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Myrcia lucasae (Myrtaceae), a new species from the *campo rupestre* of Chapada Diamantina, Brazil

ROBERTO BAPTISTA PEREIRA ALMEIDA[1]*, GUILHERME MEDEIROS ANTAR[1], THAIS VASCONCELOS[1], LEIDIANA L. SANTOS[2] & BRUNO S. AMORIM[3,4]

[1] *Departamento de Botânica, Instituto de Biociências, Universidade de São Paulo, Rua do Matão 277, 05508-090, São Paulo, SP, Brazil.*
[2] *Programa de Pós-graduação em Botânica, Universidade Federal Rural de Pernambuco, Rua Dom Manoel de Medeiros s/n, 52171-900, Recife, PE, Brazil*
[3] *Pós-Graduação em Biotecnologia e Recursos Naturais (PPGMBT-UEA), Universidade do Estado do Amazonas, Av. Carvalho Leal, 1777, 69058-807, Manaus, AM, Brazil.*
[4] *Museu da Amazônia, MUSA, Av. Margarita, s/n° 69099-415, Manaus, AM, Brazil.*
**corresponding author: robertobaptistapa@usp.br*

Abstract

Myrcia lucasae (*Myrcia* sect. *Gomidesia*, Myrtaceae), a new species from the Bahia state, Brazil, is here described and illustrated. It differs from *M. lughadhae*, a closely related and sympatric species, by the strigose indumentum with ferruginous trichomes and the absence of ribs on fruits. It is also different and from *M. virgata* (*Myrcia* sect. *Myrcia*), by presenting thecae with irregular dorsal openings (characteristics of *Myrcia* sect. *Gomidesia*). Collections of *M. lucasae* have been constantly misidentified as the morphologically similar *M. virgata*, a species from a different section, which does not occur in the state of Bahia. *Myrcia lucasae* is endemic to the highly diverse *campo rupestre* vegetation of the Chapada Diamantina biogeographic province. We also provide preliminary conservation assessment, comments on distribution and ecological aspects of this new taxon.

Keywords: Bahia, Caatinga, Endemism, Espinhaço Range, Taxonomy

Resumo

Myrcia lucasae (*Myrcia* sect. *Gomidesia*, Myrtaceae), uma nova espécie do estado da Bahia, Brasil, é aqui descrita e ilustrada. Ela difere de *M. lughadhae*, espécie proximamente relacionada e simpática pelo indumento estrigoso com tricomas ferrugíneos e pela ausência de costas nos frutos. É também diferente de *M. virgata* (*Myrcia* sect. *Myrcia*) por apresentar as tecas com aberturas dorsais irregulares (característica de *Myrcia* sect. *Gomidesia*). Coleções de *M. lucasae* tem sido repetidamente identificadas de maneira incorreta com a morfologicamente similar *M. virgata*, que por sua vez é de uma seção diferente (Myrcia sect. Myrcia) e não ocorre no estado da Bahia. M. lucasae é endêmica da vegetação altamente diversa de campo rupestre da província biogeográfica da Chapada Diamantina. Nós também fornecemos o status de conservação preliminar e comentários da distribuição e de aspectos ecológicos desse novo táxon.

Palavras-chave: Bahia, Caatinga, Cadeia do Espinhaço, Endemismo, Taxonomia

Introduction

The *campo rupestre* is a highly diverse vegetation type that spreads over higher altitudinal areas in the eastern side of South America, predominantly over the mountaintops of the Espinhaço Range (Rapini *et al*. 2008, Silveira *et al*. 2016). In the state of Bahia, Brazil, *campo rupestre* ecosystems are mainly confined to the area of the Chapada Diamantina biogeographic province (*sensu* Colli-Silva *et al*. 2019), an archipelago of mountaintops with high levels of plant-endemism surrounded by the Caatinga province (*sensu* Morrone 2014). These ecosystems are characterized by their floristic singularity and elevated number of species that are either endemic or micro-endemic within this region (e.g. Zappi *et al*. 2003).

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A common element of the *campo rupestre* vegetation is the genus *Myrcia* de Candolle (1827: 406). *Myrcia* is a genus of shrubs or trees belonging to the family Myrtaceae and one of the largest exclusively Neotropical angiosperm genera with c. 800 species (WCSP 2019). It has a wide distribution from the northern Argentina to the south of Florida, occurring mainly in moist forests and savannas along this range (Lucas *et al*. 2011, 2018). *Myrcia* is also among the ten most diverse genera of angiosperms in the *campo rupestre* (Silveira *et al*. 2016).

During field expeditions to the Chapada Diamantina between 2014 and 2018, collections of a particular taxonomic entity within *Myrcia* were made and preliminary identified as *Myrcia* cf. *virgata* Cambessèdes (1832: 320). However, later inspection revealed that these collections had morphological characteristics of *Myrcia* sect. *Gomidesia*, such as anthers with thecae with irregular dorsal openings and erect calyx lobes in fruit (Lucas *et al*. 2018, Amorim *et al*. 2019), while *Myrcia virgata* is placed within *Myrcia* sect. *Myrcia* and has no such features. Molecular evidence (T. Vasconcelos unpublished) also confirms that these collections are placed within *Myrcia* sect. *Gomidesia*, possibly related to the sympatric *Myrcia lughadhae*, also endemic to the Chapada Diamantina. Therefore, a new species, *Myrcia lucasae*, is here described and illustrated to accommodate these and other collections previously misidentified as *Myrcia virgata* from the Chapada Diamantina.

Material and Methods

The morphological description was based on the specimens seen in the following herbaria: ALCB, ESA, K, SPF, UB (acronyms according to Thiers, 2019). A 10−60 × magnification stereomicroscope was used to analyze morphological features of the specimens. Terminology follows Harris & Harris (2001) for general morphology and Hickey (1973) for leaf shape, as well as Lucas *et al*. (2018) for specific terms within the genus morphology and taxonomy. IUCN criteria (2012, 2017), alongside with the GeoCAT tool (Bachman *et al*. 2011) with the default value for Extent of occurrence (EOO) and Area of occupancy (AOO), were used to infer conservation status. The distribution map was produced in QGIS version 2.8.1 (QGIS Development Team, 2018). In case of herbarium specimens that were not geo-referenced, the geographic coordinates were approximated using the locality description on the label. A phenology histogram based on all paratypes (except vouchers *Oliveira R.P. 45* and *Harley R.M. 18675* that bared only buds and galled inflorescences, respectively) and the holotype here presented was generated using the function *phenoHist* in the R package monographaR (Reginato 2016, R Development Core Team, 2019).

Taxonomic treatment

Myrcia lucasae R.B. Almeida, Antar & B.S. Amorim, *sp. nov.* (Figure 1 and 2)

Type:—Brazil. Bahia: Mucugê, Estrada entre Mucugê e Andaraí, 12º57’57”S, 41º18’47”W, Alt: 1109m, 07 January 2019, *T.N.C. Vasconcelo*s, *M.C. Antonicelli, R.C. Pizzardo & A. Cabral 1029* (holotype: SPF, isotypes: HUEFS, K, RB).

Myrcia lucasae is morphologically related to *Myrcia lughadhae* B.S.Amorim (2014: 3) but differs in the stems, leaves, inflorescences and fruits with strigose indumentum of ferruginous trichomes, absence of ribs on fruits and elliptic or subulate bracteoles, while *M. lughadhae* have stems, leaves and inflorescences puberulent to glabrous, never strigose, 8-ribbed fruits and lanceolate bracteoles. It also resembles *Myrcia virgata* by the narrowly elliptic leaves and the elliptic fruits, but can be distinguished by the thecae displacement and the slightly extended hypanthium that are typical of *Myrcia* sect. *Gomidesia*.

Shrub to tree 1−2,5 m tall; younger stems strigose, covered by ferruginous simple trichomes, older stems with longitudinal ribs, glabrous to glabrescent with scattered white, simple trichomes. Leaves opposite in angulate 60º, leaf blade narrow elliptic, 4.5−12.4 x 0.8−3.0 cm, chartaceous, apex acute, base cuneate or truncated, abaxial surface densely strigose with simple tricomes, ferruginous, becoming white when older, adaxial surface strigose with simple ferruginous trichomes; midvein strigose, impressed in the adaxial surface, prominent in the abaxial surface, secondary veins 14−18 pairs, diverging 60º−70º from midvein, marginal vein ca. 0.1 cm from the margin; petiole 0.5–1.0 cm long, strigose with ferruginous trichomes, getting white when older, adaxially sulcate, abaxially flat or cylindrical, rugose. Inflorescence paniculate, rachis strigose, denser near the apex, with simple trichomes, ferruginous, with white trichomes, main floral axis 5–11 cm long, secondary axes 1–2.5 cm long, tertiary axes 0.8–0.9 cm long, multi-flowered, evenly distributed along the axes; bracteoles 2.1–2.6(–3) mm long, elliptic or subulate, strigose. Flowers pentamerous,

sessile or with pedicel 0.2–0.5(–3.5) mm long; flower bud obovoid, 4.2–4.8 × 4.5–5 mm, hypanthium not ribbed, prolonged 0.6–0.8 mm beyond the ovary, strigose; 5 calyx lobes 1.8–2 mm long, triangular with acute to obtuse apex, persistent, strigose, with ferruginous trichomes on both surfaces; 5 petals oblong with truncated base, 3–3.5 × 3–3.3 mm, concave, soon deciduous, glabrous with ciliated margins on the adaxial surface and strigose abaxial surface, with ferruginous simple trichomes; stamens ca. 250, 3.6–4.3 mm long, white to reddish when older, anthers 3–5 mm long, oblong-ellipsoid, thecae with irregular dorsal openings with septum visible; staminal ring 3.8 mm diam., ca. 0.8 width, canescent; style 4.7–5.3 mm long, strigose-canescent, glabrous at apex, stigma cylindrical-botuliform; ovary 2–locular with 2 ovules per locule. Fruit 0.5 × 0.9 cm, green and strigose when immature, red and glabrous with strigose apex when ripe, smooth, elliptic, calyx lobes persistent. Seed one, 4.9 × 3.8 mm, glabrous, shiny.

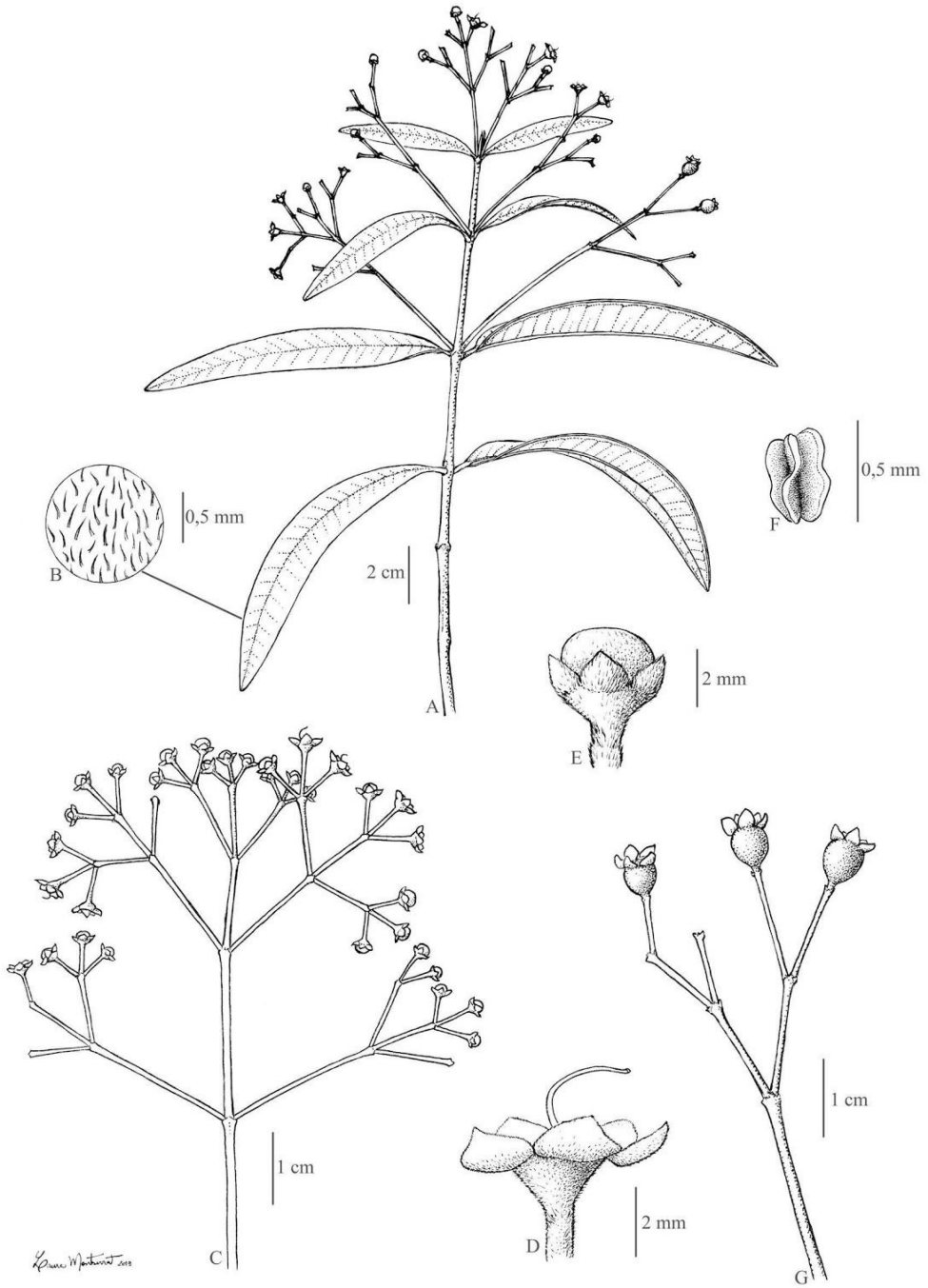

FIGURE 1. *Myrcia lucasae*, **A.** Branch in flower and fruit. **B.** Detail of strigose indumentum of the adaxial surface of leaves. **C.** Inflorescence with flowers. **D.** Flower in anthesis without petals. **E.** Flowering bud. **F.** Detail of anther. **G.** Inflorescence with fruits. **A-G** Illustration of Laura Montserrat based on *T.N.C. Vasconcelos et al. 1029*.

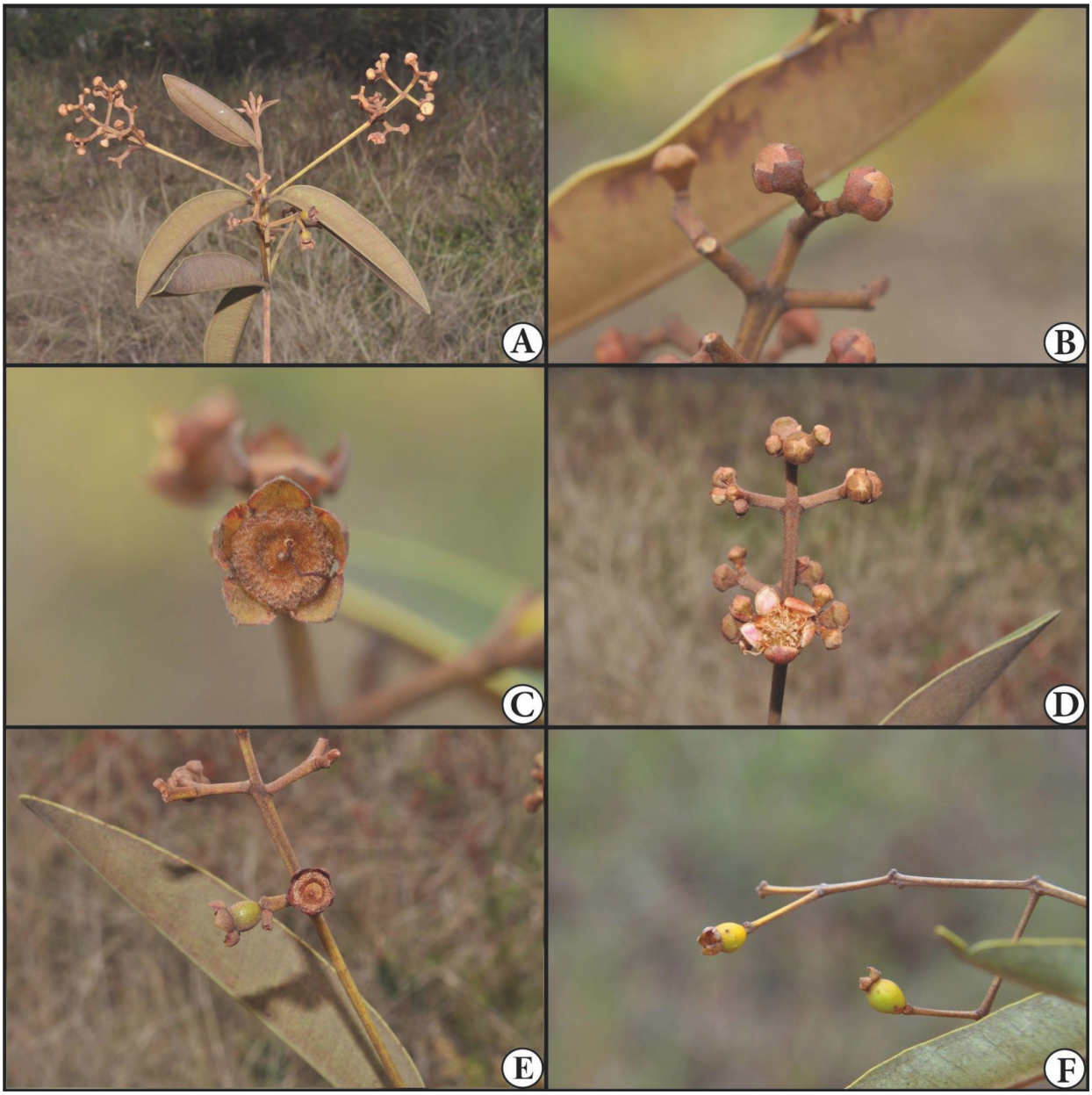

FIGURE 2. Field pictures of *Myrcia lucasae*, **A.** Branch with Inflorescence, **B.** Flower in bud, **C.** Flower in anthesis without petals and stamen, **D.** Inflorescence with a flower in anthesis, **E.** Inflorescence with immature fruit, **F.** Inflorescence with fruit. **A-F** photos by T.N.C. Vasconcelos.

Paratypes:—BRAZIL. Bahia: Andaraí, south of Andaraí, along road to Mucugê near small town of Xique-Xique. 41º19'S, 12º54'W, 14 February 1977, *R.M. Harley et al. 18675* (ESA!, K); caminho para a antiga estrada para Xique-Xique do Igatú 12º25'15''S, 41º18'25''W Alt: 560 m, 14 February 1997, *T.R. Santos et al.* PCD 5646 (ALCB!); ca. 1 km S do Distrito de Igatú, 12º53'S, 41º19'W, 15 December 1999, *J.G. Jardim et al. 2311* (CEPEC, NY, RB); ca. 2 km S de Andaraí na estrada para Mucugê, 12º49'48''S, 41º19'30''W, 10 March 2003, *L.P. Queiroz et al. 13592* (HUEFS [scan seen]); estrada Andaraí para Mucugê, 12º51'05''S, 41º18'36''W, Alt: 414 m, 17 December 2009, *M.L. Guedes et. al.* 16867 (ALCB!); margem da rodovia entre Mucugê e Andaraí, próximo ao segundo córrego, 12º56'56"S, 41º17'04''W, Alt: 850, 26 Sep 2011, *J.E.Q. Faria 1927* (HUEFS, HUEG, UB). Mucugê, estrada Mucugê/Andaraí, ca. 8 km de Mucugê, torre da telebahia, 12 November 1998, *R.P. Oliveira et al. 45* (HUEFS [scan seen]); margem da estrada de terra Palmeiras para Mucugê & Andarai, 12º57'41"S, 41º18'58''W, Alt: 1129, 27 October 2014, *T.N.C. Vasconcelos 439* (HURB, K!, UB, SPF!); Parque Municipal de Mucugê, 13º0'S, 41º23'W, 27 March 2003, *T.C. Faustino 28* (HUEFS [scan seen]); ibid., 30 Jan 2003 , *T.C. Faustino 47* (HUEFS [scan seen]); Capa Bode,

12º58’27’’S, 41º19’23’’W, 30 March 2004, *R. Funch 253* (HUEFS [scan seen]); Chapada Diamantina, Estrada entre Mucugê e Andaraí, 12º57’50.1”S, 41º18’47.1”W, Alt:1116 m, 14 September 2018, *T.N.C. Vasconcelos & J.E.Q. Faria 998* (SPF!, UB).

Phenology:—Specimens of *Myrcia lucasae* were found flowering between September and January and producing fruits between December and March (Figure 3).

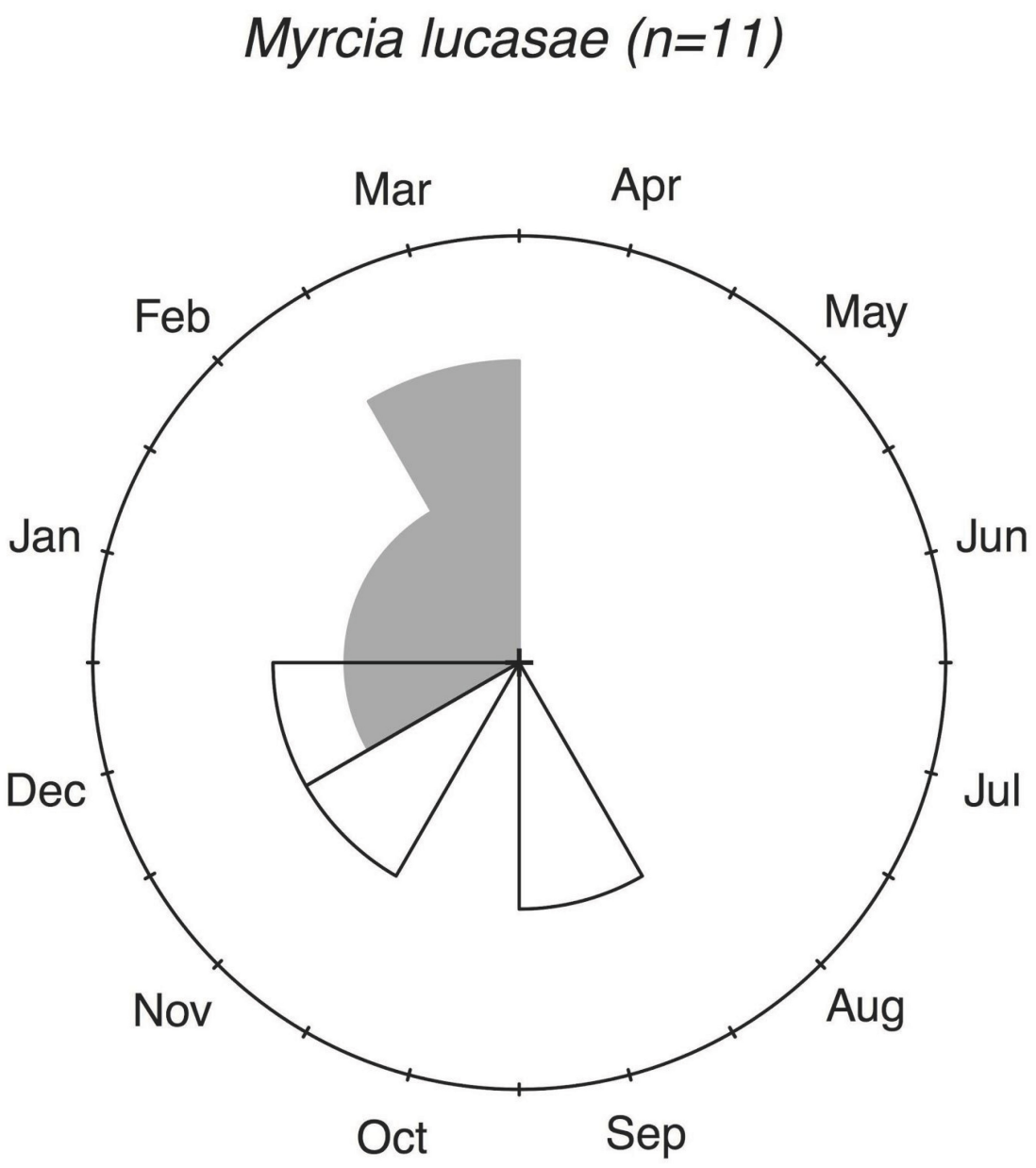

FIGURE 3. Phenology in *Myrcia lucasae.* White slices denote flowering specimens and gray slices fruiting specimens; The size represents the relative amount of specimens from the total which was blooming or fruiting in that month.

Etymology:—The epithet of this species honors Dr. Eve Lucas, botanist and prolific *Myrcia* specialist. Dr. Lucas is the first author of the first comprehensive phylogenetic study for *Myrcia* (Lucas *et al*. 2011) and of the current infrageneric classification for the genus (Lucas *et al*. 2018). She also contributed immensely to Myrtaceae studies in Brazil by supervising innumerous Brazilian graduate students.

Habitat and distribution:—*Myrcia lucasae* is endemic to the Chapada Diamantina, in the municipalities of Andaraí and Mucugê, Bahia state. It is recorded from areas of high altitude (1100 m elev.) in rocky outcrops of the *campo rupestre* vegetation. Most collections appear to have been made within the protected areas of the Parque

Municipal de Mucugê and Parque Nacional da Chapada Diamantina, but remarkably following the road between Mucugê and Andaraí (a well-known bias in botanical collecting, Oliveira *et al*. 2016). In this sense, it is likely that other populations of *Myrcia lucasae* occur in and out the conservation units close to the area where the species was frequently collected (Figure 4).

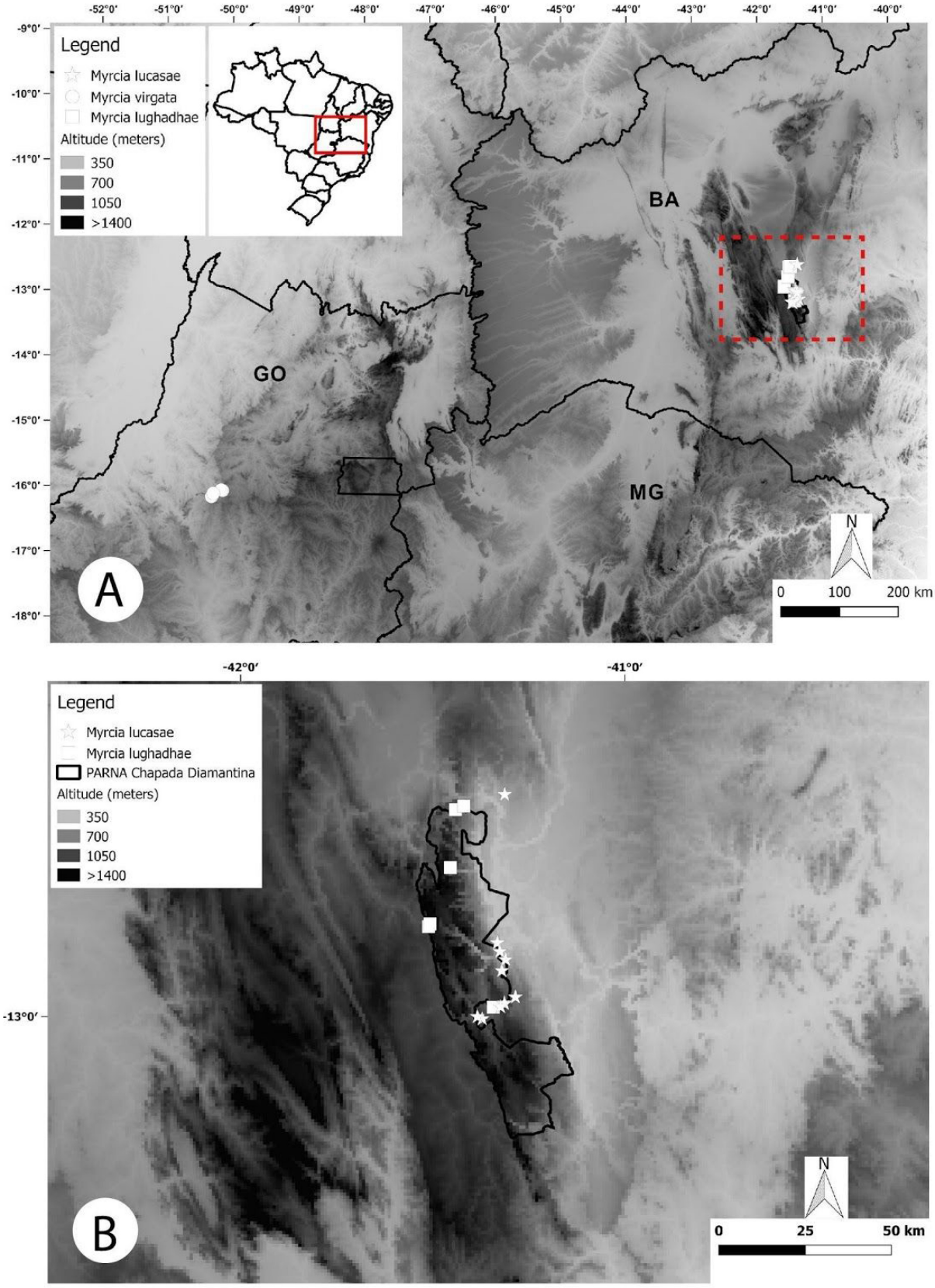

FIGURE 4. Distribution maps showing (A) the contrasted range of *Myrcia lucasae M. lughadhae* and *M. virgata;* (B) Detail of *Myrcia lucasae* and *M. lughadhae* distributions in the Chapada Diamantina area.

Similar species and remarks:—*Myrcia lucasae* is morphologically placed in *Myrcia* sect. *Gomidesia* due to the presence of erect, distinct and imbricate calyx lobes in flowers and fruits, thecae with irregular dorsal openings with visible septum. The phylogenetically placement of this species in sect. *Gomidesia* was also confirmed by molecular data evidence (T. Vasconcelos unpublished). *M. lucasae* is morphologically similar and sympatric to *Myrcia lughadhae* but differs by the narrow elliptic and chartaceous leaves, elliptic or subulate bracteoles, absence of ribs and strigose trichomes on fruits; while *M. lughadhae* presents lanceolate and coriaceous leaves, lanceolate bracteoles, fruits 8-ribbed and puberulent (never strigose).

Further examination demonstrated that several collections from the Chapada Diamantina previously identified as *Myrcia virgata* were actually *Myrcia lucasae*. These species share some morphological features, such as narrow elliptic leaves and elliptic fruits (uncommon in sect. *Gomidesia*), as well as characters that are common to both sections, such as trichomes in the staminal ring, number of locules and number of ovules per locule. However, they differ in the morphology of the anthers, the slightly extended hypanthium in *M. lucasae* (vs. up to 0.2 mm beyond the ovary summit in *M. virgata*) and the narrow staminal ring, comprising less than 30% of the total disc width in *M. lucasae* (vs. more than 60% of the total disc width in *M. virgata*). Collections of *Myrcia virgata* that actually correspond to its type collection and protologue both in terms of morphology and geographical distribution appear endemic to the region of Serra Dourada in the state of Goiás, which interestingly is also a *campo rupestre* vegetation.

Conservation status:—The AOO and EOO are both small, of just 32 km² and 106.150 km², respectively. The restricted geographical range is also a common feature of species endemic to the *campo rupestre* ecosystems. Although some specimens were collected within the protected areas of the Parque Municipal de Mucugê and the Parque Nacional da Chapada Diamantina, the area has intense tourism, with high probability of anthropic fires and presence of invasive species (Silveira *et al*. 2016). In this sense, *Myrcia lucasae* should be considered endangered according to the IUCN criteria B1ab(iii)+2ab(iii) (IUCN 2012).

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