

DE MACROCARPAEAE GRISEBACH (EX GENTIANACEIS)
SPECIEBUS NOVIS VII: FOUR NEW SPECIES
AND TWO NATURAL HYBRIDS

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Abstract. Four new species, *Macrocarpaea dies-viridis* (Ecuador), *M. luctans* (Ecuador, Peru), *M. lucubrans* (Panama), and *M. opulenta* (Ecuador), and two natural hybrids, *M. × acuminata* (Costa Rica) and *M. × mattii* (Ecuador), are described. *Macrocarpaea × acuminata* Weaver (pro sp.) is recognized as a natural hybrid between *M. subcaudata* and *M. valerii*, rather than as a distinct species, and *M. × mattii* is described here as a natural hybrid between *M. noctiluca* and *M. subsessilis*. The average number of seeds per capsule of *M. dies-viridis* is reported. With 10,400–11,000 seeds per capsule, this is the first report in the genus.

Keywords: *Macrocarpaea*, Gentianaceae, natural hybrids, Ecuador, Peru, Panama, Costa Rica.

Studies on *Macrocarpaea* have revealed numerous new species in this morphologically diverse genus of the Neotropics (Grant, 2003, 2004, 2005; Grant and Struwe, 2001, 2003; Grant and Weaver, 2003). This installment continues the work, reporting two new species described from herbarium material (*M. luctans*

and *M. lucubrans*) and two others discovered during a recent plant-collecting trip to the Cordillera del Cóndor in southern Ecuador (*M. dies-viridis* and *M. opulenta*). Additional new species from this remote and species-rich region are expected to be found in future expeditions.

NEW SPECIES

1. *Macrocarpaea dies-viridis* J.R. Grant, *sp. nov.*
TYPE: ECUADOR. Zamora-Chinchipec: Cordillera del Cóndor, 8.8 km E of Paquisha, 03°56'03" S, 078°37'32" W, 1369 m, 27 February 2006, Jason R. Grant, Mei Lin Cheung, Fabienne Luisier & Neil Villard 06-4352 (Holotype: NY; Isotypes: G, LOJA, MO, QCA). Fig. 1.

A *Macrocarpaea pringleana* J. R. Grant *cui affinis sed foliis grandioribus, calycibus scabrosis hyalinis, capsulis longioribus (32–45 vs. 23–32 mm), et seminibus grandioribus differt.*

Shrub or small tree, 1–4 m, glabrous throughout, though calyces are hyaline scabrous with

short simple hairs. Trunk to 3 cm diam., wood solid in lower portions to hollow above and in branches, rings scarcely visible; bark papery thin to scarcely measurable, 0.05 mm thick, outer surface smooth to rugose, tan to greenish, blotched with lichens and mosses. Stems terete, hollow, 6–14 mm diam. just below the inflorescence. Leaves ovate to ovate-elliptic, long-petiole, (17–)44–51 cm long. Petioles (20–)80–100 mm, slender with slight vagination; interpetiolar ridge 2–3 mm high. Blades (15–)33–41 × (7–)18–32 mm, entire, not revolute, dark green, with slightly impressed veins above, and slightly raised veins below, glabrous above and

This work was supported by two Swiss National Science Foundation grants, Nos. 3100-052885 and 3100-065395, to Philippe K upfer at the Universit  de Neuch tel, Switzerland. Fieldwork in Ecuador in 2006 was generously supported by a travel grant from the Swiss Academy of Sciences (SCNAT). Bobbi Angell skillfully prepared the illustrations, and Neil Villard took the photographs of the herbarium specimens. Seeds of *Macrocarpaea dies-viridis* were counted by Mei Lin Cheung, M lanie Thobor, and Neil Villard. Library research was largely carried out at the Conservatoire et Jardins botaniques de la Ville de Gen ve, Switzerland. I thank the following herbaria for loans of material, photocopies of specimens, data on their collections, and/or hospitality extended during visits* to examine material of *Macrocarpaea*: AAU, AFP, ALA,* B, BM, BP, BR,* BRIT, BSB, C, CAS, CAUP, CHOCO, CHR,* COAH,* COL,* CONN, CR, CUV,* CUZ,* DAV, DUKE, E, EHH, F, FAUC, FI, FLAS, FMB, FR,* G,* GB, GH,* GOET, HAC, HAL, HAM, HAO,* HUA,* HUCP, HUQ, HUT,* IAN,* INB, INPA,* JAUM, JBSD, JE, K, L, LD, LINN, LOJA,* LPB, LS, M, MA,* MANCH, MARY,* MBM,* MEDEL,* MER,* MG,* MICH, MIN, MO,* MOL,* MSB, MU, MY, NA, NEU,* NO, NSW,* NY,* OXF, P,* PH, PORT,* PR, PRC, Q,* QAP,* QCA,* QCNE,* QPLS,* QUSF,* R,* RB,* RNG,* S,* SBBG,* SEL,* SP,* SPF,* TEX, U, UC, UCWI, UDBC, UPCB, UPS, UPTC, US,* USM,* VALLE,* VEN,* W,* WIS, WU,* YU, and Z.*

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FIGURE 1. *Macroparpaea dies-viridis*. A, habit of fruiting stem, and leaf behind; B, interpetiolar ridge; C, corolla viewed from front (below) and side (above); D, young fruit. Drawn from Grant et al. 06-4348 and Grant et al. 06-4352.

below, papery thin; base equilateral to oblique, rounded to cuneate and slightly decurrent on the petiole; apex nearly rounded then acuminate, acute to nearly cuspidate. Inflorescence a much-branched open thyrse, 40+ cm long; branches 5–30 cm long; 9- to 20-flowered per branch. Bracts ovate to lanceolate, sessile to short-petiolate, 10–95 × 3–60 mm; base equilateral to oblique, rounded, cuneate, to slightly cordate; apex acute to acuminate; bract petioles 0–5 mm. Flowers pedicellate, erect to spreading; pedicels 14–25 mm long; bracteoles linear to lanceolate, 2–10 × 1–3 mm. Calyx campanulate, 6–8 × 6–7 mm, glabrous to hyaline scabrous with short simple hairs, green, ecarinate; calyx lobes ovate to rotund, 3–4 × 4–5 mm, apex rounded to obtuse. Corolla funnel-shaped, yet measurements unknown. Capsules ellipsoidal to linear-long, 32–45 × 6–8 mm, smooth to faintly ribbed, greenish brown to tan, erect; style remnant 5–12 mm long. Seeds “perimetrically winged type,” flattened, roughly 3- to 4-sided in outline, yet appearing as myriads of different puzzle pieces, 0.9–1.3 × 0.9–1.0 mm, bicolored, testa tanish and reticulate, wings straw-colored and ribbed.

Macrocarpaea dies-viridis belongs to sect. *Choriophylla* and occurs in the Central Andes, in the Huancabamba region of Ecuador. According to ITS and 5s-NTS DNA sequences (J. R. Grant, unpubl.), *Macrocarpaea dies-viridis* falls within a well-supported clade within sect. *Choriophylla* composed of five closely related south Ecuadorian species—*M. dies-viridis* J. R. Grant, *M. jensii* J. R. Grant, *M. lenae* J. R. Grant, *M. pringleana* J. R. Grant, and *M. sodiroana* Gilg. *Macrocarpaea luctans*, described below, probably also belongs here.

Macrocarpaea dies-viridis appears to be most closely related to *M. pringleana*, to which it appears very similar even in the field. However, it differs in having larger leaves, calyces that are hyaline scabrous with short simple hairs, longer capsules (32–45 vs. 23–32 mm), and larger seeds. The illustration of the flowers of *M. dies-viridis* (Fig. 1C) is based on a photograph of the single collected flower. The rest of the plant and population was already in fruit. This flower was preserved in alcohol for anatomical studies but has since been misplaced. Therefore, description of the corolla is presently not possible.

Along the road from Los Encuentros to Paquisha Alta military camp, several species of *Macrocarpaea* were found, including *M. bubops* J. R. Grant (06-4349), *M. dies-viridis* J. R. Grant (06-4348), and *M. opulenta* J. R. Grant (06-4347). Two of these species are described here, giving further evidence to the little we know about the species diversity of the Cordillera del Cóndor.

Number of seeds per capsule: the number of seeds in a capsule of *Macrocarpaea* has never been counted previously. Therefore, mature yet undehiscent capsules of *M. dies-viridis* were collected in the field and air-dried for this purpose. In the lab, the bilocular capsules of five different fruits from a single plant (Grant 06-4352) were separated, and the seeds within were counted by several methods. The first was simply to count by hand every seed in half a capsule, then multiply by two for the average of the entire capsule. This was time-consuming and not reasonable for large-scale counts. The second method used was to glue millimetric paper to the bottom of a small box and disperse the seeds onto it until they were equally distributed in cm². Counts of seeds per cm² were then made, averaged, and multiplied by the number of cm² in the box for a total. Although a count was achieved, there was a margin of error since it was difficult to equally distribute seeds accurately. The third and most accurate and efficient method was a technique adapted from microbiology. Seeds were distributed on a sheet of white paper, then photographed with a digital camera. The image was then imported into the PC software program UVItec-UVIpro, which is typically used to automatically count bacterial colonies. Using the colony-counting-analysis option, the individual seeds were instantly counted. This method is certainly faster than manually counting thousands of seeds less than 1 mm long, giving the same results as counting by hand.

Our counts in the three different methods average between 5,200 and 5,500 seeds per locule, or 10,400–11,000 seeds per fruit. If we average 50 mature fruits on an individual plant of *Macrocarpaea dies-viridis*, the incredible number of 520,000–550,000 seeds per plant is estimated. Despite the large number of seeds produced, their small size, limitations in long-distance dispersal, and probable slow growth

rate to maturity are likely reasons for the small populations and generally narrow endemic status of any given species of *Macrocarpaea*.

Paratype: ECUADOR. Zamora-Chinchipec: Cordillera del Cónдор, 43.9 km E of Los Encuentros (as measured from the bridge crossing the Rio Nangaritzta E of the city center) in the direction of the Paquisha Alta military camp, 03°51'02" S, 078°33'06" W, 1558 m, 24 February 2006, Jason R. Grant, Mei Lin Cheung, Fabienne Luisier & Neil Villard 06-4348 (G, LOJA, MO, NY, QCA).

Etymology: from the Latin "dies," day, and "viridis," green, for the American punk-rock music group *Green Day*, whose music we listened to, especially while driving to localities throughout Ecuador during our 2006 expedition. The hyphen in the epithet is to be maintained, according to Articles 23.1 and 60.9 of the ICBN (Greuter et al., 2000).

2. *Macrocarpaea luctans* J. R. Grant, *sp. nov.* TYPE: PERU. Amazonas: Cónдорcanqui Province, Cónдорcanqui, Distrito El Cenepa, Comunidad de Mamayaque, Cerro Sakee-gaig, bosque primario, 04°34'58" S, 78°14'01" W, 1010 m, 14 February 1997, arbusto 2 m, flores y frutos verdes, Rodolfo Vásquez, Rosie Rojas & Antonio Peña 22572 (Holotype: MO [2 sheets]; Isotypes: HUT, U). Fig. 2, A–C.

A *Macrocarpaea pringleana* J. R. Grant *cui affinis sed pedicellis brevioribus* (7–18 mm vs. 11–27), *calycibus brevioribus* (5–7 mm vs. 6–10), *et corollis brevioribus* (25–32 mm vs. 30–40) *differt*.

Shrub 1–3 m, glabrous throughout. Stems terete, hollow, 3–11 mm diam. just below the inflorescence. Leaves elliptic to oval, long-petiolate, (7–)17–30 cm long. Petioles (4–)20–50 mm long, slender with very slight vagination; interpetiolar ridge 1–3 mm high. Blades (7–)17–25 × (4.5–)6.5–9.5 mm, entire, not revolute, light green, with slightly impressed veins above, and slightly raised veins below, glabrous above and below, membranaceous, thin, flexible; base equilateral to long attenuate and decurrent on the petiole; apex acute to acuminate. Inflorescence a much-branched open thyrse, 7–31+ cm long; branches 3–31 cm long; 5- to 28-flowered per branch. Bracts ovate to elliptic, sessile to short-petiolate, 10–70 × 8–38 mm; base equilateral to oblique, cordate to cuneate; apex acute to acuminate; bract petioles 1–3 mm. Flowers pedicellate, erect to slightly spreading; pedicels

7–18 mm long; bracteoles linear, lanceolate to ovate, 1–12 × 1–4 mm. Calyx campanulate, 5–7 × 5–8 mm, glabrous, smooth, ecarinate; calyx lobes ovate, elliptic to rotund, 2–4 × 3–4 mm, apex rounded to obtuse. Corolla funnel-shaped, 25–32 mm long, 17–22 wide at the apex of the tube, green (Vásquez 22234, Vásquez 22572), yellow-green (Neill & Palacios 9486), smooth; corolla lobes ovate, 8–10 × 6–9 mm, obtuse to rounded. Stamens 14–18 mm long; filaments 17.0–22.5 mm long, filiform, flattened; anthers elliptic to oblong, 3.0–4.5 × 1.5–2.0 mm, sagittate, versatile. Pollen labra-type. Pistil 18–22 mm long; ovary 5–7 × 2.0–2.5 mm; style 13–14 × 0.75–1.00 mm; stigma lobes rounded to spatulate, 1–2 × 1–2 mm. Capsules ellipsoidal, 25–28 × 4–5 mm, smooth to faintly ribbed, faint orangish-tan to greenish, erect to slightly nodding; style remnant 3–7 mm long. Seeds "perimetrically winged type," flattened, roughly 3- to 4-sided in outline, yet appearing as myriads of different puzzle pieces, 0.6–1.0 × 0.4–0.6 mm, bicolored, testa orange-tan and reticulate, wings translucent yellow and ribbed.

Macrocarpaea luctans belongs to sect. *Choriophylla* and occurs in the Central Andes, in the Huancabamba region of Ecuador and Peru. Although not yet confirmed by molecular data, it probably falls within the group of species described above including *Macrocarpaea dies-viridis*, *M. jensii*, *M. lenae*, *M. pringleana*, and *M. sodiroana*. *Macrocarpaea luctans* appears to be most closely related to *M. pringleana*, from which it differs in having shorter pedicels (7–18 mm vs. 11–27), shorter calyx (5–7 mm vs. 6–10), and a shorter corolla (25–32 mm vs. 30–40).

Material of *Macrocarpaea luctans* has been linked to *M. pringleana* (Grant, 2004: 18–21). Although I did not use Jaramillo & Grijalva 13411 or Neill & Palacios 9496 to prepare the description of *M. pringleana* (see Grant, 2004: 19), I noted the morphological differences of these two collections from Zamora-Chinchipec from *M. pringleana*. Now that three recently collected specimens from Peru (Vásquez 22234, Vásquez 22572, and Vásquez 22587) have been received that match those of Zamora-Chinchipec, a link is provided that is seen in other species of the region. Five other species occur in both southern Ecuador and northern Peru: *M. bubops*, *M. harlingii* J. S. Pringle, *M. innarrabilis* J. R. Grant, *M. micrantha* Gilg, and *M. noctiluca* J. R. Grant & Struwe.



FIGURE 2. A–C. *Macrocarpaea luctans*. A, habit of flowering stem, and leaf behind; B, bud; C, habit of fruiting stem. D–E. *Macrocarpaea lucubrans*. D, habit of flowering stem and leaf behind; E, corolla. A–C drawn from Vasquez 22572; D–E drawn from Croat 69163.

Macrocarpaea pringleana occurs in Ecuador in Morona-Santiago, Napo, Pastaza, Sucumbíos, and Tungurahua provinces and is no longer recorded from Zamora-Chinchipe.

Paratypes: PERU. Amazonas: Al rededor de la yuwi entsa, 6 hours desde pongo more el camino o kusu, Monte al lado de yuwi entsa, shrub 1 m, local name "tsuwim," *E. Ancuash* 98 (MO); Córdorcanqui Province, Mamayaque, 04°34'62" S, 78°14'01" W, arbusto 1.5 m, frutos verdes, 16 February 1997, *R. Vásquez, R. Rojas, & A. Peña* 22587 (HUT, U); Córdorcanqui Province, Distrito El Cenepa, Comunidad Aguárana, Pagki-Suwa, Río Cenepa, bosque primario, sobre Colinas, 04°31'35" S, 78°10'34" W, 289 m, arbusto 3 m, flores y frutos verdes, 24 January 1997, *R. Vásquez, R. Rojas, A. Peña, E. Chávez, & E. Quiaco* 22234 (HUT, MO, U). ECUADOR. Zamora-Chinchipe: Cantón Nangaritzá, Parroquia Pachicutza, colecciones en el sector Noreste del Campamento militar, bosque primario, 900 m, arbusto de 3 m, flores en botón verdes, 6 December 1990, *J. Jaramillo & E. Grijalva* 13411 (NY, QCA). Cantón Nangaritzá, lower slopes of Cordillera del Cóndor, above Río Nangaritzá at Pachicutza, tropical premontane wet forest, primary forest, 04°07' S, 78°37' W, 950 m, erect herb or subshrub to 2 m tall, in small forest openings, corolla yellow-green, 4 December 1990, *D. Neill & W. Palacios* 9496 (HAM, MO, QCNE).

Etymology: from the Latin "luctari," to wrestle, the taxonomy of this species on which I did.

3. *Macrocarpaea lucubrans* J. R. Grant, *sp. nov.* TYPE: PANAMA. Bocas del Toro: Cerro Colorado, 6.5 miles west of Chamé, steep forested slopes north of road, 08°35' N, 81°50' W, 1630 m, shrub 3.5 m, flowers white, 7 July 1988, *Thomas B. Croat* 69163 (Holotype: F [2 sheets]; Isotypes: MO [not seen], PMA?). Fig. 2, D–E.

A *Macrocarpaea macrophyllae* (Kunth) Gilg *cui affinis sed pilis nervi medi foliorum brevioribus, inflorescentia robusta compacta, ramis et pedicellis brevioribus crassis, et lobis calycis longioribus.*

Shrub 3.5 m, glabrous throughout except hispid on lower leaf surfaces. Stems terete to

slightly quadrangular, hollow, 11–13 diam. just below the inflorescence. Leaves broadly elliptic to broadly obovate, sessile to short-petiolate, 19–22 cm long. Petioles 0–20 mm long, sometimes absent, or a robust petiole with strong open vagination present; interpetiolar ridge 4–6 mm high. Blades 19–22 × 15–16 cm, entire, not revolute, dark green, with slightly impressed veins above, and slightly raised veins below, hyaline hispid to spiculate on veins on lower surface, papery thin, to thin coriaceous; base equilateral to oblique, broadly attenuate to a slightly auriculate base; apex obtuse to rounded. Inflorescence a much-branched open thyrse, 39 cm long; branches 5–20 cm long; 5– to 30-flowered per branch. Bracts ovate to elliptic, sessile to short-petiolate, 10–150 × 6–90 mm; base attenuate to slightly auriculate, oblique to equilateral; apex obtuse to acute; bract petioles 0–5 mm long. Flowers pedicellate, erect to slightly spreading; pedicels 10–22 mm long; bracteoles ovate, elliptic, lanceolate to oblanceolate, 5–15 × 4–10 mm. Calyx campanulate, 10–13 × 9–12 mm, glabrous, rough to rugose, chestnut to tan with some greenish highlights when dried as herbarium specimen, ecarinate; calyx lobes ovate to elliptic, 6–7 × 4–6 mm, apex obtuse to rounded. Corolla funnel-shaped, 38–40 × 22–27 mm, white (*Croat* 69163), smooth; corolla lobes ovate, 10–12 × 8–11 mm, apex obtuse to rounded. Stamens 25.0–29.5 mm long; filaments 19–23 mm long, filiform, flattened; anthers linear to linear-elliptic, 6.0–6.5 × 1.5–2.0, sagittate, versatile. Pollen glabra-type. Pistil 34–36 mm long; ovary 7–9 × 3–5 mm; style 23–24 × 1.0–1.5 mm; stigma lobes spatulate to oblong, 3–4 × 1–3. Capsules and seeds unknown.

Macrocarpaea lucubrans is known from only a single collection in western Panama and is probably a narrow endemic. It belongs to *Macrocarpaea* sect. *Macrocarpaea* and is closely related to *M. valerii* Standl. (endemic to Costa Rica), *M. macrophylla* (Kunth) Gilg (which is largely restricted to the Cordillera Central of Colombia, but also ranges to the Darien of Panama), and *M. auriculata* (endemic to Costa Rica).

The leaves of *Macrocarpaea macrophylla* are hispid underneath, as well as on the midveins, the lateral veins, and the regions between the

veins. In both *M. lucubrans* and *M. valerii*, the hairs on the midvein and lateral veins are shorter than those of *M. macrophylla*, and no hairs are present in the areas between the veins. In its calyx, *M. lucubrans* is most similar to *M. macrophylla* in overall shape and coloring, yet the lobes are generally longer and more pronounced. The inflorescence is generally more robust and compact, with shorter, stouter branches and pedicels.

Etymology: from the Latin “lucubrans,” working by night, for its nocturnal pollinators.

4. *Macrocarpaea opulenta* J. R. Grant, *sp. nov.*
 TYPE: ECUADOR. Zamora-Chinchi: Cordillera del Cónдор, 28.1 km E of Los Encuentros (as measured from the bridge crossing the Rio Nangaritzta E of the city center) in the direction of the Paquisha Alta military camp, 04°06'42" S, 078°57'49" W, 1441 m, 24 February 2006, Jason R. Grant, Mei Lin Cheung, Fabienne Luisier & Neil Villard 06-4347 (Holotype: NY; Isotypes: G, LOJA, MO, QCA, QCNE). Fig. 3.

Species novae a speciebus aliis lobis corollae spiralis imbricatis caput-equi-formis distinguenda.

Shrub 2–4 m, glabrous throughout. Trunk to 2 cm diam., wood hollow, rings absent; bark papery thin to scarcely measurable, 0.05 mm thick, outer surface smooth to rugose, tan to greenish, blotched with lichens and mosses. Stems terete, hollow, 8–11 mm diam. just below the inflorescence. Leaves elliptic, oval to ovate, long-petiolate, (20–)37–47 cm long. Petioles (20–)65–85 mm, slender with slight vagination; interpetiolar ridge 2–3 mm high. Blades (18–)29–40 × (8.5–)14–19 cm, entire, not revolute, dark green, with slightly impressed veins above, and slightly raised veins below, glabrous above and below, membranaceous, thin, flexible; base equilateral to oblique, cuneate to attenuate; apex acuminate to acute. Inflorescence much-branched open thyrse, 29–35+ cm long; branches 5–35 cm long, 3- to 12-flowered per branch. Bracts ovate, elliptic, to lanceolate, petiolate, 17–130 × 9–65 mm; base equilateral to oblique, cuneate; apex acuminate to acute; bract petioles 0–5 mm. Flowers pedicellate, erect to slightly spreading; pedicels 7–30 mm long; bracteoles inconspicuous and scabrous, linear, triangular

to ovate, 1–5 × 1–2 mm. Calyx campanulate, 13–15 × 11–17 mm, glabrous, smooth, green, ecarinate, ovate, reniform to rotund; calyx lobes 4–9 × 6–10 mm, apex obtuse to rounded. Corolla broadly funnel-shaped with petal lobes slightly spiraled to the right such as to give the impression of a pinwheel, 47–59 mm, 40–45 mm wide at the apex of the tube, greenish yellow, smooth, spongy, significantly thickened and fleshy; corolla lobes ovate, slightly imbricate (lobes spiraling, curving and overlapping to the right), an additional curling of the right side of the petal lobe gives each petal the shape of a horse’s head; corolla lobes 28–32 × 22–30 mm, obtuse to rounded. Stamens 27–33 mm long; filaments 22–27 mm long, filiform, terete; anthers elliptic to oblong, 5–6 × 3.0–3.5 mm, sagittate, versatile; pollen glabra-type. Pistil 38–40 mm long; ovary 11–13 × 3–4 mm; style 23–25 × 1.5–2.0 mm; stigma lobes oblong to spatulate, 3–4 × 2–3 mm. Capsules and seeds unknown.

Macrocarpaea opulenta belongs to sect. *Choriophylla* and occurs in the Central Andes, in the Huancabamba region of Ecuador. According to ITS and 5s-NTS DNA sequences (J. R. Grant, unpubl.), *M. opulenta* places within sect. *Choriophylla* and is closely related to *M. chthonotropa* J. R. Grant of Peru. Despite some overall similarities to species of sect. *Magnolifoliae* (large calyx, large corolla, few-flowered inflorescence), the DNA and its glabra-type pollen clearly support its inclusion within this section. It also appears to be related to the *M. pringleana* group as described above. It differs from all currently known species in the genus in its pinwheel-shaped corolla.

Macrocarpaea opulenta is an extraordinary find, as it presents novel morphological features in the corolla. The flowers have a very broad mouth (Fig. 3C, D, E), petals that have a flattened face before curling backwards (Fig. 3D), petals that are significantly thickened and fleshy (see lateral section in Fig. 3E), a slight turn in the angle of the petal lobes so they appear as curving toward the right (Fig. 3D) as in many Apocynaceae, and unique curving of the right side of the petal lobes that give each petal the shape of a horse’s head or knight in the game of chess (Fig. 3A, D).

Etymology: from the Latin “opulentus,” splendid or opulent.

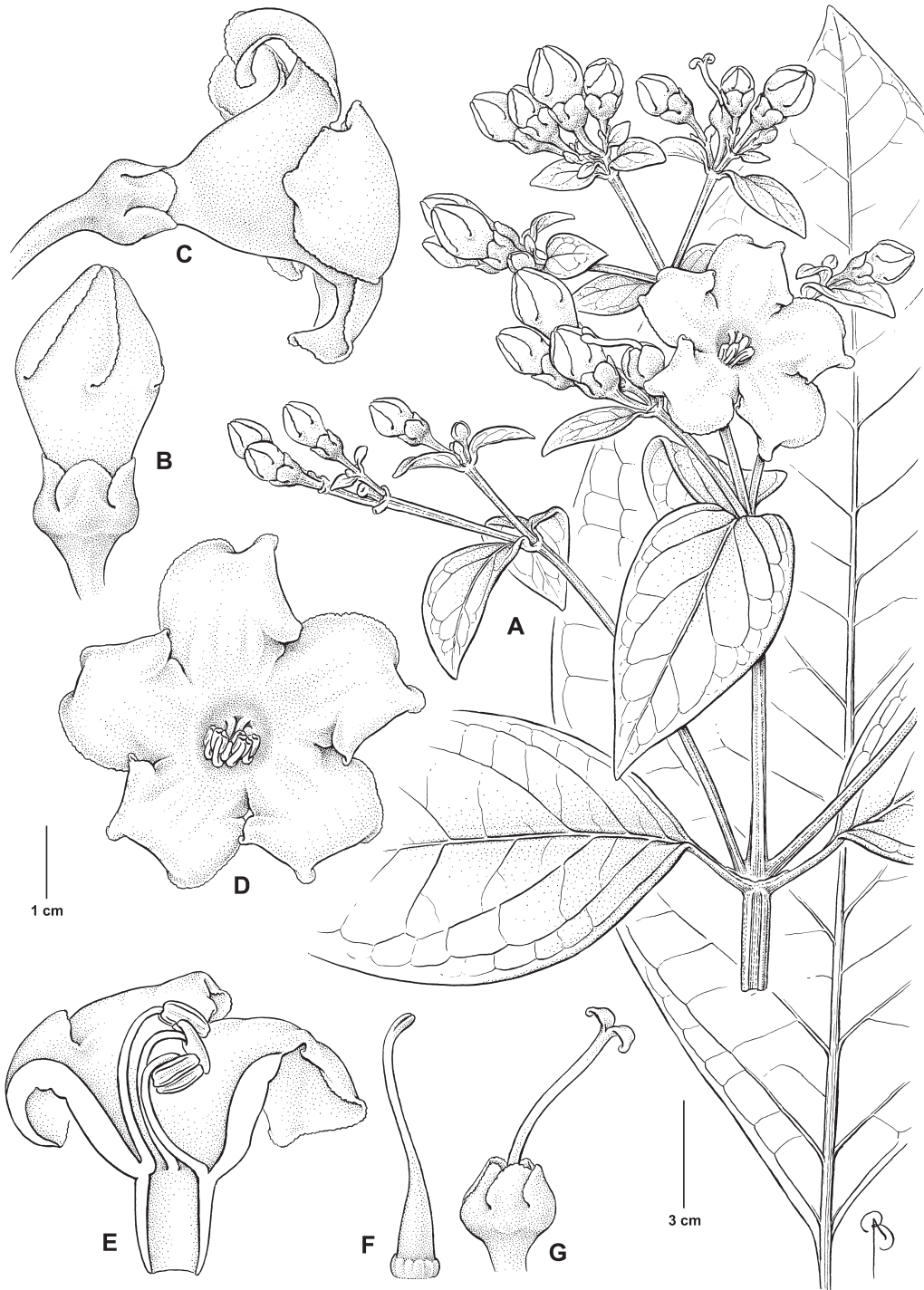


FIGURE 3. *Macrocarpaea opulenta*. A, habit of flowering stem and leaf behind; B, bud; C, corolla viewed from side; D, corolla viewed from front; E, dissected corolla (notice thickened petals); F, young pistil; G, calyx and pistil once corolla has dropped. Drawn from Grant et al. 06-4347.

NATURAL HYBRIDS

5. *Macrocarpaea* × *acuminata* Weaver, *pro sp.* J. Arnold Arbor. 53(4): 555. 1972. TYPE: COSTA RICA. Cartago: Tapantí, 1250 m, flores amarillo pálido, los lóbulos de la corola reflexos, cáliz verde pálido; casi igual al No. 2022 pero la plant más alta y las hojas más pequeñas, puede ser una planta más vieja, 7 July 1964, *Alfonso Jiménez M.* 2023 (Holotype: F; Isotypes: B, GH, NY). Fig. 4.

Macrocarpaea × *acuminata* Weaver (*pro sp.*) is here recognized as a natural hybrid between *M. subcaudata* Ewan and *M. valerii* Standl., rather than as a distinct species. Alfonso Jiménez M. collected several numbers of *Macrocarpaea* at Tapantí near Cartago, Costa Rica. His number 2022 is a typical sample of *M. valerii*, yet the next collection number, 2023, is slightly different. On the label Jiménez writes that the plant is nearly identical to 2022 but notes that it is taller and the leaves are smaller; he suggests that it might be an older plant than number 2022. Even with these doubts raised, Weaver (1972) described *Macrocarpaea acuminata* as a new species on the basis of Jiménez 2023. Although I agree with Jiménez that 2023 is closely related to 2022, I disagree with Weaver in recognizing it as a distinct species. *Macrocarpaea acuminata* either represents a smaller-leaved individual of *M. valerii* or, I suggest here, is a hybrid between the broad-leaved *M. valerii* and the narrow-leaved *M. subcaudata*. There are no

particularly strikingly different characters that would lead me to recognize this as a distinct species, rather simply intermediate morphological characters between *M. valerii* and *M. subcaudata*. Notably, the leaves and inflorescence are intermediate in size.

Macrocarpaea valerii is a widespread species of central Costa Rica (Alajuela, Cartago, Heredia, Puntarenas, San José), whereas *M. subcaudata* is rarer but occurs in eastern Costa Rica (Cartago, Limon, San José) and western Panama (Bocas del Toro, Chiriqui). *Macrocarpaea subcaudata* has been most often collected at Tapantí (*Luteyn* 3918, *Morales et al.* 3053, *Umaña et al.* 684, and *Wilbur et al.* 22396), and numerous collections of *M. valerii* are also known from Tapantí (*Chacón et al.* 1529, *Ferreya & Davis* 15686, *Jiménez* 2022, *Lent* 26, *Maas & Maas* 7987, *Tessene* 1294, *Wilbur* 21624, *Wilbur* 22322, *Wilbur* 30791, *Wilbur* 32984, and *Wilbur & Stone* 10483). Therefore, with sympatric populations of *M. subcaudata* and *M. valerii*, hybrids could occur, as I would argue is the case of *M. × acuminata*. Hybridization is probably a rare event, since no other intermediate specimens have been found and no other specimens have ever been attributed to *M. acuminata*.

To update Grant and Weaver (2003: 90), six species of *Macrocarpaea* are now recognized as occurring in Mesoamerica (Costa Rica, CR, and Panama, PAN):

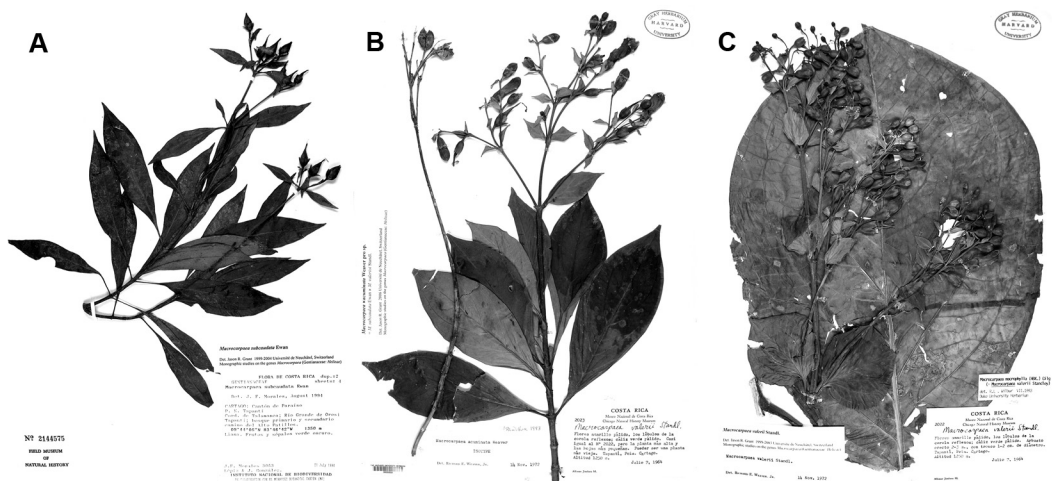


FIGURE 4. *Macrocarpaea* × *acuminata* = *M. subcaudata* × *M. valerii*. Representative specimens and types. A, *Macrocarpaea subcaudata* (*Morales* 3053, F), B, *M. acuminata* (*Jiménez* 2023, GH), C. *M. valerii* (*Jiménez* 2022, GH).

MACROCARPAEA IN MESOAMERICA

1. *M. auriculata* Weaver & J. R. Grant (CR, endemic)
2. *M. browallioides* (Ewan) A. Robyns & Nilsson (CR, PAN)
3. *M. lucubrans* J. R. Grant (PAN, endemic)
4. *M. macrophylla* (Kunth) Gilg (PAN, Darien; primary range is in Colombia)
5. *M. subcaudata* Ewan (CR, PAN)
6. *M. valerii* Standl. (CR, endemic)
7. *M.* × *acuminata* Weaver = *M. subcaudata* × *M. valerii* (CR)

6. *Macrocarpaea* × *mattii* J. R. Grant, *hybr. nov.* (*Macrocarpaea noctiluca* J. R. Grant & Struwe × *M. subsessilis* Weaver & J. R. Grant). TYPE: ECUADOR. Loja: Beside the road from Yangana to “Cerro Toledo,” 04°22'6.94" S, 079°08'0.35" W, 2500 m, 1 January 1998, on and at the edge of small spots with bushes and little trees, at an old clearing that is now a meadow, *Felix G. Matt 14* (Holotype: ER). Fig. 5.

Hybrida inter Macrocarpaea noctiluca J. R. Grant & Struwe et Macrocarpaea subsessilis Weaver & J. R. Grant, characteribus inter parentes variantibus; tubo calyce campanulato angustato, bracteolis prominens (ut M. subsessilis), et inflorescentia diffusis (ut M. noctiluca).

Shrub, usually between 1–2 m, glabrous throughout. Stems terete, solid, 5–6 mm diam. just below the inflorescence. Leaves broadly elliptic, petiolate, 9.5–10.5 cm long. Petioles 10–12 mm long, slender with slight vagination; interpetiolar ridge 2–3 mm high. Blades 8.5–9.5 × 5.5–6.5 cm, entire, not revolute, dark above and conspicuously lighter below, with slightly impressed veins above and slightly raised veins below, glabrous above and below, thin coriaceous; base equilateral to oblique, cuneate; apex rounded to obtuse. Inflorescence a much-branched open thyrse to 15 cm long; branches 5–14 cm long; 3- to 12-flowered per branch. Bracts obovate to oblanceolate, petiolate, 18–60 × 10–32 mm; base equilateral to oblique, cuneate; apex obtuse, acute to rounded; bract petioles 4–7 mm long. Flowers pedicellate, erect to slightly spreading; pedicels 2–15 mm long; bracteoles spatulate to oblanceolate, 5–18 × 1–7 mm. Calyx narrowly campanulate, 9–11 × 4.5–6.0 mm, glabrous, smooth, green, ecarinate; calyx lobes ovate to reniform, 3–4 × 4–5 mm, rounded. Corolla funnel-shaped, 28–32 mm long, 12–14 wide at the apex of the tube, yellow, smooth; corolla

lobes ovate to elliptic, 7–12 × 4–7 mm, apex obtuse to rounded. Stamens 22–25 mm long; filaments 18–20 mm long, filiform, flattened; anthers linear to linear-elliptic, 4–5 × 1.5–2.0 mm, sagittate, versatile. Pollen glabra-type. Pistil 27–28 mm long; ovary 4–5 × 2–3 mm; style 20–22 × 0.75–1.00 mm; stigma lobes spatulate, 2–3 × 1–2 mm. Capsules and seeds unknown.

Macrocarpaea × *mattii* is described here as a natural hybrid between *M. noctiluca* J. R. Grant & Struwe and *M. subsessilis* Weaver & J. R. Grant. According to ITS and 5s-NTS DNA sequences (J. R. Grant, unpubl.), *Macrocarpaea* × *mattii* places with three other accessions of *M. noctiluca*.

Macrocarpaea × *mattii* is almost perfectly intermediate in its morphological characters between its putative parents. The leaves are intermediate in shape and texture. Whereas *M. subsessilis* has small, rounded, thick, leathery-coriaceous leaves, *M. noctiluca* has much larger, broad, papery thin leaves. The leaves of *Macrocarpaea* × *mattii* are intermediate, being elliptic to slightly obovate in shape. It should be noted that it has the “dots” on the lower backside of leaves, as in *M. noctiluca* and *M. bubops*. The inflorescence also is intermediate between the few-branched, nearly sessile thyrse of *M. subsessilis* and the much-branched open thyrse of *M. noctiluca*. In *M. subsessilis*, the flowers are subtended by large, prominent, spatulate bracteoles, perhaps the largest presently known in the genus (10–22 × 4–11 mm), vs. *M. noctiluca*, which has smaller linear, lanceolate to obovate bracteoles (1–13 × 1–8 mm).

Macrocarpaea noctiluca is widespread in southern Ecuador (Loja, Zamora-Chinchi), whereas *M. subsessilis* is endemic to ridges south of Loja. At one site, on the road that leads from Yangana to Cerro Toledo, these two

species are sympatric. A third species, *M. luna-gentiana* J. R. Grant & Struwe, occurs at higher elevations toward the summit of Cerro Toledo. Collections of *Macrocarpaea* × *mattii* were made along this roadside by Matt. Despite several searches I performed in 2002 and 2006, no additional hybrid individuals have been found, leading me to believe that hybridization is

indeed a rare event within *Macrocarpaea*.

Paratype: ECUADOR. Loja: Beside the road from Yangana to “Cerro Toledo,” 2530 m, January 1998, *Matt 15* (ER).

Etymology: named in honor of its collector, German biologist Felix G. Matt, who studies nocturnal bats in Ecuador and their pollination of *Macrocarpaea*.

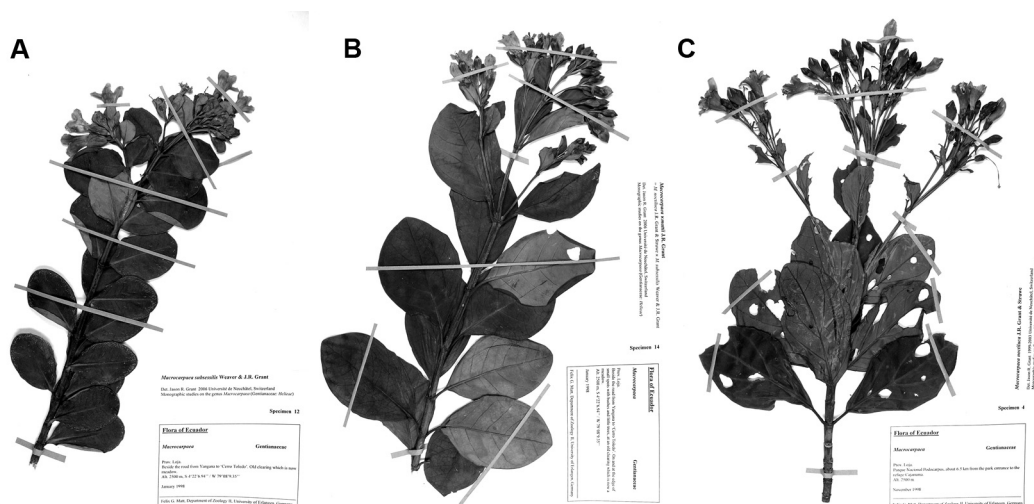


FIGURE 5. *Macrocarpaea* × *mattii* = *M. noctiluca* × *M. subsessilis*. Representative specimens and types. A, *Macrocarpaea subsessilis* (*Matt 12*, ER), B, *M. mattii* (*Matt 14*, ER), C, *M. noctiluca* (*Matt 4*, ER).

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