. Corolla funnel-shaped, 38–40 mm long, 18–20 mm wide at the apex of the tube, light green, smooth; corolla lobes ovate, 10–12 × 8–12 mm, obtuse to rounded. Stamens 30.0–32.5 mm long; filaments 28–30 mm long, filiform, flattened; anthers elliptic to oblong, 5–6 × 2.0–2.5 mm, sagittate, versatile; pollen Glabra-type (sensu Nilsson, 1968; Grant, 2005). Pistil 31–33 mm long; ovary 8–11 × 3–4 mm; style 19–21 × 1.0–1.5; stigma lobes spatulate, 2–3 × 1–2 mm. *Capsules* ellipsoidal to oblong, 35–38 × 6–8 mm, smooth to faintly ribbed, faint orangish-tan, erect to slightly nodding; style remnant 1–2 mm long. *Seeds* “perimetrically winged type” (sensu Grant, 2005), flattened, roughly 3–4-sided in outline, yet appearing as myriads of different puzzle pieces, 0.8–1.2 × 0.8–1.0 mm, bi-colored, testa brown, wings

straw-colored, testa reticulate, wings ribbed.

Additional specimens examined: ECUADOR. Zamora-Chinchipec: Nangariza, Región de la Cordillera del Cóndor, cuenca del alto Río Nangariza, Las Orquídeas, 04°09'222"S, 078°38'555"W, 877 m, 8 January 2008, *Jason R. Grant & Claire Arnold 08-4537* (G, LOJA, MO, NY, QCA).

Eponymy: named for the collector of the type and good friend, Ing. Wilson Quizhpe (1967–), an Ecuadorian botanist of the Herbario Loja, Universidad Nacional de Loja, Ecuador (LOJA).

Macrocarpaea quizhpei appears to be closely related to *M. dies-viridis* with which it shares characteristically large, broad leaves, often characteristic of plants of lower elevations. It differs in having a much larger inflorescence (up to 1.3 m high vs. 40–80 cm), longer inflorescence branches (10–60+ cm vs. 5–30 cm), and longer pedicels (20–52 mm vs. 14–25 mm). The flowers are distributed diffusely within the large, open-thyrse inflorescence (vs. the more compact cymes of *M. dies-viridis* or other related species such as *M. lenae* and *M. pringleana*).

Macrocarpaea quizhpei occurs within the Nangariza watershed east of P. N. Podocarpus. At the Las Orquídeas site, it is sympatric with *M. micrantha* (*Grant & Arnold 08-4538*), which is in fact one of the most widespread species in the lowlands of the Huancabamba region of southern Ecuador and northern Peru. *Macrocarpaea micrantha* is often found growing with other species, and like *M. noctiluca* and *M. harlingii* elsewhere, its presence can be indicative of a good habitat to find other, more rare species of *Macrocarpaea*; at Bombuscaro, it is sympatric with *M. lenae*. Both *M. quizhpei* (1100 m) and *M. micrantha* (300–1100 m) grow at some of the lowest elevations for *Macrocarpaea* in the Andes. *Macrocarpaea quizhpei* is presently only known from essentially one locality in southern Ecuador, but it may also occur in northern Peru.

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