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DE MACROCARPAEAE GRISEBACH (EX GENTIANACEIS) SPECIEBUS NOVIS X: A SYNOPSIS OF THE GENUS IN MONTANE ATLANTIC FORESTS OF BRAZIL

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Abstract. Outside of the principal distribution and major diversification of *Macrocarpaea* in the Andes, smaller groups of species are found in the Greater Antilles of the Caribbean, Mesoamerica, the Guayana Highlands, and montane Atlantic forests of Brazil. Here, a complete revision of the genus in the latter region is presented recognizing eight species that correspond to the entirety of *Macrocarpaea* sect. *Tabacifoliae*: ***M atlantica*** J.R. Grant & V. Trunz, *sp. nov*., ***M. dolichophylla*** J.R. Grant & V. Trunz, *sp. nov*., *M. glaziovii* Gilg, *M. illecebrosa* J.R. Grant, ***M. inesiae*** J.R. Grant & V. Trunz, *sp. nov*., *M. obtusifolia* (Griseb.) Gilg, ***M. orbiculata*** J.R. Grant & V. Trunz, *sp. nov*., and *M. rubra* Malme. These species occur primarily in humid coastal montane rainforests (Mata Atlântica), and two species also occur in *campos rupestre* montane savannas.

Keywords: *Macrocarpaea*, Gentianaceae, Helieae, Brazil, Mata Atlântica

Macrocarpaea Gilg is comprised of shrubs or small trees with yellow to green funnel-shaped flowers as in *M. obtusifolia* (Griseb.) Gilg) (Fig 1b), or unusually urceolate as in *M. rubra* Malme (Fig. 1a). The seeds are small (0.2–2.2 μm) and numerous (at least 10,000 per fruit), with taxonomically informative characters at both the species and sectional rank. *Macrocarpaea* is also the most species-rich genus of tribe Helieae and occurs in all mountainous regions of the Neotropics. More than 100 species occur in the Andes, but a few, all corresponding to sect. *Tabacifoliae* occur in southeastern Brazil.

In the coastal montane Atlantic forests of Brazil, *Macrocarpaea* occurs from approximately Blumenau (SC) through the cities of Curitiba (PR), São Paulo (SP), Rio de Janeiro (RJ), Belo Horizonte (MG), Vitoria (ES), and Itabuna (BA) to Lençóis (BA). Biogeographical analyses performed by Struwe et al. (2009) showed the possibility that these southeastern Brazilian species occupy an ancestral refuge area that later spread to the Andes. The map presented here shows distributions of all Brazilian species (Fig. 2). It was created with ArcGIS by using estimated or known GPS locations from herbarium specimens. *Macrocarpaea rubra* is the southernmost species, a relatively common element of the Serra do Mar from Blumenau (SC) to Paraty (RJ). *Macrocarpaea obtusifolia* ranges from coastal São Paulo to Santa Teresa (ES), and then again in the Serra do Espinhaço around Belo Horizonte (MG). *Macrocarpaea inesiae* J.R. Grant & V. Trunz is known from a single locality at Cunha (SP), overlapped by the distributions of *M. rubra*

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FIGURE 1. Flowers of *Macrocarpaea rubra* (a) and *M. obtusifolia* (b). Photos V. Trunz.

and *M. obtusifolia*. *Macrocarpaea glaziovii* Gilg occurs in the mountains surrounding Rio de Janeiro to Santa Teresa (ES). *Macrocarpaea illecebrosa* J.R. Grant is known from two localities in the Chapada Diamantina of interior Bahia. Three species, *M. atlantica* J.R. Grant & V. Trunz, *M. dolichophylla* J.R. Grant & V. Trunz, and *M. orbiculata* J.R. Grant & V. Trunz, occur in coastal montane southern Bahia near Itabuna and Arataca.

In Brazil, *Macrocarpaea* occurs in primary humid coastal montane Atlantic forests (Mata Atlântica) from near sea level to 1800 m (Fig. 3, 2). Two species, *M. illecebrosa* and *M. obtusifolia* also inhabit *campos rupestres* montane savannas. All species can be found in secondary vegetation if adjacent to primary forest. *Macrocarpaea rubra* occurs at generally lower elevations, ranging from 30–1280 m. *Macrocarpaea inesiae* is known from 1046 m. *Macrocarpaea glaziovii* (420–1700 m) and *M. obtusifolia* (676–1850 m) share similar elevations, though *M. glaziovii* tends to occur at lower elevations, especially when the two species are sympatric. The three species from southern Bahia, *Macrocarpaea atlantica, M. dolichophylla*, and *M. orbiculata*, occur from 550–1000 m. *Macrocarpaea illecebrosa* is the highest species, ranging from 1665–1810 m in the Chapada Diamantina of Bahia.

MATERIALS AND METHODS

The aim of this project was to revise genus in Brazil through fieldwork, studies of herbarium specimens including general morphology and seed micromorphology, and biogeography. Two expeditions to Brazil were undertaken in 2009 and 2010 where six out of eight species were successfully observed. Material was examined during visits to thirteen herbaria in Brazil including those in Belém (IAN, MG), Curitiba (MBM, UPCB), Feira de Santana (HUEFS), Itabuna (CEPEC), Manaus (INPA), Rio de Janeiro (HB, R, RB), Sâo Paulo (SP, SPF), and Santa Teresa (MBML). Additional material was also examined from herbaria that may include (an asterisk indicates herbaria visited by the senior author): AAU, AFP, ALA*, B, BM, BP, BR*, BRIT, BSB, C, CAS, CAUP, CESJ, CHOCO, CHRB*, COAH*, COL*, CONN, CR, CUVC*, CUZ*, DAV, DUKE, E, EHH, F*, FAUC, FI, FLAS, FMB, FR*, FTG, G*, GB, GH*, GOET, HAC, HAL, HAM, HAO*, HUA*, HUCP, HUQ, HUT*, INB, JAUM, JBSD, JE, K*, L, LD, LINN, LOJA*, LPB, LS, M, MA*, MANCH, MARY*, MEDEL*, MER*, MICH, MIN, MO*, MOL*, MSB, MU, MY, NA, NEU*, NO, NSW*, NY*, OXF, P*, PH, PORT*, PR, PRC, Q*, QAP*, QCA*, QCNE*, QPLS*, QUSF*, RNG*, S*, SBBG*, SEL*, TEX, U, UC, UCWI, UDBC, UPS, UPTC, US*, USM*, VALLE*, VEN*, W*, WIS, WU*, YU, and Z*. This study is part of a series of papers that will lead to a full monograph of the genus (Grant and Struwe, 2001, 2003; Grant, 2003, 2004, 2005, 2007, 2008, 2011; Grant and Weaver, 2003).

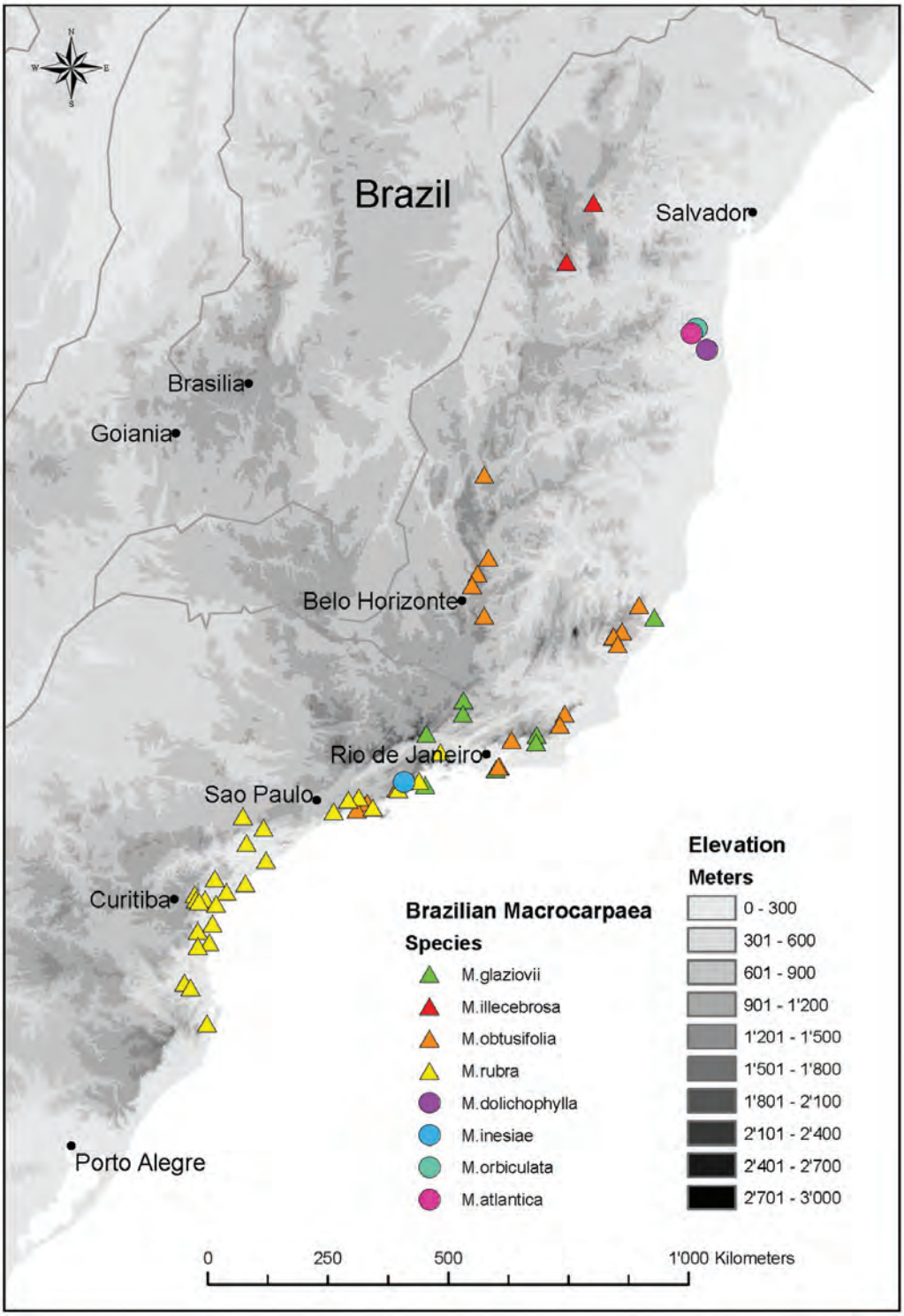

FIGURE 2. Map of the distribution of Brazilian *Macrocarpaea*.

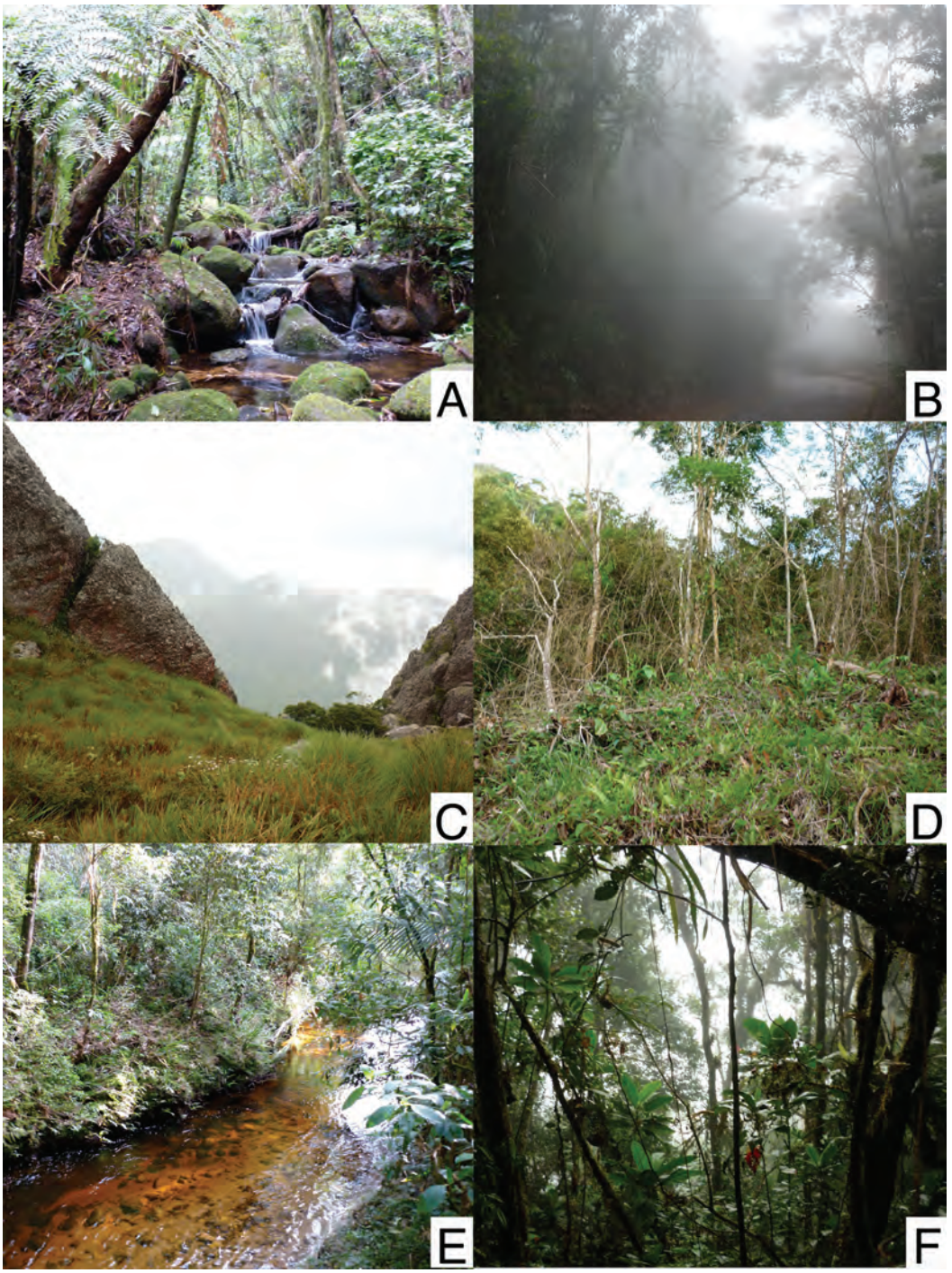

FIGURE 3. Habits of Brazilian *Macrocarpaea*: A, *Macrocarpaea rubra* (Quatro Barras, Paraná); B, *M. glaziovii* and *M. obtusifolia* (near Corcovado, Rio de Janeiro); C, *M. illecebrosa* (Rio de Contas, Bahia); D, Deforested area where *M. dolichophylla* occurs near Arataca, Bahia; E, *M. inesiae* (Cunha, São Paulo); and F, *M. atlantica* (Serra da Pedra Lascada, Bahia). Photos V. Trunz.

Taxonomic History

Prior to this study, four species of *Macrocarpaea* had been described from Brazil. In *Genera et Species Gentianearum*, Grisebach (1839) described *Lisianthus obtusifolius* (transferred later to *Macrocarpaea*) based on material from Rio de Janeiro; it was also described with a β variety as *constrictus* from Minas Gerais. In *Flora Brasiliensis*, Grisebach (1865) again reported this species and illustrated it with a black and white line drawing. Gilg (1896) described the second species, *M. glaziovii*, based on material collected in Rio de Janeiro by notable plant collector Glaziou. Malme (1928) described *Macrocarpaea rubra* from Paraná, comparing it to both *M. glaziovii* and *M. obtusifolia*, differentiating it specifically by its "red" urceolate corolla. Most recently, Grant (2005) described *M. illecebrosa* from the Chapada Diamantina in Bahia. These species have been recognized in various regional floristic treatments, for example *M. glaziovii* in *Gentianaceae do Estado da Guanabara*, (Guimarães 1966), *M. obtusifolia* in *Flora da Serra do Cipó, Minas Gerais* (Cordeiro 1987), (Guimarães 1966), and *Flora Fanerogâmica do Estado de São Paulo* (Cordeiro 2005), and *M. rubra* in Guimarães (1966), *Flora Ilustrada Catarinense* (Fabris 1971), and *Catálogo de las Plantas Vasculares del Cono Sur* (Zuloaga et al. 2008).

In the only existing monograph of *Macrocarpaea*, Ewan (1948) recognized two species of *Macrocarpaea* in Brazil, *M. rubra* and *M. obtusifolia*. He placed *M. glaziovii* in his list of doubtful species, suggesting that it may simply be an earlier name for *M. rubra*. He later recognized *M. glaziovii* as distinct species (Ewan 1951), then, transferred *M. obtusifolia* var. *constricta* Grisebach to *M. glaziovii* subsp. *constricta* (Grisebach) Ewan (Ewan 1952). Nevertheless, examination of the type material (unavailable to Ewan) of *M. glaziovii*, *M. obtusifolia*, *M. obtusifolia* var. *constricta*, and *M. rubra*, has resulted in several novel conclusions for which the need for a revision of the Brazilian species has become evident. *Macrocarpaea rubra* is a distinct species of southern Brazil. The types of *M. glaziovii* and *M. obtusifolia* var. *constricta* are conspecific, and therefore, the latter is recognized as a synonym *M. glaziovii*. Additionally, many recent collections have been made from previously inaccessible regions that represent four new species described in this paper, *M. atlantica*, *M. dolichophylla*, *M. inesiae*, and *M. orbiculata*.

Seed Morphology

Four morphological types of seeds have been identified in *Macrocarpaea*: "flattened-type seeds," "perimetrically winged-type seeds," "rimmed-type seeds" and "winged-type seeds," corresponding respectively to the four sections *Tabacifoliae*, *Choriophylla*, *Macrocarpaea* and *Magnolifoliae* defined by Grant (2005). Because of the small size of these seeds, electron microscopy is used. Seeds were removed from herbarium specimens, glued on carbon stickers and coated in gold. A Philips XL30 ESEM-FEG microscope was used for observations. Seed morphology was studied in five species (*Macrocarpaea glaziovii*, *M. illecebrosa*, *M. inesiae*, *M. obtusifolia*, and *M. rubra*). Each of these have seeds that belong to the "Flattened-type seeds," generally in the shape of a right to scalene triangle, flattened, and without wings.

The seeds of the Brazilian species have considerable differences in shape and size. *Macrocarpaea rubra* (Fig. 4 A–B) seeds are flattened and triangular or slightly L-shaped, with sides measuring 0.75–1.02 × 0.95–1.16 × 1.13–1.30 mm. No visible difference was visible between southern to northern *M. rubra* size morphs. *Macrocarpaea glaziovii* (Fig. 4 C–D) seeds are flattened, but more L-shaped than *M. rubra* and much larger, measuring 0.71–0.91 × 1.44–1.72 × 1.50–1.89 mm. *Macrocarpaea illecebrosa* (Fig. 4 E–F) seeds are flattened to slightly angled, triangular to L-shaped with one side rounded and longer. The sides may be strongly rimmed and measure 0.55–0.64 × 1.08–1.45 × 1.43–1.50 mm. The chalazal end gives the impression to be on the point to detach itself from the rest of the seed but always remains in place. *Macrocarpaea obtusifolia* (Fig. 4 G–H) seeds are quadrangular with angles. Some of the margins show slight to strong rims. Nevertheless, the measurements were taken as if the seeds were triangular with a protuberance forming a fourth angle, in order to simplify the comparisons: 0.83–0.99 × 1.04–1.06 and 1.16–1.25 mm. *Macrocarpaea inesiae* (Fig. 4 I–J) seeds with a shape intermediate between triangular and quadrangular are much smaller than the other species: 0.43–0.47 × 0.51–0.70 × 0.63–0.85 mm. The chalazal end is present in *M. rubra, M. glaziovii* and *M. illecebrosa* (J.R. Grant 2005), but appears absent in *M. obtusifolia* and *Macrocarpaea inesiae*. Table 1 summarizes the seed characters.

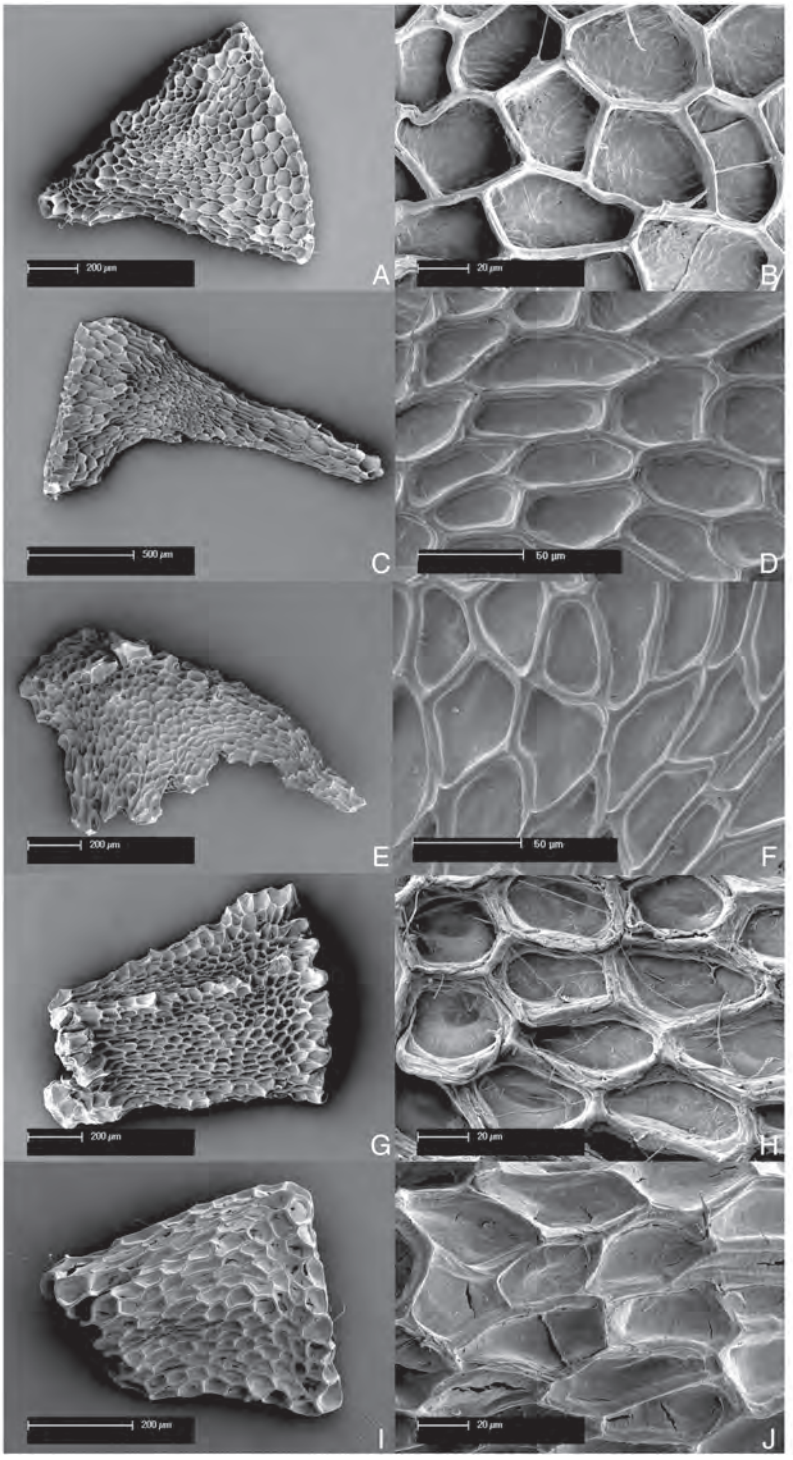

FIGURE 4. Scanning electron micrographs of seeds of Brazilian *Macrocarpaea*. A–B, *M. rubra* from *Grant 4592* (NY); C–D, *M. glaziovii* from *Rossini & Bausen 539* (SPF); E–F, *M. illecebrosa* from *Harley 54400* (HUEFS); G–H, *M. obtusifolia* from *Farney 1207* (RB); and I–J, *M. inesiae* from *Grant 09-4602* (NY). Photos V. Trunz.

Table 1: Comparisons between the seeds of five species of *Macrocarpaea* regarding Outline shape, 3-dimensional shape, Margin, Chalazal, and Dimensions of the seeds.

Species	Outline shape	3-dimensional shape	Margin	Chalazal	Short side (mm)	Medium side (mm)	Long side (mm)
M. rubra	Triangular	Flattened	Smooth	Present	0.75–1.02	0.95–1.16	1.13–1.30
M. glaziovii	L-shaped	Flattened	Smooth	Present	0.71–0.91	1.44–1.72	1.50–1.89
M. illecebrosa	Triangular to L-shaped, Rounded	Slightly Angular	Rimmed	Present	0.55–0.64	1.08–1.45	1.43–1.50
M. obtusifolia	Quadrangular	Angular	Slightly Rimmed	Absent	0.83–0.99	1.04–1.06	1.16–1.25
M. inesiae	Triangular to Quadrangular	Slightly Angular	Smooth	Absent	0.43–0.47	0.51–0.70	0.63–0.85

Taxonomic Treatment

Macrocarpaea Sect. *Tabacifoliae* Ewan, Contr. U. S. Natl. Herb. 29: 215. 1948. TYPE: *Lisianthus obtusifolius* Griseb., Gen et Sp. Gent.: 175. 1839. *Macrocarpaea obtusifolia* (Griseb.) Gilg, in Engl. & Prantl, Nat. Pflanzenfam. 4(2): 94. 1895.

= *Macrocarpaea* subg. *Paranagenes* Ewan, Contr. U. S. Natl. Herb. 29: 215. 1948. TYPE: *Macrocarpaea rubra* Malme, Arkiv Bot. Stockh. 22A(2): 3. 1928.

Plants terrestrial to epiphytic. Pollen "Glabra type," being 3-colporate with generally reticulate exine patterning. Seeds "Flattened type," flattened, roughly triangular in outline formed by extended chalazal and micropylar ends, and reticulate testa. This section is restricted to the Atlantic forests of Brazil. Eight species comprise the section: *M atlantica*, *M. dolichophylla*, *M. glaziovii*, *M. illecebrosa*, *M. inesiae*, *M. obtusifolia*, *M. orbiculata*, and *M. rubra*.

Key to the species of *Macrocarpaea* in Brazil

1a. Leaves conspicuously hispid on both upper and lower surfaces; calyces conspicuously hispid pubescent 2

2a. Small tree to 3–6 m; leaves long-petiolate (15–80 mm); flowers diffusely positioned on the inflorescence; pedicels 20–43 mm long; plants of the coastal mountains of southern Bahia . . . . . ***M. atlantica***

2b. Shrub to 1.5–3.0 m; leaves sessile to short-petiolate (0–5 mm); flowers more densely positioned on the inflorescence; pedicels 15–36 mm; plants of montane Atlantic forests of São Paulo, Rio de Janeiro, and Espírito Santo, as well as *campos rupestres* montane savannas of Minas Gerais . . . . . ***M. obtusifolia***

1b. Leaves glabrous, to slightly spiculate on veins of lower surface; calyces glabrous to spiculate 3

3a. Corolla urceolate, bright yellow; plants terrestrial to sometimes epiphytic; plants of montane Atlantic forests of Santa Catarina, Paraná, São Paulo, and Rio de Janeiro . . . . . ***M. rubra***

3b. Corolla campanulate, pale yellow, cream, to greenish-cream; plants terrestrial 4

4a. Calyx 6–9 × 5–6 mm, calyx lobes 3–4 × 3–4 mm; corolla lobes 1–3 mm long; plants of the coastal mountains of southern Bahia 5

5a. Leaves orbiculate to slightly ovate; bracteoles bract-like ovate to obovate, to small and inconspicuous, 1–7 × 0.5–6.0 mm . . . . . ***M. orbiculata***

5b. Leaves lanceolate to narrowly elliptic; bracteoles inconspicuous, triangular, 1 × 1 mm . . . . . ***M. dolichophylla***

KEY TO THE SPECIES OF *MACROCARPAEA* IN BRAZIL CONT.

4b. Calyx 7–16 × 5–13 mm, calyx lobes 4–10 × 4–7 mm; corolla lobes 4–10 mm long 6

6a. Plants glabrous varying to spiculate on stems, petioles, leaves and bracts especially along veins on the lower surface; branches of the inflorescence diffuse cymes; calyx lobes half the length of the calyx, 4–6 mm long; plants in *campos rupestres* montane savannas in inland Bahia (Chapada Diamantina) . . . . . ***M. illecebrosa***

6b. Plants glabrous throughout; branches of the inflorescence compact flat-topped cymes; calyx lobes more than half the length of the calyx, 6–10 mm long; plants in montane Atlantic forest 7

7a. Plants to 1 m; calyx 13–16 mm long; corolla 46–52 × 24–36 mm; plants endemic to the Cuhna area of the Serra do Mar, São Paulo . . . . . ***M. inesiae***

7b. Plants 2–4 m; calyx 10–13 mm long; corolla 18–26 × 10–21 mm; plants largely of Rio de Janeiro and Espírito Santo . . . . . ***M. glaziovii***

1. ***Macrocarpaea atlantica*** J.R. Grant & V. Trunz, *sp. nov*. TYPE: BRAZIL. Bahia: Barro Preto, Serra da Pedra Lascada, 13.7 km de Barro Preto, na estrada que passa pela Faz, São Miguel em direção à serra, montana, 14˚46'13"S, 39˚12'10"W, 600–900 m, 7 February 2005, *André M. Amorim, J. Jardim, J.L. Paixão, F. Moura, & S.C. Sant'Ana 4792* (Holotype CEPEC; isotypes NY, MBM, RB, SP, SPF, U). Fig. 2, 5H–J.

A Macrocarpaeae obtusifoliae (Griseb.) Gilg cui affinis, sed arbor 3–6 m bahiensis, foliis grandioribus, petiolis longioribus, et inflorescentia diffusa differt.

Small tree, 3–6, m, hyaline hispid to spiculate with short simple hairs on stems, petioles, leaves, inflorescences, bracts and calyces. Stems terete to slightly quadrangular, hollow, 10–12 mm diam. just below the inflorescence. Leaves broadly oval to ovate, long-petiolate, 26–55 cm long. Petioles 15–80 cm long, robust without vagination; interpetiolar ridge 2–4 mm high. Blades 24.5–47 × 15–25 cm, entire, not revolute, lustrous green (*Thomas 14304*), with slightly impressed veins above, and slightly raised veins below, hyaline hispid to spiculate above and especially below, papery thin, to thin coriaceous; base aequilateral to oblique, broadly cuneate to rounded; apex obtuse, rounded to acute. Inflorescence a sturdy large open diffusely branched thyrse at least 43 cm long since this is the length of one of the lateral branches, so perhaps an estimate of 70–80 cm for the entire inflorescence; branches 36–43 cm long; 2–16 flowered per bract. Bracts ovate, sessile to petiolate, 10–260 × 6–150 mm; base aequilateral to oblique, cuneate to rounded; apex acute to obtuse; bract petioles 0–15 mm long. Flowers pedicellate, erect to slightly spreading; pedicels 20–43 mm long; bracteoles ovate to rounded, 4–11 × 2–6 mm. Calyx campanulate, 10–14 × 9–13 mm, hyaline hispid to spiculate with short simple hairs, green, ecarinate; calyx lobes ovate to rotund, 5–7 × 5–7 mm, apex obtuse to rounded. Corolla funnel-shaped, 30–35 × 17–20 mm, cream tinged greenish (*Thomas 14304*), smooth; corolla lobes ovate, 5–6 × 5–6 mm, apex obtuse to acute. Stamens 16.5–19.0 mm; filaments 14–16 mm, filiform, flattened; anthers elliptic to ovate, 7–8 × 2.5–3.0 mm, sagittate, versatile; pollen glabra-type. Pistil, capsules and seeds unknown.

Morphology and similarities: *Macrocarpaea atlantica*, *M. illecebrosa*, and *M. obtusifolia* are closely related that can be seen in the shape of the inflorescence as a sturdy branched thyrse, vs. the much more slender inflorescences in the other Brazilian species. These three species also have hispid pubescence on leaves and calyces, especially in *M. atlantica* and *M. obtusifolia*, though its is much reduced in *M. illecebrosa*. *Macrocarpaea atlantica* differs notably from *M. obtusifolia* in its stature as a 3–6 m tall tree (vs. 1–3 m), in its much larger leaves, longer petioles (15–80 mm vs. 0–5 mm), as well as flowers that are diffusely positioned on the inflorescence. *Macrocarpaea atlantica* is sympatric with *M. orbiculata* at the type locality of both.

Distribution and habitat: Endemic to remnant forests in mountains of the Atlantic Forest south of Itabuna and Ilhéus in southern Bahia from 550–900 m.

Etymology: Named for the Atlantic Forest (Mata Atlântica) where the species occurs.

Paratypes: BRAZIL. Bahia: Barro Preto, Serra da Pedra Lascada, 13.7 km de Barro Preto, na estrada que passa pela Faz, São Miguel em direção à serra, 14˚46'13"S, 39˚32'10"W, 600–900 m, 13 December 2004, *Amorim. et al*.

FIGURE 5. Three species of Brazilian *Macrocarpaea*. A–C, *M. illecebrosa* J.R. Grant; D–G, *M. inesiae* J.R. Grant & V. Trunz; H–J, *M. atlantica* J.R. Grant & V. Trunz. A–C, drawn from *Fiaschi 2688* (SP); D–F, from *Cordeiro 2025* (NY); G, from *Grant 09-4602* (NY); and H–J, from *Amorim 4792* (NY) by Bobbi Angell.

4536 (SP); Barro Preto, Serra da Pedra Lascada, 13.7 km de Barro Preto, na estrada que passa pela Faz, São Miguel em direção à serra, 14°46'04.5"S, 039°32'16.1"W, 604 m, 30 November 2010, *Grant, J.R. & V. Trunz 10-4647* (G, MO, NY, SP); Mun. de Barro Preto, Serra da Pedra Lascada, 13.7 km from Barro Preto on road passing Fazenda Sâo Miguel towards mountains, lower slopes, 14°46'13"S, 39°32'10"W, 550–750 m, moist tropical montane and submontane forest, 16 January 2005, *Thomas et al. 14304* (NY, SP).

2. ***Macrocarpaea dolichophylla*** J.R. Grant & V. Trunz, *sp. nov*. TYPE: BRAZIL. Bahia: Arataca, Topo da Serra do "Peito-de-Moça," Ramal ca. 22.4 km na estrada que liga Arataca à Una, com entrada no assentamento Santo Antônio, RPPN "Caminho das Pedras," floresta montana en formação de floresta baixa sob solo turfoso, 15°10'25"S, 39°20'30"W, 1000 m, 15 April 2006, *André M. Amorim, R. Goldenberg, M. Lopes, L.C. Gomes & S. Sant'Ana 5798* (Holotype: CEPEC; isotypes NY, U). Fig. 2, 6C–E.

Species novae a speciebus aliis foliis grandis longe lanceolatis distinguienda.

Shrub to small tree, 3–4 m, glabrous throughout except calyces, which are spiculate. Stems terete to slightly quadrangular, solid to hollow, 2–3 mm diam. just below the inflorescence. Leaves lanceolate to narrowly elliptic, long-petiolate, (9–13)–52–54 cm long; petioles (5–12)80–90 cm, slender with very slight vagination; interpetiolar ridge 3–4 mm high. Blades (8.5–12)–43–45 × (4–7)–12–13 cm, entire, not revolute, green, with slightly impressed veins above, and slightly raised veins below, glabrous, papery thin, to thin coriaceous; base aequilateral, cuneate to rounded in leaves above; apex acute to acuminate. Inflorescence a much branched open thyrse, 26–37 cm long; branches 10–19 cm long; 3–9 flowered per branch. Bracts ovate to long-ovate, sessile to short-petiolate, 26–130 × 12–54 mm; base aequilateral, rounded; apex acute to acuminate; bract petioles 2–4 mm. Flowers pedicellate, erect to spreading; pedicels 30–40 mm; bracteoles inconspicuous, triangular, 1 × 1 mm. Calyx campanulate, 8–9 × 5–6 mm, spiculate, smooth, green, ecarinate; calyx lobes ovate, 3–4 × 3–4 mm, apex rounded to obtuse. Corolla funnel-shaped, 20–31 × 13–19, green (*Jardim 4674*) to green on the exterior and pale yellow in the interior (*Amorim 5798*), smooth; corolla lobes ovate, 6–7 × 4–6 mm, lobes obtuse. Stamens, pistil, capsules, and seeds unknown.

Morphology and similarities: *Macrocarpaea dolichophylla* seems to be related to *M. orbiculata* in the size and shape of the flowers, but differs in having ovate rather than orbiculate to rounded bracts, and inconspicuous, triangular, 1 × 1 mm bracteoles. It is notably distinct from all members of the genus known to date in its large linear-long strap-like leaves.

Distribution and habitat: Endemic to remnant forests in mountains of the Atlantic Forest south of Itabuna and Ilhéus in southern Bahia from 450–1000 m.

Etymology: From the Greek "dolicho" for long, and "phyll" for leaf, for its long lanceolate shaped leaves.

Paratypes: BRAZIL. Bahia: Arataca, Serra do Peito-de-Moça, estrada que liga Arataca à Una, ramal ça. 22.4 km de Arataca com entrada no Assentamento Santo Antônio, RPPN "Caminho das Pedras," 15°10'25"S, 39°20'30"W, 1000 m, floresta ombrófila densa montana, 20 January 2007, *Amorim et al. 6703* (CEPEC); Arataca, RPPN Caminho das Pedras. Serra do Peito-de-Moça, entrada a 9.5 km no Assentamento Santo Antônio, mais 8.9 km até a sede da RPPN, coletas na trilha para o topo, 2–4 km da sede, 15°10'27"S, 39°20'22"W, 450–800 m, floresta ombrófila densa montana, 21 July 2005, *Jardim et al. 4674* (CEPEC).

3. *Macrocarpaea glaziovii* Gilg, Bot. Jahrb. Syst. 22: 335. 1896. TYPE: BRAZIL. Rio de Janeiro: Legit in Brasilia et communicavit, Tijuca, herbacée, fleurs verdâtres, 7 November 1868 (P sheets), 7 October 1871 (C sheets), *Glaziou 4939* (type B? [destroyed]; Lectotype: P [3 sheets]; isolectotypes: C [2 sheets], K, designated by Grant 2004: 47). Fig. 2, 4C–D, 7E–H.

= *Lisianthus obtusifolius* var. *constrictus* Griseb., Gen. et Sp. Gent.: 175. 1839. *Macrocarpaea glaziovii* Gilg subsp. *constricta* (Griseb.) Ewan, Proc. Biolog. Soc. Washington 65: 189. 1952. TYPE: Brazil. Minas Gerais, *Langsdorff s.n.* (lectotype K [herb. Hooker]; isolectotype BR, designated by Grant 2004: 46).

Shrub to small tree, 2–4 m, glabrous throughout. Stems terete to slightly quadrangular, solid to hollow, 1–20 mm diam. just below the inflorescence. Leaves oval, elliptic, ovate to obovate, long-petiolate, 20–52 cm long. Petioles 35–60 mm long, slender to robust with short vagination; interpetiolar ridge

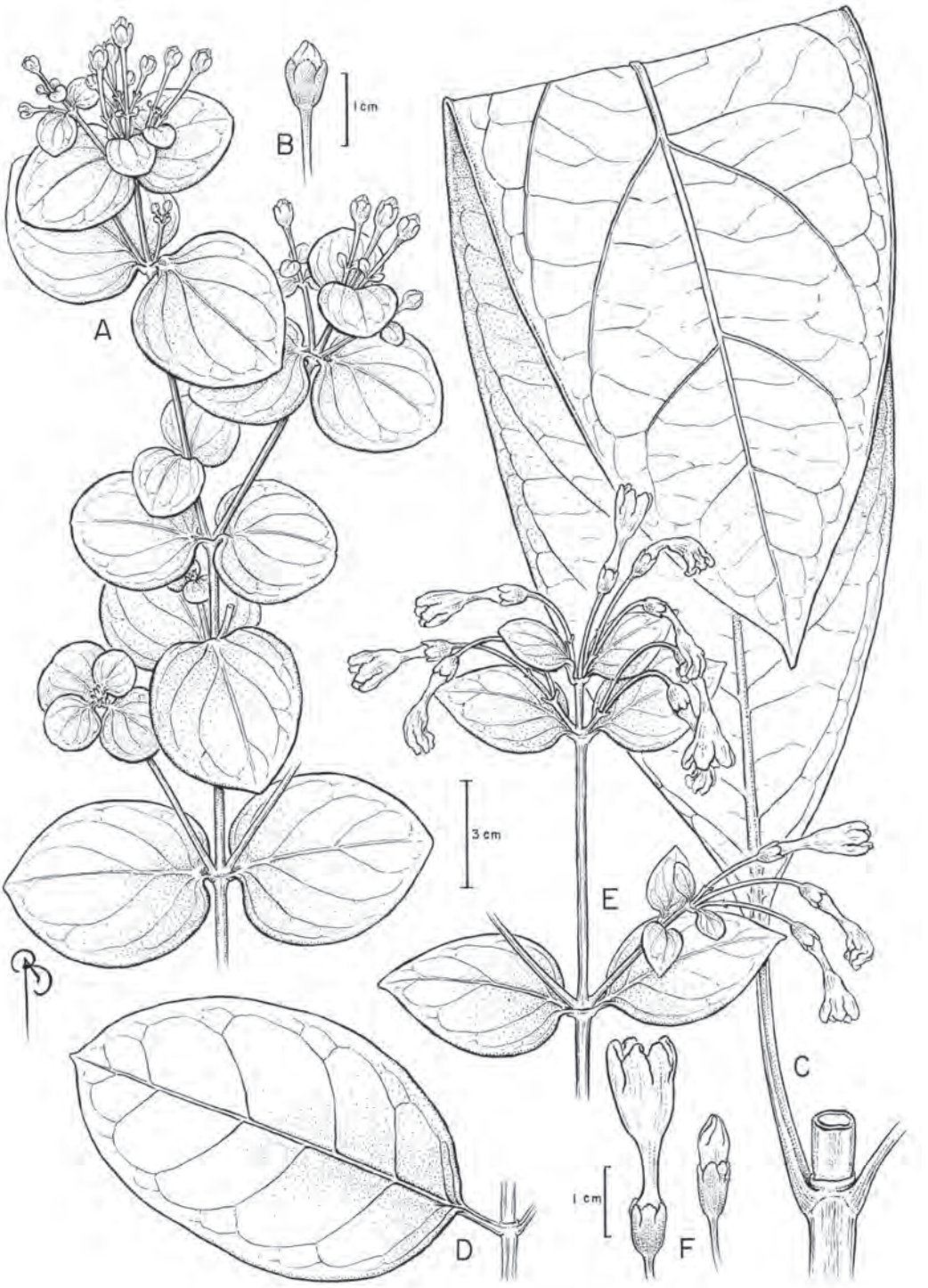

FIGURE 6. Two species of Brazilian *Macrocarpaea*. A–B, *M. orbiculata* J.R. Grant & V. Trunz; C–E, *M. dolichophylla* J.R. Grant & V. Trunz. A–B, drawn from *Fiaschi 2638* (NY); C–F, from *Amorim 5798* (NY) by Bobbi Angell.

FIGURE 7. Three species of Brazilian *Macrocarpaea*. A–D, *M. obtusifolia* (Griseb.) Gilg; E–H, *M. glaziovii* Gilg; I–L, *M. rubra* Malme. A, Drawn from *Irwin et al. 22249* (NY); B–C, *Duarte 2280* (RB); D, *Farney 1207* (RB); E–G, *Glaziou 4939* (P isotype); H, *Pereira 229* (RB); I–K, *Oliveira 686*; L, *Kummrow 2385* by Bobbi Angell.

1–8 mm high. Blades 16.5–46 × (7–)14–25 cm, entire, not revolute, dark green above, lighter below, with slightly impressed veins above, and slightly raised veins below, glabrous, papery thin to thin-coriaceous; base aequilateral to oblique, cuneate, short-attenuate to slightly decurrent on the petiole; apex obtuse, rounded to acute. Inflorescence a much branched open thyrse, 45–80 cm long; the branches 12–65 cm long, compact flat-topped cymes of flowers, 5–17 flowered per branch. Bracts broadly ovate, orbiculate to ovate, sessile, 17–120 × 9–90 mm; base aequilateral to oblique, rounded to cuneate; apex obtuse to acute. Flowers pedicellate, erect; pedicels 12–26 mm; bracteoles inconspicuous, triangular, 1.5–2.0 × 0.5–1.0 mm. Calyx campanulate, 10–13 × 8–11 mm, glabrous, smooth, green, ecarinate; calyx lobes ovate to elliptic, 7–9 × 5–8, obtuse, rounded to nearly acute. Corolla funnel-shaped, 18–26 × 10–21, yellow (*Braga 1390*) to pale yellow (*Giordano et al. 1738*), smooth; corolla lobes ovate, 4–6 × 4–8, apex obtuse to acute. Stamens and pistil unknown. Capsules ovoid, when in maturity the sutures open and the two locules inflate outwards to release the seeds, 11–13 × 8–10 mm, smooth to ribbed, straw-colored, erect; style remnant 4–6 mm long. Seeds "Flattened type," flattened, roughly triangular in outline formed by extended chalazal and micropylar ends, 0.3–1.1 × 1.16–2.2 mm, straw-colored throughout, to bicolored with testa brown and wing straw-colored; testa reticulate.

Morphology and similarities: The inflorescence of *Macrocarpaea glaziovii* is a large open thyrse with long branches ending in compact flat-topped cymes. The flowers are relatively small in respect to the overall size of the inflorescence. *Macrocarpaea glaziovii* is best known from forests above Rio de Janeiro near the Corcovado. Large populations of various sized plants can be seen from seedlings, to young robust sterile plants up to 2 m tall with large leaves, to plants in fruit. Nevertheless, there are few complete specimens of this species. Notable is the near complete absence of specimens in full flower; the best specimens are surprisingly enough the type material collected in 1868. *Macrocarpaea glaziovii* is sympatric with *M. obtusifolia* in Rio de Janeiro (e.g. *M. glaziovii Grant 09-4603, 09-4604, 10-4638, 10-4639, 10-4640, 10-4641,* and *M obtusifolia Grant 09-4605*).

Distribution and habitat: This species occurs in Serra do Mar coastal mountainous vegetation from the city of Rio de Janeiro to Santa Teresa (ES) from 420–1700 m.

Eponymy. Named for the collector of the type, Frenchman August François Marie Glaziou (1828–1906).

Specimens examined: BRAZIL. **Espírito Santo**: Santa Teresa, Santa Lucia, 31 December 2001, *Boone W. 311* (MBML, RB); Mun. de Santa Teresa, Mata do Tabajara, 22 March 2000, *Demuner et al. 827* (MBML); Mun. Fundão, Goiapaba-Açu, 31 December 2000, *Demuner et al. 1253* (MBML, RB); Mun. de Santa Teresa, Nova Lombardia, Reserva Biológica Augusto Ruschi, Estrada de Lombardia, 800 m, 27 November 2001, *Kollmann et al. 5046* (MBML); Castello, Parque Estadual do Forno Grande, Localidade de Bateias, 20°31'37"S, 41°06'6"W, 1250 m, 13 February 2008, *Kollmann et al. 10582* (CEPEC, MBML, RB); Mun. de Castello, Farrio Grande, 6 December 1956, *Pereira, E. 2103* (RB [3 sheets]); Mun. Santa Teresa, Reserva Biológica Augusto Ruschi, parte final, estrada para João Neiva, 5 September 2003, *Rossini & Bausen 539* (MBML, SPF); Município de Santa Teresa, Nova Lombardia, Reserva Biológica Augusto Ruschi, linha da divisa, lado esquerdo, seguido corrego, 20 March 2003, *Vervloet & Bausen 2025* (MBML, RB); **Minas Gerais**: 1 January 1852, *Aeckermann s.n.* (BR); 5/1/1883, *Saint-Hilaire 706* (P); Serra de Ibitipoca, 1500–1700 m, 28 September 1970, *Sucre, D. & Braga 7134* (RB); **Rio de Janeiro**: Mun. Nova Friburgo, Macaé de Cima, Sítio Sofronites, nascente do rio das Flores, 22 October 1990, *Amorim et al. 264-A* (RB [2 sheets]); Mun. Nova Friburgo, Macaé de Cima, estrada de terra, cerca de 900 m do Hotel São João, 19 January 1999, *Anderson et al. 99/09* (RB); Mun. Nova Friburgo, Reserva Ecológica Municipal de Macaé de Cima, 22°30'S, 42°32'W, 26 October 1989, *Araujo et al. 85* (RB [3 sheets]); Rio de Janeiro, Corcovado, Paineiras, 12 October 1884, *Belarmino s.n.* (R); Nova Iguaçu, distrito de Tingua, Reserva Biológica, estrada do Ouro, 400–700 m, 24 October 2002, *Bovini et al. 2214* (RB); *Bowie & Cunningham s.n.* (BM); 1814–1817, *Bowie & Cunningham s.n.* (BM); Therezopolis, Pedra do Frade, 1600 m, 1 November 1929, *Brade 9931A* (R); Mun. Itatiaia, Parque Nacional Itatiaia, Trilha do Hotel Simon para o Tres Picos, 1300 m, 5 October 1994, *Braga et al. 1390* (RB [2 sheets]); Planalto, Itatiayo, 1 November 1918, *Campos Porto 10595* (RB); Floresta da Tijuca, 650 m, 23 August 1959, *Carauta 66* (R [2

sheets]); Guanabara, Floresta da Tijuca, Estrada do Excelsior, 9 October 1963, *Castellanos 24427* (GH); Nova Friburgo, Reserva Ecológica Municipal de Macaé de Cima, Sítio Sophronites, 1100 m, 11 September 1990, *Correia 134* (NY, RB, SP); Rio de Janeiro, Corcovado à Tijuca, October 1862, *Drake s.n.* (P [2 sheets]); Rio de Janeiro, Corcovado, 10 November 1947, *Duarte 973* (NY, RB [5 sheets]); Parque Nacional Serra dos Orgãos, Terezopolis, 23 October 1942, *Duarte 1091* (RB [3 sheets]); Parque Nacional da Serra dos Orgãos, Terezopolis, 24 November 1942, *Duarte 1154* (RB); Rio de Janeiro, Estrada do Sumaré, 31 October 1939, *Ducke & Kuhlmann s.n.* (SP); Mun. Parati, Apa-cairuçu, Pico do Cairuçu, acesso pela praia Negra, 800–1100 m, 21 November 1990, *Farney 2498* (K); Mun. Parati, Apa-cairuçu, Pico do Cairuçu, acesso pela praia Negra, 800–1100 m, 25 November 1990, *Farney, C. 2586* (K); Mun. Nova Friburgo, Distrito de Macaé de Cima, Sítio Sofronites, 1100 m, 12 September 1989, *Fonseca Vaz 654* (RB); Serra do Rifa, P.E. do Desengano, 1 March 1981, *Garcia da Silva 79* (R); Organ Mts., 915 m, March 1837, *Gardner 539* (BM, K); Rio de Janeiro [Ceara], *Gardner 1764* (W); Itatiaya-Gebiet, 850 m, 30 October 1927, *Ginzberger s.n.* (F, WU); Itatiaya-Gebiet, 1800 m, 2 November 1927, *Ginzberger s.n.* (F); Mun. Nova Friburgo, estrada atrás do Posto Policial da Rodovia Cachoeira de Macacu-Nova Friburgo, 1083 m, 27 October 1994, *Giordano et al. 1738* (NY, RB [3 sheets]); Rio de Janeiro, May 1865, *Glaziou 900* (BR [2 sheets], C); P [2 sheets], R); Glaziou s.n. (P); Rio de Janeiro, Parque Nacional da Tijuca, estrada da Vista Chinesa, 22°58'05.7"S, 043°15'30.4"W 461 m, 20 November 2009, *Grant, J.R., L. Zeltner, B. Resende Silva & V. Trunz 09-4603* (G, NY, SPF); Rio de Janeiro, estrada do Sumaré, à 1.5 km da estrada Redentor, 22°57'16.4"S, 043°14'30.1"W, 656 m, 20 November 2009, *Grant, J.R., L. Zeltner, B. Resende Silva & V. Trunz 09-4604* (G, MO, NY, SPF); Município de Nova Friburgo, estrada Fazenda São João, 0.5 km da estrada RJ 116, 22°21'33.7"S, 042°30'58.4"W, 991 m, 21 November 2009, *Grant, J.R., L. Zeltner, B. Resende Silva & V. Trunz 09-4606* (G, MO, NY, SP, SPF); Rio de Janeiro, Parque Nacional da Tijuca, estrada do Sumaré, 22°57'22.4"S, 043°17'21.7"W, 554 m, 20 November 2010, *Grant, J.R. & V. Trunz 10-4638* (NY); Rio de Janeiro, Parque Nacional da Tijuca, estrada do Sumaré, 22°57'22.4"S, 043° 17'21.7"W, 554 m, 22 November 2010, *Grant, J.R. & V. Trunz 10-4639* (NY); Rio de Janeiro, Parque Nacional da Tijuca, estrada do Sumaré, 22°56'55.3"S, 043°13'13.3"W, 420 m, 22 November 2010, *Grant, J.R. & V. Trunz 10-4640* (NY); Rio de Janeiro, Parque Nacional da Tijuca, estrada do Sumaré, 12°27'17.0"S, 043°14'30.3"W, 677 m, 22 November 2010, *Grant, J.R. & V. Trunz 10-4641* (G, MO, NY, SP); Mun. Nova Friburgo, Reserva Ecológica Municipal de Macaé de Cima, 22°30'S, 42°32'W, 7 November 1988, *Guedes et al. 2190* (RB); El Corcovado, 17 October 1862, *Isern 6354* (MA-ISERN [4 sheets]); Rio de Janeiro, Sumaré, 5 December 1932, *Kuhlmann s.n.* (RB [3 sheets]); Rio de Janeiro, Corcovado et Mandiocca, *Langsdorff s.n.* (BR); Nova Friburgo, Cabeceira do Rio das Flores, 1300 m, 24 August 1986, *Leitman 129* (RB); Mun. São Fidelis, 1 August 1933, *Lima, S. 210* (RB [3 sheets]); Parque Nacional Serra dos Orgãos, 1100 m, 21 November 1944, *Link 2218* (R); Mun. Nova Friburgo, Muri, Macaé de Cima, 1000 m, 18 June 1986, *Martinelli et al. 11739* (RB); Tijuca, *Miers s.n.* (BM); *Nadeaud s.n.* (P [4 sheets]; Forêts humides du Corcovado à Tijuca, 31 October 1862, *Nadeaud s.n.* (P); Forêts humides entre Corcovado et Tijuca, 1 December 1860, *Nadeaud s.n. (*P); Parque Nacional Serra dos Orgãos, Distrito Santo Aleixo, trilha para o Pico Grande, fazenda Floresta do Pico, 25 September 2007, *Nadruz et al. 1992* (RB); Parque Nacional Serra dos Orgãos. Distrito Santo Aleixo, trilha coruja-italianos, beirando o rio, 27 September 2007, *Nadruz et al. 2083* (RB); Teresopolis, BR-4, 1000 m, 20 October 1963, *Pabst 28073* (B [2 sheets], HB [2 sheets]); Represa de Camorim, 1 January 1937, *Peckolt et al. s.n.* (R); Serra dos Orgãos, Castele D'Agua, 28 November 1942, *Pereira, E. 229* (CEPEC, HB, RB [2 sheets], US); Corcovado, Sumaré, 12 December 1942, *Pereira, E. 292* (RB [3 sheets]); Mun. Nova Friburgo, Reserva Ecológica Municipal de Macaé de Cima 22°33'–22°28'S, 42°30'–42°34'W, 16 February 1993, *Pereira, T.S. et al. 13* (RB [2 sheets]); Rio de Janeiro, Floresta da Tijuca, Estrada da Vista Chinesa, perto da trilha para o Morro Queimado, 22°58'13.8"S; 43°15'28.7"W, 452 m, 11 May 2004, *B. Resende Silva 1318* (NY, RB); Corcovado, *Riedel s.n.* (BR [2 sheets]); Rio Pardo, *Riedel s.n.* (OXF); Rio de Janeiro, *Rijksherbarium Leiden 141* (L); Pica da Tijuca, 1000 m, 16 July 1944, *Segadas-Vianna 571* (R); Serra Negra, 3 October 1959, *Strang 139* (R [2 sheets]); Pedra da Gavea, 750 m, 7 February 1971, *Sucre, D. 7444* (RB

[2 sheets]); Rio de Janeiro, Estrada do Sumaré, 31 October 1939, *Sucre, D. & Kuhlmann s.n.* (NY, RB [7 sheets]); Tijuca, 12 February 1944, *Vales & Vidal s.n.* (R); Parque Nacional Serra dos Orgãos, 950 m, 11 October 1912, *Vidal II-4779* (R); Terezopolis, 860 m, 24 October 1912, *Vidal II-4835* (R); Mun. Nova Friburgo, Reserva Ecológica Municipal de Macaé de Cima, caminho para os Pirineus, 21 June 1989, *Vieira et al. 32* (RB [2 sheets]); Mun. Nova Friburgo, Reserva Ecológica Municipal de Macaé de Cima, caminho para os Pirineus, 12 September 1989, *Vieira et al. 78* (MO, RB [2 sheets]); Mun. Nova Friburgo, Macaé de Cima, margens do Rio das Flores, 15 September 1988, *Wendt 185* (RB); 1 January 1844, *Widgren 1234* (S); Rio de Janeiro, 1 January 1844, *Widgren s.n.* (S); Rio de Janeiro, 1838–1842, *Wilkes s.n.* (US); **São Paulo**: Alta de Serra, Serra da Mar, 1000 m, 2 February 1913, *Brade 5805* (S [2 sheets], SP); São Paulo, *Burchell 3630* (BR [2 sheets], K, P).

Macrocarpaea cf. *glaziovii*: **Bahia**: Camaca: RPPN Serra Bonita, 9.7 km W de Camaca na estrada para Jacareci, dai 6 km SW na estrada para a RPPN e Torre da Embratel, trilha do mirante, até à Torre, 15°23'30"S, 39°33'55"W, 850 m, 6 June 2006, *Lopes et al. 807* (CEPEC).

4. *Macrocarpaea illecebrosa* J.R. Grant, Harvard Pap. Bot. 9(2): 312. 2005. TYPE: BRAZIL. Bahia: Mun. de Palmeiras, Estrada que sai da BR-242 e da acesso ao Morro do Pai Inácio, 7 January 1997, *A.A. Grillo & A.A. Conceição 217* (Holotype SPF). Fig. 2, 4E–F, 5A–C.

Shrub, 1–2 m, glabrous to spiculate (on stems, petioles, leaves and bracts especially along veins on the lower surface). Stems terete to slightly quadrangular, solid to hollow, 3–10 mm diam. just below inflorescence. Leaves ovate, oval, to slightly obovate sessile to short-petiolate 4.0–14.5 cm long. Petioles 0–10 mm, robust with strong open vagination one half the length of the petiole; interpetiolar ridge 1–3 mm high. Blades 4.0–13.5 × 3.0–8.5 cm, entire, not revolute green, with slightly impressed veins above, and slightly raised veins below, glabrous above to spiculate-hispid on lower leaf surfaces especially on veins, leathery- to thin coriaceous; base aequilateral to oblique, cuneate to rounded; apex rounded to obtuse. Inflorescence a sturdy much branched open thyrse, 11–32 cm long; branches 7–16 cm long; (3)–7–9 flowered per branch. Bracts ovate, oval, to slightly obovate, sessile to short-petiolate, 12–130 × 5–85 mm; base aequilateral to oblique, cuneate to rounded; apex rounded, obtuse, to nearly acute; bract petiole 0–4 mm. Flowers pedicellate, erect; pedicels 4–9–(15–23 in fruit); bracteoles inconspicuous and scabrous, linear to ovate, 2–8 × 1–7 mm. Calyx campanulate, 8–12 × 8–10 mm, glabrous to spiculate, smooth, green, ecarinate; calyx lobes ovate, 4–6 × 5–7; calyx lobe apex rounded to obtuse. Corolla funnel-shaped, 33–37 × 21–23, cream-colored (*Fiaschi 2688*), smooth; corolla lobes ovate, 6–7 × 7–8, apex obtuse. Stamens and pistil unknown. Capsules ovoid, 17–20 × 8–9 mm, smooth to ribbed, chestnut-tan, erect to slightly spreading; style remnant 8–19 mm. Seeds "Flattened type," flattened, roughly triangular in outline formed by extended chalazal and micropylar ends, 0.4–1.0 × 1.1–1.9 mm, light orange to translucent amber-colored; testa reticulate.

Morphology and similarities: *Macrocarpaea illecebrosa* is closely related to both *M. atlantica* and *M. obtusifolia*. The latter two species are conspicuously hispid, where *M. illecebrosa* ranges from glabrous to spiculate, and while complete specimens are still lacking, it appears to have generally smaller leaves (4.0–8.5 vs. 6.0–20.0) and smaller calyces (8–12 × 8–10 vs. 10–16 × 6–14).

Distribution and habitat: Occurs in rocky *campos rupestres* montane savannas in the Chapada Diamantina region of interior Bahia. It has been collected at two sites, one at Morro Pai Inácio, near Lençóis, and another at Pico das Almas near Rio de Contas from 1665–1810 m.

Etymology: From the Latin *illecebrosus*, full of allurement.

Specimens examined: TYPE: BRAZIL. Bahia: Rio de Contas, Trilha de acesso ao Pico das Almas, 13°31'33.7"S, 041°57'51.1"W, 4 December 2004, *Fiaschi 2688* (CEPEC, SP); Rio de Contas, haut du chemin d'accès au Pico das Almas, 13°31'33.7"S, 041°57'51.1"W, 1810 m, 28 November 2010, *Grant, J.R. & V. Trunz 10-4645* (G, MO, NY, SP); Rio de Contas: Pico das Almas, caminho para o pico, 13°31'25"S, 41°57'40"W, 1665 m, 19 May 2001, *Harley et al. 54400* (HUEFS); Rio de Contas: Pico das Almas, na subida, depois da area pedregosa com passagem estreita e sombrada, entre as pedras, 13°31'32"S, 41°57'52"W, 1785 m, 23 February 2004, *Harley et al. 54956* (HUEFS).

5. ***Macrocarpaea inesiae*** J.R. Grant & V. Trunz, *sp. nov*. TYPE: BRAZIL. São Paulo: Cunha,

Parque Estadual da Serra do Mar, Núcleo Cunha/Indaiá, Trilha do Rio Bonito, Mata Ombrófila Densa, subarbusto ca. 1 m alt, ombrófilo, botões e flores crème-esverdeadas, levemente odoríferas, frutos secos, 15 February 2000, *Inês Cordeiro 2025* (Holotype SP; isotype NY). Fig. 2, 4I–J, 5D–G.

A Macrocarpaeae obtusifoliae (Griseb.) Gilg cui affinis, sed frutex 1 m, foliis glabris, corollis longioribus (46–52 vs. 36–46 mm), et inflorescentia umbelliformibus differt.

Shrub, 1 m, glabrous throughout. Stems terete to slightly quadrangular, solid, 4–5 in diam. just below the inflorescence. Leaves oval to elliptic, long-petiolate, 20–39 cm long. Petioles 25–80 mm long, robust without vagination; interpetiolar ridge 3–4 mm high. Blades 17.5–31 × 8–15 mm, entire, not revolute, green, with slightly impressed veins above, and slightly raised veins below, glabrous, papery thin, membranaceous; base aequilateral to oblique, cuneate; apex acute to acuminate. Inflorescence ranges from a first-year single stout flat-topped cyme formed from up to three branches, to the second-year where up to two much longer branches diverge from below the fruits of the previous year, 9–14 cm; branches 8–13 cm; 3–5 flowered per branch. Bracts varying widely in shape from the large pair of bracts that subtend the inflorescence that are broadly ovate (nearly orbicular), to the next set that are nearly rhomboid, to elliptic to obovate on the bracts that subtend the flowers, sessile to short-petiolate, the large pair that subtend the entire inflorescence 80–90 × 55–65 mm, regular bracts 12–60 × 7–40 mm; base aequilateral to oblique, cuneate to rounded; apex rounded to obtuse; bract petioles 0–5. Flowers pedicellate, erect; pedicels 20–28 mm long; bracteoles inconspicuous and scabrous, linear to ovate, 1.5–2.0 × 1.0–1.5. Calyx campanulate, 13–16 × 10–13 mm, glabrous, with fairly prominent linear venation, green, ecarinate; calyx lobes ovate to rotund, 7–10 × 6–7 mm, apex obtuse to rounded. Corolla funnel-shaped, 46–52 × 24–36 mm, greenish-cream (*Cordeiro 2025*), smooth; lobes ovate, 8–10 × 10–15, apex obtuse to acute. Stamens 20–33 mm long; filaments 15–26 mm long, filiform, flattened; anthers elliptic to ovate, 5–7 × 2–3 mm, sagittate, versatile; pollen glabra-type. Pistil 34–38 mm long; ovary 10–12 × 2–3 mm; style 20–21 × 1.5–2.0; stigma spathulate, 4–5 × 3–4 mm. Capsules ovoid, when in maturity the sutures open and the two locules inflate outwards to release the seeds, 11–15 × 7–9 mm, smooth to ribbed, straw-colored, erect to slightly spreading; style remnant 7–10 mm long. Seeds "Flattened type," flattened to polygonal (2–3[–4]) sided, roughly triangular in outline formed by extended chalazal and micropylar ends, yet the chalazal end often either falls of before seed maturity or has been lost during seed development, 0.3–0.5 × 0.3–0.6 mm, bicolored, the reticulate mesh around the seed straw-colored, then seed dark brown, to give an overall color from afar as light brown; testa reticulate.

Morphology and similarities: *Macrocarpaea inesiae* is distinct in its short 1 m tall stature with large leaves, and the largest flowers of all species of the genus in Brazil (46–52 mm long). Its branches form a flat-topped cyme, almost as a condensed version of *M. glaziovii*. The inflorescence varies a first-season single stout flat-topped cyme (appearing almost as an umbel), to a second-season where up to two much longer branches diverge from below the fruits of the previous year. This species is also unique in having a large pair of broadly ovate (nearly orbicular) bracts that subtends the entire inflorescence. At its type locality, it is sympatric with *M. rubra* (e.g. *M inesiae Grant 09-4602,* and *M. rubra Grant 09-4601*).

Distribution and habitat: Endemic to the Parque Estadual da Serra do Mar (Núcleo Cunha), in the state of São Paulo, about halfway between Guaratinguetá (SP) and Paraty (RJ), in Serra do Mar coastal mountainous vegetation at 1046 m.

Eponymy: Named in honor of collector of the type, Brazilian botanist Inês Cordeiro (1958–) of the Instituto de Botânica (SP), in São Paulo, Brazil. Inês is a specialist of Brazilian Euphorbiaceae and has contributed treatments of Gentianaceae for several regional floras in Brazil.

Paratype: BRAZIL. São Paulo: Município de Cunha, Serra do Mar, perto de Rio Bonito, 23°15'00.1"S, 045°00'30.2"W, 1046 m, 18 November 2009, *Grant, J.R., L. Zeltner, F. Calió & V. Trunz 09-4602* (NY, SPF).

6. *Macrocarpaea obtusifolia* (Griseb.) Gilg in Engl. & Prantl, Nat. Pflanzenfam. 4(2): 94. 1895. Based on: *Lisianthus obtusifolius* Griseb., Gen et Sp. Gent.: 175. 1839. *Helia obtusifolia* (Griseb.) Kuntze, Rev. Gen. 428. 1891. TYPE: BRAZIL. Rio de Janeiro: Sierra d'Estrella *Sellow s.n.* (Lectotype: K; isolectotype: P, designated by Weaver 1972: 305). Fig. 1b, 2, 4G–H, 7A–D.

Shrub, 1–3 m, hyaline hispid to spiculate with short simple hairs on stems, petioles, leaves, inflorescences, bracts and calyces. Stems terete to slightly quadrangular, solid to hollow, 4–16 mm in diam. just below inflorescence. Leaves oval, elliptic, ovate to obovate, sessile to petiolate, 6–32 cm long. Petioles 0–20 mm, robust with strong open vagination one half the length of the petiole; interpetiolar ridge 2–5 mm high. Blades 6–30 × 3.5–15.0 cm, entire, not revolute, light green, with slightly impressed veins above, and slightly raised veins below, hyaline hispid to spiculate above and especially below, papery thin, to thin-coriaceous; base aequilateral to oblique, cuneate to rounded; apex obtuse to rounded. Inflorescence a sturdy much branched open thyrse, 39–75 cm long; branches 11–52 cm long; 3–7 flowered per branch. Bracts ovate, elliptic to obovate, sessile to short-petiolate in larger bracts, 15–220 × 8–120 mm; base aequilateral to oblique, cuneate to rounded, apex obtuse to rounded; bract petioles 0–5 mm. Flowers pedicellate, erect; pedicels 13–26 mm long, ovate, elliptic to obovate; bracteoles 5–11 × 3–8 mm. Calyx campanulate, 10–16 × 6–14 mm, hyaline hispid to spiculate with short simple hairs, green, ecarinate; calyx lobes ovate to elliptic, 3–8 × 3–9 mm, apex rounded to obtuse. Corollas funnel-shaped, 36–46 × 15–29 mm, greenish-white (*Grant 09-4597, 09-4600, 09-4605*), greenish-cream (*Cordeiro 2785, Irwin 22249, Pirani et al. 6847*), smooth; corolla lobes ovate, 9–13 × 6–11 mm, apex obtuse to acute. Stamens 24–31 mm; filaments 20–25, filiform, flattened; anthers elliptic to ovate, 4–6 × 2–3 mm, sagittate, versatile; pollen glabra-type. Pistil 35–45 mm long; ovary 10–14 × 2–3; style 22–27 × 1.0–1.5; stigma spathulate, 3–4 × 1.0–1.5 mm. Capsules ovoid dehiscing normally, 19–28 × 8–13 mm, smooth to ribbed, dark brown, spreading to nodding; style remnant 5–18 mm long. Seeds "Flattened type," flattened to polygonal (2–3[–4]) sided, roughly triangular in outline formed by extended chalazal and micropylar ends, yet the chalazal end either falls of before seed maturity or has been lost during seed development, 0.7–1.0 × 0.7–1.1 mm, chocolate brown in color; testa reticulate.

Morphology and similarities: *Macrocarpaea obtusifolia, M. atlantica*, and *M. illecebrosa* are three closely related species as discussed above under *M. atlantica*. *Macrocarpaea obtusifolia* is distinct in its hispid ovate leaves with obtuse to rounded apices. It is sympatric with *M. rubra* in São Paulo (e.g. *M. obtusifolia Grant 09-4597, 09-4600*, and *M. rubra Grant 09-4598, 09-4599*), and with *M. glaziovii* in forests near the Corcovado in Rio de Janeiro (e.g. *M. obtusifolia Grant 09-4605* and *M. glaziovii Grant 09-4603, 09-4604, 10-4638, 10-4639, 10-4640, 10-4641*). When sympatric with either species, *M. obtusifolia* tends to occur at slightly higher elevations, and is readily distinct in its hispid leaves, inflorescence and calyces.

Distribution and habitat: Following the coast, *Macrocarpaea obtusifolia* occurs in humid montane Atlantic forests from Caraguatatuba (SP) to Rio de Janeiro and Santa Teresa (ES) from 676–1850 m. It also occurs on the Serra do Espinhaço around Belo Horizonte (especially Serra do Cipó), within or on the forest edges of rocky *campos rupestres* montane savannas.

Etymology: From the Latin *obtuse*, and *folia* for its leaves with generally obtuse to rounded apices.

Specimens examined: BRAZIL. **Espírito Santo:** Mun. de Santa Teresa, localidade Santo Antonio, Propriedade de J. Dalmaschio, 5 April 2005, *Fontana & Kollmann 1260* (MBML); Castelo, Parque Estadual do Forno Grande, Trilha para o Roninha, 20°30'58"S, 41°05'1"W, 1400–1700 m, 21 January 2009, *Forzza et al. 5440* (CEPEC, MBML, RB); Mun. de Santa Teresa, São Lourenço, Country Club, 750m, 22 February 1999, *Kollmann 1986* (MBML, SPF), Mun. de Domingos Martins, Parque Estadual da Pedra Azul, Trilha das Piscinas, 13 July 2005, *Kollmann et al. 8026* (MBML); Mun. de Vargem Alta, 18 January 2008, *Kollmann et al. 10301*, (MBML, SPF). **Minas Gerais**: Serra do Espinhaço, Pico do Itambé, 1310 m, 13 February 1972, *Anderson, W.R. et al. 35964* (AAU, MO, NY, S); Serra do Espinhaço, Serra do Cipó, 1200 m, 20 February 1972, *Anderson. et al. 36353*; Serra do Cipó, 100–1320 m, 9 February 1991, *Arbo et al. 4752* (C); Serra do Cipó, Alto Congonhas, 12 km NE de Cardeal Mota, hacia Conceição do Mato Dentro, 1000–1320 m, 9 February 1991, *Arbo et al. 4752* (GH; SPF); Mun. de Santana do Riacho, km 128 Belo Horizonte-Conceição do Mato Dentro, 11 January 1981, *Castro & Sajo 6957* (NY, SP, SPF, U); Serra do Piedade, 1 January 1843, *Claussen 352* (P [2 sheets]); 1 January 1843, *Claussen s.n.* (P [2 sheets]); Serra do Piedade, 1 January 1843, *Claussen s.n.* (W); Serra do Caraça, 70 km SE Belo Horizonte, 1500–1700, 18 November 1978, *Cruz et al. 6453* (INPA, US); Serra do Cipó, km 141 da Estrada de Conceição, 1250 m,

12 December 1949, *Duarte 2280* (CEPEC, F, G, MBM, RB [2 sheets]); Serra do Cipó, km 126 ant. Min. de Santa Luzia, 25 October 1961, *Duarte 6405* (RB [3 sheets]; SP [3 sheets]; Serra do Cipó, km 141 da Estrada de Conceição, 1250 m, 12 December 1949, *Duarte, A.P. 2280* (MO); Serra da Pedade, January 1866, *Erigler 1131* (C); Estrada Lagoa Santa/Conc. do Mato Dendro, 17 km do Córrego Chapéu de Sol, 25 February 1984, *Farney et al. 453* (RB [2 sheets]); Km 123 Mata ciliar Corego 3 Pontinhas, 5 December 1981, *Hensold et al. 7710* (SPF); Serra do Gariupu, Cocae, 13 January 1921, *Hoehne 4992* (MBM, NY, SP, SPF); Serra do Cipó, ca. km 120 (ca. 145 km N of Belo Horizonte), 1200 m, 14 February 1968, *Irwin, H.S. et al. 20021* (F, INPA, MBM, MG, MO, NY, R, S, US); Serra do Espinhaço, 1370 m, 19 January 1969, *Irwin et al. 22249* (LD, NY, S); Serra do Cipó, Município de Santana do Riacho, 1300 m, 11 May 1974, *Martinelli & I. Cordeiro 300* (CEPEC, F, K, RB [2 sheets]; Serra do Cipó, km. 138 estrada de Conceição, 4 February 1938, *Mello Barreto 8845* (F, MBM); Mun. de Santana do Riacho, km 140 Belo Horizonte-Conceição do Mato Dentro, 24 November 1979, *Menezes 5769* (NY, SP); Mun. de Santana do Riacho, km × Belo Horizonte-Conceição do Mato Dentro, 1000 m, 18 February 1982, *Muniz et al. 7887* (SPF); Mun. de Santana do Riacho, km 140 Belo Horizonte-Conceição do Mato Dentro, 29 February 1980, *Pirani 5957* (NY, SP, SPF); Mun. de Santana do Riacho, km × Belo Horizonte-Conceição do Mato Dentro, 16 December 1980, *Pirani et al. 6847* (NY, SP, SPF, U [2 sheets]); Serra da Lapa, February 1824, *Riedel 1161* (BR); *Riedel s.n.* (G, GH, K, OXF); 1816–1821, *Saint-Hilaire 2261* (P [3 sheets]); 1816–1821, *Saint-Hilaire 2262* (P); Serra de Casasse, 1816–1821 *Saint-Hilaire s.n.* (P [4 sheets]); Mun. de Santana do Riacho, Estrada Belo Horizonte-Conceição do Mato Dentro, bifurcação para Morro do Pilar, 13 December 1987, *Salatino et al. 10808* (SPF); Descoberto, Serra do Relógio, RPPN Alto da Boa Vista, 1 November 2009, *Souza, F.S. et al. 790* (CESJ, NY); 1 January 1844, *Weddell s.n.* (P). **Rio de Janeiro**: Mun. Sta. Maria Magdalena, P.E. Desengano, Pedra do Desengano, 1500–1650 m, 17 September 1986, *Farney & Caruso 1207* (RB [2 sheets]); Rio de Janeiro, estrada do Sumaré, à 2 km da estrada Redentor, 22°57'14.2"S, 043°14'22.9"W, 676 m, 20 November 2009, *Grant, J.R., L. Zeltner, B. Resende Silva & V. Trunz 09-4605* (G, NY, SPF); Santa Maria Madalena, Parque Estadual do Desengano, Pedra do Desengano, campo de altitude, 26 March 2002, *Lobão et al. 674* (SPF); Mun. Sta. Maria Magdalena, Parque Estadual do Desengano, Pedra do Desengano, 1800–1850 m, 28 June 1989, *Martinelli 13339* (RB [3 sheets], SP); Rio de Janeiro, Corcovado, Sumaré, 17 December 1942, *Pereira, E. 284* (RB [2 sheets], US); Mun. de Macaé, Pico do Frade de Macaé, 1300 m, 7 August 1985, *Pessoa et al. 34* (RB); Mun. Nova Friburgo, Macaé de Cima, Faz Sophronites, 1200 m, 16 July 1987, *Pessoa et al. 214* (RB [3 sheets]); Mun. Nova Friburgo, Macaé de Cima, Faz Sophronites, 1250 m, 18 August 1987, *Pessoa et al. 249* (RB [2 sheets]); Therezopolis, 6 January 1883, *Saldanha 6869* (R); Serra dos Orgãos, Dedo de Deus, 13 December 1891, *Ule 2414* (R); 1836–1842, *Wilkes s.n.* (US). **São Paulo**: Mun. de Salesópolis, Estrada Intermediária, próximo do km 49, cerca de 22 km do entroncamento con a Rodovia SP 088, 23°37'43"S, 45°41'23"W, 1100 m, 10 October 2003, *Cordeiro & Mello-Silva 2785* (NEU, SP, SPF); Biritiba Mirim, Estação Biológica de Boraceia, 23°38'–23°49'S, 45°52'–45°53'W, 29 May 1986, *Custodio Filho 2653* (SP); Município de Caraguatatuba, Serra do Mar, à oeste da estrada SP 099, 23°37'43.0"S, 045°41'22.4"W, 1166 m, 17 November 2009, *Grant, J.R., L. Zeltner, F. Calió & V. Trunz 09-4597* (G, MO, NY, SP, SPF); Município de Ubatuba, Serra do Mar, estrada SP 125, ± 10–15 km de Ubatuba, Km 75, 23°22'16.0"S, 045°08'41.0"W, 959 m, 18 November 2009, *Grant, J.R., L. Zeltner, F. Calió & V. Trunz 09-4600* (G, MO, NY, SP, SPF); Mun. de Cunha, Trilha da Pedreira, 23°14'02"S, 45°00'17"W, 13 December 1996, *Souza, J.P. et al. 858* (SP, SPF).

7. ***Macrocarpaea orbiculata*** J.R. Grant & V. Trunz, *sp. nov.* TYPE: BRAZIL. Bahia: Barro Preto, Serra da Pedra Lascada, 13.7 km de Barro Preto, na estrada de acesso à serra, 14°46'13"S, 39°32'10"W, 600–900 m, floresta ombrófila, vegetação montana, 11 November 2004, *Pedro Fiaschi, J.L. Paixão, S.C. Sant'Ana, & A.B. Rodrigues 2638* (Holotype CEPEC; isotype NY). Fig 2, 6 A–B.

Species novae a speciebus aliis foliis orbiculatis distinguienda.

Shrub, 1 m, glabrous throughout, except calyces, which are spiculate. Stems terete to slightly quadrangular, hollow, 4 mm in diam. just below the inflorescence. Leaves orbiculate to slightly ovate, sessile to very short-petiolate, 6–7 cm long. Petioles 0–2 mm, slender;

interpetiolar ridge 1 mm high. Blades 6–7 × 5–6, entire, not revolute, green, with slightly impressed veins above, and slightly raised veins below, glabrous, papery thin; base aequilateral, subcordate; apex acute to slightly obtuse. Inflorescence a thyrse with dense cymes, 14–24 cm long; branches 9–15 cm long; 5–15 flowered per branch. Bracts orbiculate, rotund to ovate, sessile to very short-petiolate, 7–70 × 6–60; base aequilateral, subcordate to rounded; base rounded, obtuse to acute; bract petiole 0–2 mm long. Flowers pedicellate, erect; pedicels 17–35 mm long, inconspicuous and scabrous, to ovate to obovate; bracteoles 1–7 × 0.5–6.00 mm. Calyx campanulate, 6–7 × 5–6 mm, spiculate, smooth, green, ecarinate; calyx lobes ovate to rotund, 3–4 × 3–4 mm, apex rounded with ciliate margin. Corolla, stamens, pistil, capsule, and seeds unknown.

Morphology and similarities: *Macrocarpaea orbiculata* is only known from the type collection, from the same locality as the type of *M. atlantica*. It is closely related to *M. dolichophylla*, but differs in having bract-like bracteoles that are ovate to obovate, to small and inconspicuous, 1–7 × 0.5–6.0 mm (vs. inconspicuous, triangular, 1 × 1 mm). Despite being only known from a single specimen in bud, it is distinct enough in its orbiculate leaves to warrant description.

Distribution and habitat: Endemic to remnant forests in mountains of the Atlantic Forest south of Itabuna and Ilhéus in southern Bahia from 600–900 m.

Etymology: From the Latin *orbiculatus*, for its unique orbiculate to ovate shaped leaves.

8. ***Macrocarpaea rubra*** Malme, Ark. Bot. 22A(2): 3. 1928. TYPE: BRAZIL. Paraná: Desvio Ypiranga, in terra silvae primaevae valde dumosa, 830 m, 27 October 1908, *Dusén s.n.* (Lectotype S; isolectotypes GH [2 sheets], LD [2 sheets], designated by Grant 2004: 48). Fig 1a, 2, 4 A–B, 5 I–L.

Terrestrial to epiphytic shrub, 0.25–2.5 m, glabrous throughout (although seedlings and rarely young leaves may be hispid along leaf margins, veins and petioles). Stems terete to slightly quadrangular, generally solid but sometimes hollow in larger specimens; 3–14 mm in diam. just below the inflorescence. Leaves elliptic, varying to slightly ovate to obovate, short to long-petiolate, (6–)16–43 cm. Petioles (5–)10–70 cm long, slender with very slight vagination; interpetiolar ridge 2–5 mm high. Blades (5.5–)15–36 × (3.0–)5.0–18 cm, entire, not revolute, dark green above and below, with slightly impressed veins above, and slightly raised veins below, glabrous, papery thin, membranaceous; base aequilateral to oblique, cuneate to attenuate and decurrent on the petiole; apex obtuse to rounded. Inflorescence in small (young, first year?) plants, varying from a simple inflorescence composed of a single cyme with 9 flowers, to large (at least 2 seasons) plants with a much branched open thyrse, (5–)10–50 cm long; branches 5–32 cm long; 3–7 flowers per branch. Bracts ovate, cordate, suborbicular to elliptic, sessile to short-petiolate in larger bracts, 6–150 × 4–88 mm; base aequilateral to oblique, attenuate and slightly decurrent onto the petiole on lower bracts nearest the leaves, to rounded, cuneate, to clasping the stem and slightly cordate above; apex obtuse to rounded; bract petioles 0–10 mm. Flowers pedicellate, erect to slightly spreading; pedicels 12–45 mm long; bracteoles inconspicuous and scabrous, linear to ovate, 1–3 × 1–2 mm. Calyx campanulate, 7–13 × 8–11 mm, glabrous, faintly rugose to pusticulate, green, ecarinate; calyx lobes ovate to elliptic, 5–8 × 3–5 mm, obtuse, rounded to acute. Corolla urceolate, 24–32 mm long, 8–19 mm wide (broadest above the middle), bright yellow (*Grant 09-4593, 09-4599, 09-4601*), pale yellow (*Oliveira 686*), to yellowish-green (*Reitz & Klein 4060*), buds yellow to orange, smooth; corolla lobes ovate, 1–3 × 2–3 mm, obtuse, rounded to acute. Stamens 15–18 mm long; filaments 12.5–15.0, filiform, flattened; anthers elliptic to oblong, 2.5–3.0 × 1.5–2.0 mm, sagittate, versatile; pollen glabra-type. Pistil 19–23 mm long; ovary 7–9 × 2–3; style 9–10 × 0.75–1.0, spathulate; stigma 2–3 × 1 mm. Capsules ovoid, when in maturity the sutures open and the two locules inflate outwards to release the seeds, 9–13 × 5–10 mm wide, smooth to ribbed, straw-colored, erect to slightly spreading but not nodding; style remnant 3–9 mm long. Seeds "Flattened type," flattened, roughly triangular in outline formed by extended chalazal and micropylar ends, 0.5–1.5 × 0.6–2.0 mm, straw-colored; testa reticulate.

Morphology and similarities: *Macrocarpaea rubra* tends to be short in stature in Santa Catarina and Paraná (typically 0.25–50 cm tall), yet approaches 2.5 m at the northern extent of its range in São Paulo. In larger plants (e.g. *Davis et al. 59825, Nicolau 946*) the inflo-

rescences show what appear to be two seasons of flowering from the same cyme. This is apparent since there are fruits (previous seasons) mixed with an entire new set of buds and flowers. The corolla is never red as the species name implies. The bright yellow flowers may dry as herbarium specimens as rather dark orange to red, which led Malme to give the species name "rubra." *Macrocarpaea rubra* is the only species in the entire genus with an urceolate corolla. Observations of several populations were unsuccessful in sighting any pollinators of this very unique corolla type. *Macrocarpaea rubra* is sympatric with *M. inesiae* at the type locality of the latter (e.g. *M. rubra Grant 09-4601,* and *M inesiae Grant 09-4602*), and with *M. obtusifolia* also in São Paulo (e.g. *M. rubra Grant 09-4598, 09-4599*, and *M obtusifolia Grant 09-4597, 09-4600*). It has been observed in several localities to be epiphytic on tree ferns (e.g. *Grant 09-4593*).

Distribution and habitat: This species has a fairly broad distribution in Serra do Mar coastal mountainous vegetation, from Blumenau (SC) in the south, through Curitiba (PR) and coastal São Paulo up to Paraty (RJ) from 30–1280 m.

Etymology: From the Latin *rubra*, red, for its bright yellow corollas that may appear reddish when pressed and dried as herbarium specimens.

Specimens examined: BRAZIL. **Paraná**: Morro Cunhaporanga (Mun. Guaraqueçaba), 27 September 2006, *Barbosa E. & Silva, J.M. 1650* (MBM); Serra da Prata, Torre de Prata, 8 December 1998, *Barbosa E. et al. 226* (MBM); Morro do Bronze (Mun Guaraqueçaba), 12 February 2002, *Carneiro 1316* (MBM); Morro Sete, Mun. Quatro Barras, 7 November 1992, *Cervi 3825* (NY, UPCB); Morro Sete, Mun. Quatro Barras, 24 September 1997, *Cervi 6353* (UPCB); Paranaguá, Pico do Marumbi, *Chagas & Silva 565* (SP, UPCB); Rio Arraial (Mun. S. José dos Pinhais), 13 November 1985, *Cordeiro, J. & Hatschbach 171* (MBM); Rio Arraial (Mun. S. José dos Pinhais), 13 November 1985, *Cordeiro, J. & Hatschbach 171* (MG); Desvio Ypiranga, 830 m, 2 November 1908, *Dusén 6965* (BM, F, G, GH, K, MICH, MO, NY, P, PH, S, UC, US); Desvio Ypiranga, 31 October 1914, *Dusén 15790* (BM [2 sheets], BR, F, G, GH [2 sheets], K, LD, MO, NY, P, PH, S, U, US, WIS, Z); Desvio Ypiranga, 830 m, 31 October 1914, *Dusén 15822* (S); Serra do Mar, Ypiranga, 830 m, 4 November 1915, *Dusén 17288* (G, GH, MO, S); Desvio Ypiranga, 830 m, 18 December 1914, *Dusén s.n.* (S); Reserva Natural Salto Morato, Fazenda Esperança (Mun. Guaraqueçaba), 23 April 2002, *Gati et al. 759* (MBM); Mun. Guaratuba, BR 376 between Curitiba and Joinville, Rio Itarare, 6 May 1999, *Grant, J.R., J. Moraes da Silva, L.A. Ferreira & E. Barboza 99-3449* (CHRB, SBBG, SEL, US); Município de Quatro Barras, Morro Sete, trecho original da Graciosa, Casa de Pedra, 25°20'15.1"S, 048°54'39.0"W, 875 m, 13 November 2009, *Grant, J.R., L. Zeltner & V. Trunz 09-4593* (G, NY, SPF); Guaratuba, Pedra Branca de Araraquara, 50–100 m, 17 October 1964, *Hatschbach 11726* (F, HB, K, MBM, RB, UC); Morro Pão de Ló, Estrada Itupava, 24 October 1944, *Hatschbach I47* (MBM); Piraquara, Banhado, 2 November 1948, *Hatschbach I090* (MBM, RB [2 sheets], US); Cabeçeiras Rio Arraial, Morretes, 800–950 m, 11 November 1965, *Hatschbach 13128* (MBM [2 sheets], US); Serra da Virgem Maria, 12 November 1968, *Hatschbach 20289* (C, MBM); Rio da Divisa, 30 m, 16 December 1971, *Hatschbach 28526* (MBM, NA, UC); Porto de Cima, Morretes, 22 October 1980, *Hatschbach 43301* (BRIT, F, MBM, MU, NY, SPF); Serra Ibitiraquire, 8 October 1967, *Imaguire 226* (MBM); Morretes, P.E. do Pico do Marumbi, 18 September 1997, *Kaehler & Silva 18* (MBM, UPCB); Serra do Mar, Maincatira, track branching off from Estrada da Graciosa towards the south, 700–800 m, 24 October 1989, *Kramer & Dubs 10786* (Z); Rio Itararé (Mun. Guaratuba), 8 November 1983, *Kummrow 2385* (BR, C, MBM, MG, MO, UPCB); Serra do Mar, Upper Rio Corvo S of old road to Morretes, ca. 25 km E of Curitiba, 1000 m, 12 January 1967, *Lindeman & de Haas 4071* (NY, U); Serra Gigante, Mun. Guaraqueçaba, 19 July 2002, *Mocochinski & Scheer 54* (MBM); Taquari, Quatro Barras, 21 November 1987, *Motta 815* (MBM); Guaricana (Mun. S. José dos Pinhais), 15 October 1983, *Oliveira 686* (BR, F, GB, MBM, MU); Taquari, Quatro Barras, 1 November 1987, *Person s.n.* (MBM); Morro do Canal, Mun. Piraquara, 8 October 2004, *Sakagami et al. 174* (UPCB); Guaratuba, Serra de Araçatuba, Morro dos Perdidos, 1280 m, 13 November 1998, *Santos et al. 609* (MBM, UPCB); Morro do Vigia (Mun. Piraquara), 21 August 2005, *Schwartsburd & Peres 896* (UPCB); Prainhas (Mun. Morretes), 16 October 2001, *Silva, J.M. 3492* (MBM); Usina Hidrelétrica Parigot de Souza, cota 800, Mun. Antonina, 25 October 2007, *Silva, J.M. et al.*

6115 (MBM); Morro Ingles, (Mun. Paranaguá), 29 October 2002, *Silva, J.M. & Barbosa 3732* (MBM); Usina Hidrelétrica Parigot de Souza, cota 800 Mun. Antonina, 5 October 2006, *Silva, J.M. & Hatschbach 5016* (MBM); Morro do Canal, Mun. Piraquara, 14 November 2004, *Stange 93* (MBM). **Rio de Janeiro**: Paraty, Ponta Negra, trilha para o Pico Cairuçu, APA-CAIRUÇU, 31 March 2009, *Bovini et al. 2733* (RB). **Santa Catarina**: Blumenau, Fazenda Faxinal (Florestal R.H. Ltda), próx. Rio Garcia (via Lageado Alto, Guabiruba), 500 m, 13 November 1986, *Falkenberg 3846* (MBM); Palhoça, Morro do Cambirela, 800 m, 28 April 1983, *Klein & Breselin 9915* (UPCB); Vila da Gloria, Trilha da Captação, SAMAE Mun. São Francisco do Sul, 8 September 2006, *Mehlhaff & Berger 115* (MBM); Brusque, Morro da Bateia, 300 m, 27 October 1947, *Reitz C1905* (S, US); Joinville, Estrada Dona Francisca, 650 m, 6 November 1957, *Reitz & Klein 4060* (S, US); Blumenau, Morro Spitzkopf, 900 m, 23 October 1959, *Reitz & Klein 4131* (US); Monte Crista, Garuva, São Francisco do Sul, 900 m, 6 October 1960, *Reitz & Klein 10039* (US); Faz. Renaux-Hering, 10 October 1985, *Souza et al. 826* (MBM). **São Paulo**: Parque Estadual da Serra do Mar–Núcleo Curucutu, Trilha do rio Embu-Guaçu. beira da mata, 8 July 1997, *Affonso et al. 28* (SPF); Iguape, Estação Ecológica Juréia-Itatins, 17 October 1990, *Anunciação et al. 20* (NY, SP); Iguape, Estação Ecológica Juréia-Itatins, Serra da Juréia, 29 October 1990, *Anunciação & Rossi 388* (SP); Cananéia, Ilha do Cardoso, próximo ai pico do Morro do Cardoso, 800 m, 5 December 1990, *Barros & Ribeiro 2054* (NEU, SP); Iguape, Estação Ecológica Juréia-Itatins, Alto do maciço, restringa do Rio Verde, 22 November 1990, *Catharino et al. 1551* (SP); Município de Caraguatatuba, Parque Estadual da Serra do Mar, Núcleo Caraguatatuba, Estrada Intermediária Km 40, cerca de 31 km do entroncamento com a Rodovia SP 088, 23°39'05"S, 45°40'14"W, 800 m, 10 October 2003, *Cordeiro, I. & R. Mello-Silva 2786* (MBM, NEU, SP, SPF); Salesópolis, Casa Grande, Estação Biológica de Boraceia, 8 December 1981, *Custodio Filho 719* (NY, SP); Biritiba Mirim, Estação Biológica de Boraceia, 890–950 m, 9 December 1983, *Custodio Filho 2039* (NY, SP, SPF); Biritiba Mirim, Estação Biológica de Boraceia, 890–950 m, 10 December 1983, *Custodio Filho 2077* (SP); Biritiba Mirim, Estação Biológica de Boraceia, 23°38'–23°39'S, 45°52'–45°53'W, 29 May 1986, *Custodio Filho 2653* (SP); Serra do Mar above Ubatuba, 100–299 m, 21 August 1976, *Davis et al. 59825* (MBM); Alto da Serra, 7 January 1901, *Edwall 5797* (SP); Caraguatatuba, Parque Estadual da Serra do Mar, Núcleo Caraguatatuba, Base do Gravi, 20 October 2000, *Esteves et al. 2770* (SP); Mun. de Iguape, Estação Ecológico de Juréia, 20 July 1983, *Figueredo et al. 14732* (U); Parque Estadual da Serra do Mar–Núcleo Curucutu, Trilha do rio Embu-Guaçu, beira da mata, 29 October 1999, *Garcia et al. 1773* (SPF); Município de Caraguatatuba, Serra do Mar, à oeste da estrada SP 099, 23°39'06.7"S, 045°40'15.2"W, 817 m, 17 November 2009, *Grant, J.R., L. Zeltner, F. Calió & V. Trunz 09-4598* (G, MO, NY, SP, SPF); Município de Caraguatatuba, Serra do Mar, à oeste da estrada SP 099, 23°43'12.6"S, 045°35'08.9"W, 600 m, 17 November 2009, *Grant, J.R., L. Zeltner, F. Calió & V. Trunz 09-4599* (G, MO, NY, SP, SPF); Município de Cunha, Serra do Mar, perto de Rio Bonito, 23°15'13.7"S, 045°00'37.8"W, 1047 m, 18 November 2009, *Grant, J.R., L. Zeltner, F. Calió & V. Trunz 09-4601* (G, NY, SPF); Alto da Serra, Estação Biológica, 4 December 1922, *Hoehne s.n.* (SP); Serra Itapura, 19 November 1880, *J. Bot. Rio de Janeiro 10682* (RB [3 sheets]); Iguape, Estação Ecológica Juréia-Itatins, margem do Rio Verde, próximo al 2 rio da Trilha da Figuera, 26 July 1991, *Kawall & Anunciação 87* (SP); Iguape, Estação Ecológica Juréia-Itatins, Morro de Juréia, 300 m, 17 November 1987, *Kirizawa et al. 1933* (SP); Sete Barras, Fazenda Intervales, sede Quilombo, 150–200 m, 13 May 1993, *Kirizawa et al. 2836* (SP); Sete Barras, Fazenda Intervales, 13 October 1994, *Kirizawa et al. 2945* (SP); Salesópolis, Estrada de manutenção da Petrobras, 6 September 1994, *Kiyama et al. s.n.* (SP); Boracea, Estação Experimental, 19 December 1940, *Lima & da Silva 6033* (IAC, NY, SP); Mun. de Bananal, Parque Nacional da Serra da Bocaina, marco 22, 1100 m, 23 June 1978, *Martinelli 4669* (RB); Iguape, Estação Ecológica Juréia-Itatins, 22 November 1994, *Melo et al. 1053* (NY, SP); Mun. de Juquia. 31 km de Juquia em direção à Tapirai (Km 180), 24°06'19.1"S, 47°37'29.0"W, 9 September 1994, *Moncaio et al. 35* (SP); Iguape, Estação Ecológica Juréia-Itatins, 13 October 1995, *Nicolau et al. 946* (NY, SP); Iguape, Estação Ecológica Juréia-Itatins, Serra da Juréia, 10 November 1993, *Nicolau et al. 1496* (SP); Iguape, Estação Ecológica Juréia-Itatins,

13 August 1991, *Pereira, D.F. et al. 50* (NEU, SP); Campo Grande, 27 November 1902, *Puttemans 5798* (SP); Mun. de Bananal, Serra da Bocaina, Mata de encosta, 28 September 1994, *Rodrigues et al. 234* (SP, SPF); Iguape, Estação Ecológica Juréia-Itatins, 16 July 1990, *Rossi et al. 621* (SP); Mun. de Salesópolis, Estrada de manutenção da Petrobras, 16 November 1994, *Simão-Bianchini 636* (SP); Iguape, Estação Ecológica Juréia-Itatins, 12 October 1991, *Skorupa et al. 970* (SP); Caraguatatuba, Parque Estadual da Serra do Mar, Núcleo Caraguatatuba, Trilha da Captação, 11 August 2000, *Souza, J.P. et al. 179* (SP); Mun. de Cunha, Trilha da Pedreira, 23°14'02"S, 45°00'17"W, 13 December 1996, *Souza, J.P. et al. 861* (SP); São Miguel Arcanjo, P.E. de Carlos Botelho, 21 September 1992, *Sugiyama & Kirizawa 1000* (NY, SP); Mun. de Sete Barras, Parque Estadual de Carlos Botelho, Estrada Estadual São Miguel Arcanjo–Sete Barras (SP 139), 22 April 2002, *Udulutsch et al. 649* (SP).

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