



Two new species of *Myrcia* (Myrtaceae) from Brazilian Atlantic Forest

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Abstract

Two new species of *Myrcia* from the Atlantic rainforest in southeastern Brazil, *Myrcia congestiflora* and *Myrcia longipaniculata* are here described and illustrated. *Myrcia congestiflora* occurs in São Paulo and Rio de Janeiro states and is similar to *Myrcia cerqueiria*, differing by having densely sericeous indumentum (versus sparse and shorter trichomes), larger flowers and flower buds (flower buds with 3–4 mm versus 1.1 mm long) and by acute or obtuse calyx lobes rather than rounded. *Myrcia longipaniculata* is known for one collection from the boundary of São Paulo and Rio de Janeiro differing from *Myrcia spectabilis* mainly by the longer inflorescence size (29 cm versus 3.5–21.5 cm long.) as well as for presenting a strong reddish or ferruginous indumentum (versus brown to yellowish).

Keywords: *Gomidesia*, Myrteae, Southeastern Brazil

Resumo

Duas novas espécies de Myrtaceae, *Myrcia congestiflora* e *Myrcia longipaniculata*, nativas da Floresta Atlântica no Sudeste do Brasil, são descritas e ilustradas. *Myrcia congestiflora* ocorre nos estados de São Paulo e Rio de Janeiro, sendo mais semelhante morfológicamente com *Myrcia cerqueiria*, da qual difere por apresentar um indumento denso-seríceo (versus tricomas esparsos e curtos), flores e botões maiores (botões com 3–4 mm versus 1.1 mm compr.) e cálice com lobos agudos ou obtusos ao invés de arredondados. *Myrcia longipaniculata* é conhecida apenas por uma única coleta na divisa entre os estados de São Paulo e Rio de Janeiro, sendo diferenciada de *Myrcia spectabilis* não só pelo tamanho da inflorescência (29 cm versus 3.5–21.5 cm compr.), mas também pelo denso indumento ferrugíneo-avermelhado presente nos ramos e na inflorescência (versus pardo-amarelado).

Palavras-chave: *Gomidesia*, Myrteae, Sudeste do Brasil

Introduction

Myrtaceae is widely spread across the globe, mainly along tropical and subtropical zones (Barroso *et al.* 1984; Wilson *et al.* 2001; Mazine & Souza 2008). Estimates of the species number are controversial with values ranging from 3,800 species, *sensu* Wilson *et al.* (2001) to 5800 species *sensu* Nic Lughadha & Snow (2000), distributed in about 140 genera (Govaerts *et al.* 2015). In Brazil there are 23 genera and more than 1,000 species, 797 of which are endemic (Sobral *et al.* 2015).

Myrcia de Candolle (1827: 406), the second largest genera in Brazil, occurs in all Brazilian states (Sobral *et al.* 2015). From the 260 recognized species more than 60% occur along the Atlantic Forest biome (Sobral *et al.* 2015).

Due to its high levels of endemism and biodiversity, the Atlantic Forest is considered a biome of unique biological complexity, making the remaining forest fragments singular relics (Peixoto 1991, Stehmann *et al.* 2009). Currently, estimates of existing Atlantic Forest cover ranges from 11.4% to 16% from its original area. Furthermore, more than 80% of the fragments are ≤ 50 hectares and almost half the remaining forest is ≤ 100 m from its edges. The average distance between fragments is large (1440 m), and nature reserves protect only 9% of the remaining forest and 1% of the original forest (Ribeiro *et al.* 2009). A history of colonization and degradation makes it one of the most threatened ecosystems in the world (Myers *et al.* 2000), where many global extinctions are imminent (Mittermeier *et al.* 2005).

In this paper we report two new species of *Myrcia* from the Atlantic Forest biome. Both species belong to the species group formerly included in the Bergian genus *Gomidesia* (Berg 1855–1856: 27) due to their anthers with asymmetrical thecae. The species of *Gomidesia* were nested in an inclusive genus *Myrcia* in the phylogenetic study of Lucas *et al.* (2011), where they emerge as a well defined clade informally dubbed in that paper as “group 3”.

Material and Methods

This study was based on field work and the study of herbarium collections. Specimens from eight herbaria were studied (ESA, HRCB, MBM, RB, SP, SPF, SPSF and UEC; acronyms follow Thiers 2016). Morphological studies were carried out using dried and fresh specimens and Harris & Harris (2001) and Radford *et al.* (1974) were followed for the morphological terminology.

Results

1. *Myrcia congestiflora* Caliari & V.C. Souza, *sp. nov.* Type:—BRAZIL. São Paulo: Ubatuba, Picinguaba, trilha do corisco, 27 January 1996, A. Takahasi & E.C. Romera 211 (holotype HRCB!, isotypes UEC!, SPSF!). Figures 1–2.

This species is related to *Myrcia cerqueiria* from which it is distinguished by the twigs with a dense, bright and sericeous to tomentose indumentum (versus sparse, opaque and shorter trichomes) combined with the congested inflorescence, wider buds (6–8 × 5 mm versus 5 × 3.5 mm) and longer calyx lobes (3–4 mm long versus 1–1.1 mm long).

Shrub, treelet or tree 2–5 m tall; twigs flat to sulcate; densely covered by bright, sericeous to tomentose indumentum, densely covered, appressed, farinaceous under the trichomes, yellowish to whitish, deciduous. Leaf blades elliptic, slightly oblanceolate, or slightly lanceolate, (7.1–)13.5–32.5 × (2.2–)3.3–10.5 cm, membranaceous to subchartaceous, margins flat; dark green adaxially and pale green abaxially, discolorous, rarely low contrast, glabrous adaxially and tomentulose abaxially with simple trichomes in two different sizes, sometimes whitish with brown base, giving bright appearance, glandular dots blackened to brown, salient to indistinct adaxially and salient and blackened abaxially, apex acute to acuminate or caudate; base attenuate to long attenuate; midvein sulcate to canaliculate adaxially and salient abaxially, lateral veins 18–29 pairs, slightly salient to canaliculate on adaxial surface and slightly salient to flat on abaxial surface; marginal veins 2, respectively up to 5 mm and 0.1–0.8 mm from margin; petiole 2–10 mm long, canaliculate, interpetiolar scar linear. Inflorescence in panicles or racemes, erect, 2–6.6 cm long, indumentum sericeous to tomentose, farinaceous, greyish to yellow, slightly bright; bracts not seen, probably deciduous. Flower buds 6–8 mm long, densely and uniformly sericeous to tomentose; bracteoles 6–10 mm; calyx with 5 lobes, these widely ovate to widely depressed ovate, 3–4 mm long, slightly acuminate, acute to obtuse; anthers linear to narrowly elliptic, with 1.3–2 × 0.1–0.3 mm; hypanthium smooth, elevated 1–3 mm above the level of style insertion, ovary bilocular, with two ovules per locule. Fruit globose, 18–20 mm in diameter, tomentulose, glabrescent, yellow, red or purple.

Distribution and habitat:—This species occurs in two disjunct areas in the states of Rio de Janeiro and São Paulo. The occurrence of *Myrcia congestiflora* in Rio de Janeiro is restricted to the municipality of Petrópolis. In São Paulo state it is restricted to the northeastern coast (Caraguatatuba and Ubatuba), in areas of Atlantic rainforest. *Myrcia congestiflora* occurs in dense rainforest at low altitudes, on forest-covered slopes, submontane and montane forests, at about 665 m elev. (according to specimen Cordeiro *et al.* 2319).

Phenology:—Buds were collected in December, flowers in January–March, and fruits from May–September. The only specimen collected with flower buds and fruits in the same material was *E.M.B. Prata s.n.* (HRCB 51027), collected in July.

Etymology:—The epithet refers to the congested distribution of the buds in the inflorescence.

Conservation status:—The municipality of Petrópolis, in the state of Rio de Janeiro, is more than 300 km away from the municipalities of Ubatuba and Caraguatatuba. Thus, the lack of information does not allow us to do a consistent evaluation. In the absence of additional data we presently score it as DD (Data Deficient) according to IUCN conservation criteria (IUCN 2001).

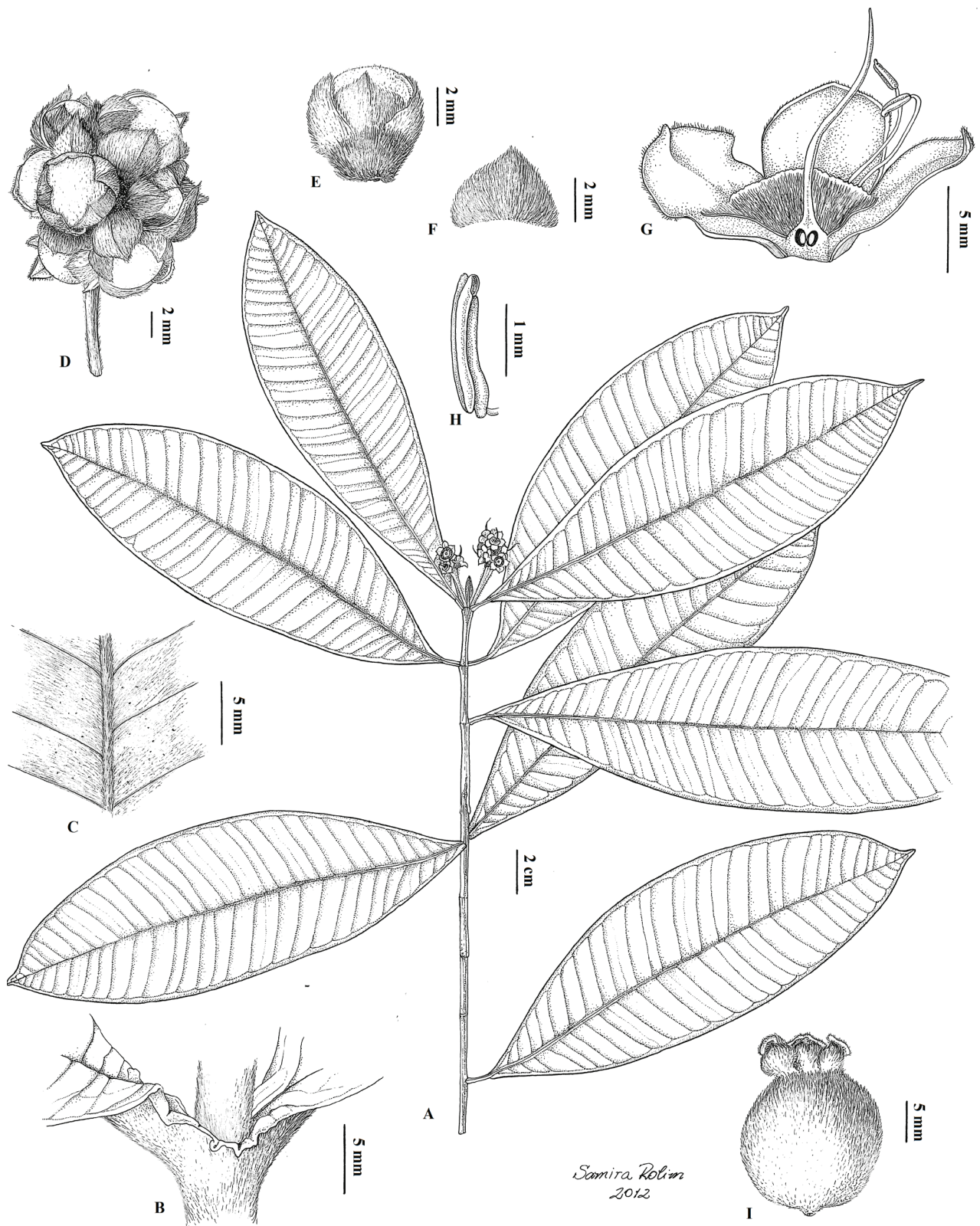


FIGURE 1. *Myrcia congestiflora*. A. fertile branch; B. interpetiolar scar; C. detail of gland dots and indumentum on the abaxial surface; D. inflorescence; E. flower bud; F. calyx lobe; G. flower, longitudinal section, H. anther; I. fruit with persistent calyx. (A–C, *C.P. Calixari et al.* 3029—ESA; D–H, *A. Takahasi & E.C. Romera* 211—ESA, HRCB, SPSF, UEC; I, *M. Sanchez & F. Pedroni* 36—HRCB). Illustration by Samira Rolim.



FIGURE 2. *Myrcia congestiflora*. Flowering branch (C.P. Caliari, M.F. Santos e M. Büniger. 3024—ESA).

Paratypes:—BRAZIL. Rio de Janeiro, Magé/Petrópolis, 22°33'51,1" S, 43°11'34,1" W, July 2000, *P.L.R. Moraes 2152* (RB! ESA!). São Paulo: Caraguatatuba, 17 July 2000. *F.O. Souza et al. 20* (MBM!, SPF!); Caraguatatuba, Parque Estadual da Serra do Mar Núcleo Caraguatatuba, Trilha dos tropeiros, 7 September 2000, *R.S. Bianchini et al. 1391* (SP!); Caraguatatuba, Parque Estadual da Serra do Mar, Núcleo Caraguatatuba, nascentes do Córrego Ribeirão

da Aldeia, 27 September 2000, *I. Cordeiro et. al.*, 2319 (SP!); Caraguatatuba, Parque Estadual da Serra do Mar, Núcleo Caraguatatuba, trilha da Mococa, 10 October 2000, *G.L. Esteves et. al.* 2714 (SP!). Ubatuba, Parque Estadual da Serra do Mar, núcleo de Picinguaba, margem do Rio Fazenda, 11 July 1992, *M. Sanchez & F. Pedroni* 31341 (UEC!); Ubatuba, Parque Estadual da Serra do Mar, núcleo de Picinguaba, margem do Rio Fazenda, 12 July 1992, *M. Sanchez & F. Pedroni* 36 (HRCB!); Ubatuba, Parque Estadual da Serra do Mar, núcleo de Picinguaba, margem do Rio Fazenda, 16 August 1992, *M. Sanchez & F. Pedroni* 31343 (UEC!); Ubatuba, Parque Estadual da Serra do Mar, núcleo de Picinguaba, margem do Rio Fazenda, 17 December 1992, *M. Sanchez & F. Pedroni* 31354 (UEC!); Ubatuba, P. E. Serra do Mar, núcleo de Picinguaba, trilha do corisco, 16 May 1995, *M.A. Assis & P.L.R. Moraes* 553 (HRCB!); Ubatuba, Picinguaba, Parque Estadual da Serra do Mar, Núcleo Picinguaba, trilha casa da farinha, 21 January 2001, *A. Lobão & P. Fiaschi* 524 (RB!); Ubatuba, Parque Estadual da Serra do Mar, núcleo de Picinguaba, trilha do corisco, 22 June 2001, *K. Ressel*, 58 (HRCB!); Ubatuba, Parque Estadual da Serra do Mar, núcleo de Picinguaba, trilha do corisco, 08 February 2002, *P.L.R. Moraes* 2526 (ESA!); Ubatuba, P. E. Serra do Mar, núcleo de Picinguaba, Instituto Agrônomo de Campinas, Trilha do Poço, SAD69, Zona 23, 23°25'14,460''S 45°7'46,795''W, 16 November 2005, *N.M. Ivanauskas et. al.* 6019 (SPSF!); Ubatuba, P. E. Serra do Mar, núcleo de Picinguaba, trilha da casa da Farinha, 8 May 2006, *M.C.R. Campos et al.* 470 (UEC!); Ubatuba, Parque Estadual da Serra do Mar, núcleo de Picinguaba, 26 July 2008, *E.M.B. Prata. s.n.* (HRCB 51027!); Ubatuba, Picinguaba, Parque Estadual da Serra do Mar, Núcleo Picinguaba, trilha casa da farinha (500 m da casa da Farinha), 6 March 2012, *C.P. Caliari et al.* 3024 (ESA!); Ubatuba, Picinguaba, Parque Estadual da Serra do Mar, Núcleo Picinguaba, trilha casa da farinha, 7 March 2012, *C.P. Caliari et. al.* 3029 (ESA!).

Affinities and discussion:—This species occurs in a narrow range from the Atlantic Forest in the most populous region in Brazil, which increases the importance of its habitat conservation.

Myrcia congestiflora is similar to *Myrcia cerqueiria* (Niedenzu 1893: 78) E. Lucas & Sobral (2010: 54), including its anther morphology, both with a vertical displacement of thecae marked, thecal halves retaining curvature after dehiscence, connivent or held parallel with margins inrolled, resembling a poricide dehiscence. In the following key there are presented characters to distinguish them:

1. Flower buds 5 × 3.5 mm, calyx 1–1.1 mm long, calyx lobes with rounded apices, hypanthium externally striated.....*Myrcia cerqueiria*
- Flower buds 6–8 × 5 mm, calyx 3–4 mm long, calyx lobes acute to obtuse with slightly acuminate apices; hypanthium externally smooth.....*Myrcia congestiflora*

2. *Myrcia longipaniculata* Caliari & V.C. Souza, *sp. nov.* Type:—BRAZIL. Divisa RJ–SP, Km 0, “picada em beira da estrada”, 22 November 1990, *M. Nadruz* 651 (holotype RB!). Figures 3, 4, 5B, 6B

This species is related to *Myrcia spectabilis*, from which it is distinguished by its dense reddish to ferruginous indumentum combined with larger inflorescence (29 versus 3.5–21.5 cm long.).

Tree, 6 m tall; twigs flat to sulcate, with a pilose to lanuginose, farinaceous indumentum, reddish to ferruginous, persistent. Leaf blade lanceolate, chartaceous, margins flat to slightly curved; discolored, dark brown adaxially, light green abaxially; blades 35 × 12.2 cm, glabrescent with the midrib sparsely pilose adaxially and slightly lanuginose abaxially; gland dots flat to slightly impressed and dark adaxially, indistinct abaxially, apex acute to slightly acuminate, base rounded to slightly cordate, midrib sulcate adaxially, salient abaxially, lateral veins ca. 27 pairs, slightly salient to impressed adaxially, salient abaxially; marginal veins 2, respectively up to 6 mm and 0.1 mm from margin, petioles 5 mm long, canaliculate; interpetiolar scar linear. Inflorescence in terminal panicles, erect, ca. 29 cm long, pilose or lanuginose, farinaceous under the trichomes, ferruginous to reddish; bracts not seen. Flower buds, ca. 7 mm long, uniformly lanuginose; bracteoles not seen; calyx with 5 lobes, these depressed ovate, 2 mm long, rounded; anthers elliptic with 0.6–0.7 × 0.3–0.4 mm; hypanthium 2.2–2.5 mm, smooth; ovary bilocular, with two ovules per locule. Fruits not seen.

Distribution and habitat:—Boundary between São Paulo and Rio de Janeiro states, in the Atlantic rainforest.

Phenology:—Flower buds and flowers in November.

Etymology:—The epithet refers to the length of inflorescence.

Conservation status:—This species occurs in the border of Paraty and Ubatuba, two contiguous and very well collected municipalities, which sum 1,649 km² (IBGE 2015). *Specieslink* (CRIA 2016), a site that exhibits collections from all major Brazilian herbaria, registered 35,600 specimens within its limits, resulting in an average of 21 collections/km², a high sampling effort when compared with the Brazilian average of 0.59 collections/km² calculated by Sobral & Stehmann (2009). In spite of this, and the present efforts to recollect this species, *Myrcia longipaniculata*

was collected only once, which is a good indication of its probable rarity. Applying IUCN evaluation criteria to *M. longipaniculata*, it presents an area of occupation smaller than 10 km² (B2) in the Atlantic Forest, where many species are seriously threatened by anthropogenic pressure (Myers *et al.* 2000, Orme *et al.* 2005). Also it is known from a single locality (B2.a), with a very small, restricted population (D), as inferred by the number of sampling in a well collected locality. We therefore evaluate this species as CR (critically endangered) IUCN (2001).

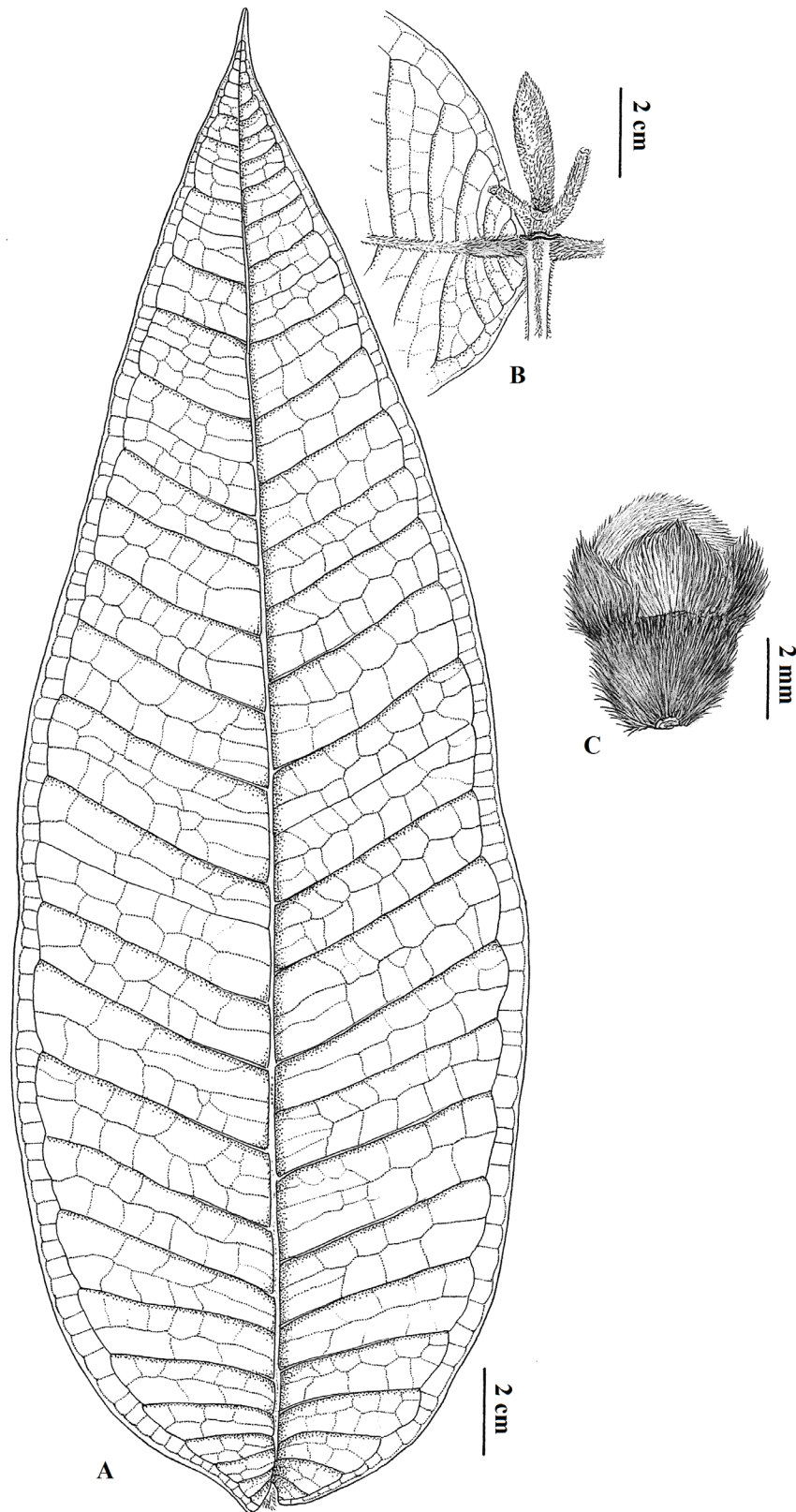


FIGURE 3. *Myrcia longipaniculata*. A. Leaf blade adaxial surface; B. interpetiolar scar and indumentum pilose to lanuginose; C. flower bud. Illustration by Samira Rolim from the Holotype.

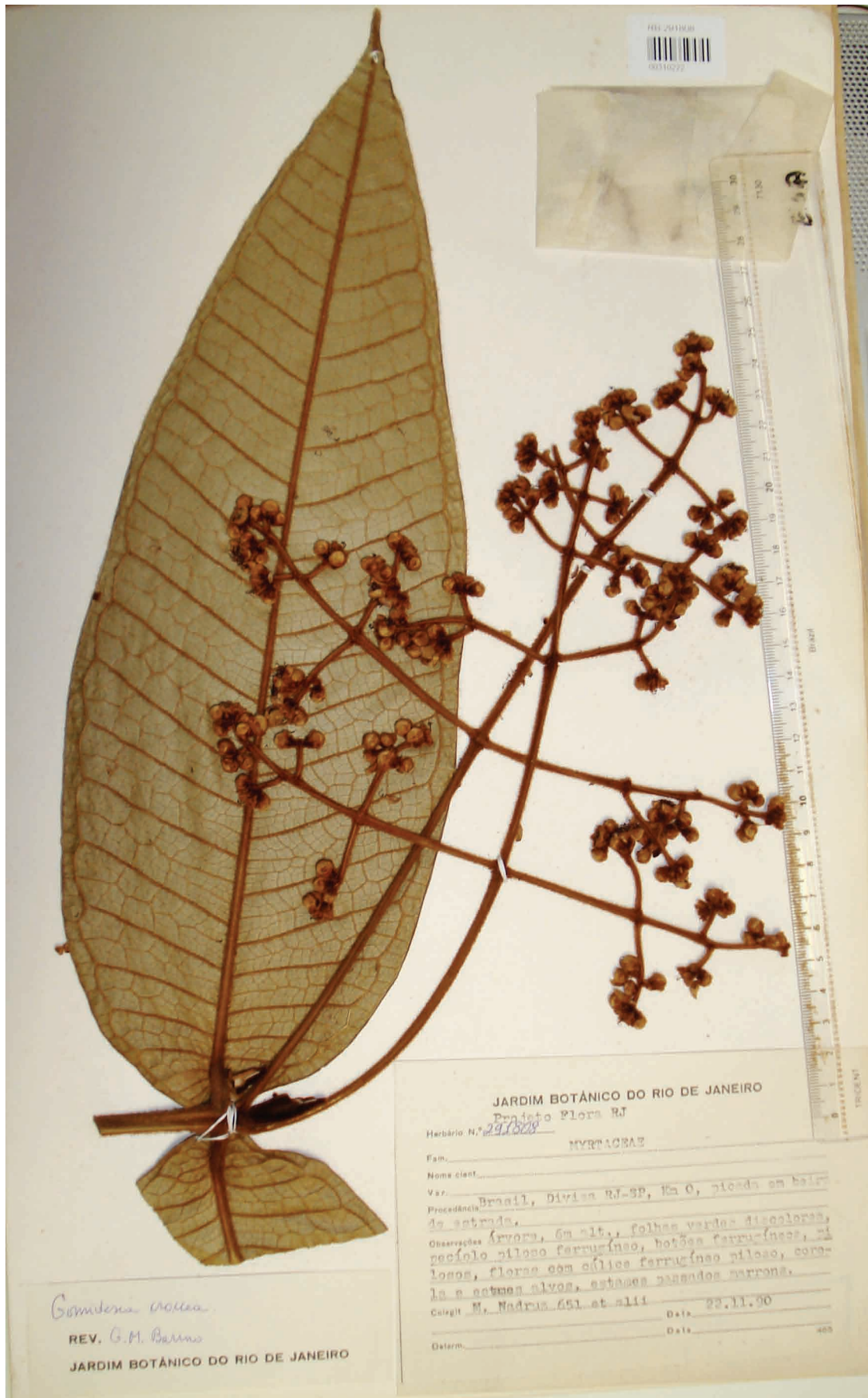


FIGURE 4. *Myrcia longipaniculata*. Image of the Holotype at RB. (*M. Nadruz et al.* 651).

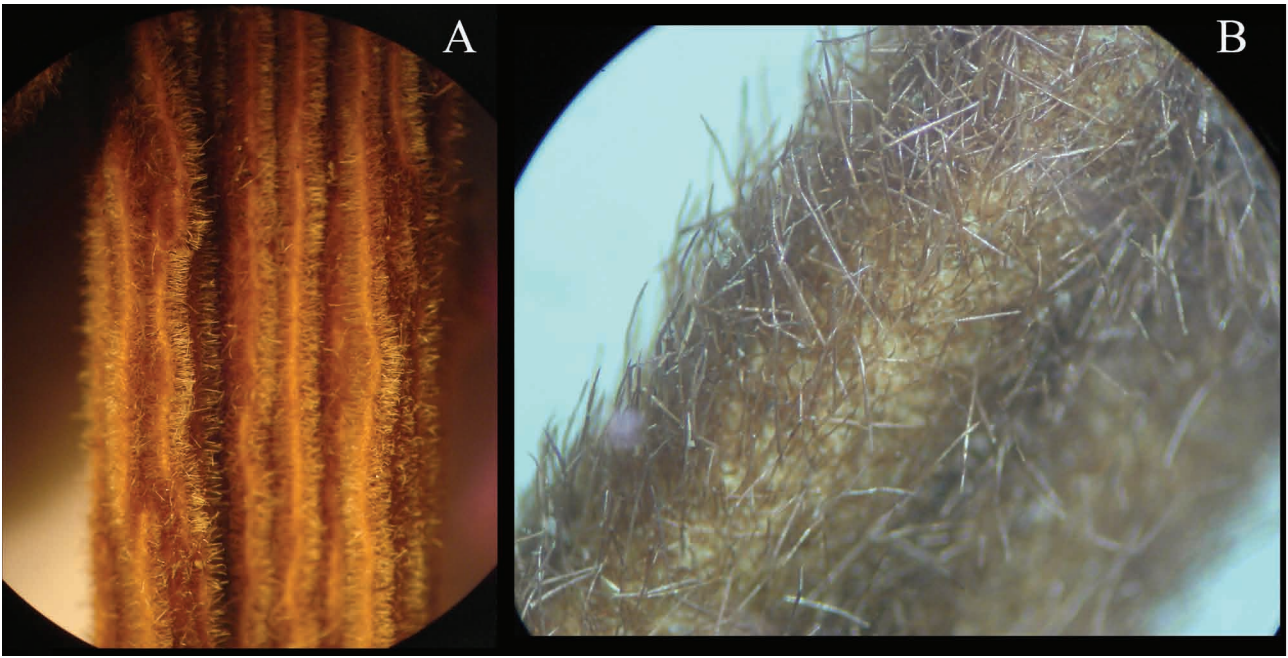


FIGURE 5. Twigs. A. *Myrcia spectabilis* (N.M. Ivanauskas et al. 5051—ESA). B. *Myrcia longipaniculata* (M. Nadruz et al. 651—RB).



FIGURE 6. Inflorescences. A. *Myrcia spectabilis* (F.F. Mazine et al. 767—ESA). B. *Myrcia longipaniculata* (M. Nadruz et al. 651—RB).

Affinities and discussion:—This species has vegetative morphology similar to *Myrcia spectabilis* De Candolle (1828: 248). These two species are distinguished by the characters in the following key:

1. Twigs striated; twigs and inflorescence indumentum with setose trichomes or lanate to dense-lanate, brown to yellow, tending to golden, dark brown or cream (Figure 5A); leaves puberulous abaxially; inflorescence with maximum 21.5 cm long (Figure 6A) ..
 *Myrcia spectabilis*

- Twigs not striated; twigs and inflorescence with lanuginose indumentum, reddish to ferruginous (Figure 5B); leaves sparsely pilose on midrib and the indumentum more or less lanuginose abaxially; inflorescence with about 29 cm long (Figure 6B)
 *Myrcia longipaniculata*

Acknowledgments

We would like to thank Marcos Sobral, Eimear Nic Lughadha, Mariana Bünger, Matheus Fortes Santos and Tarciso Filgueiras for all their help. We would also show our appreciation to our lab colleagues for their help during difficult times. We are grateful to the Forest Science Program from “Escola Superior de Agricultura Luiz de Queiroz” (ESALQ/USP) and Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) which funded our field research; to two anonymous reviewers for their valuable observations and to Samira Rolim who prepared the botanical illustrations. We acknowledge Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) for its effort to improve the laboratory structure used to produce this paper.

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