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SHORT COMMUNICATION

Miconia bahiana (Melastomataceae, Miconieae), a new species from semideciduous forest in Bahia, Brazil

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Background – Recent collection efforts in semideciduous forests from Bahia, Brazil, provided material that belongs to a species of *Miconia* (Melastomataceae) not yet described scientifically. Here, we describe this new species and compare it to four species in the "*Miconia discolor* group" that share morphological similarities. We also provide illustrations, photographs, a distribution map and conservation assessment for the new species.
Methods – This study was based on specimens from several herbaria and field collections, which resulted in photographs and ethanol-preserved material, as well as information about the environment where the plants were found. The conservation assessment is based on field observations and spatial analyses (i.e., extent of occurrence, area of occupancy), following IUCN guidelines and criteria.
Results – *Miconia bahiana* has been collected ten times in four localities since 2001, ranging from 800 to 1041 m elevation. The species resembles a group of species endemic to the Brazilian Atlantic Forest (*M. capixaba* R.Goldenb., *M. cubatanensis* Hoehne and *M. setosociliata* Cogn.), all of them with abaxial leaf surfaces densely (seldom moderately) covered with branched trichomes, inflorescences with paraclades with a first dichasial branching, then uniparous (scorpioid) branchings, and white, glabrous stamens lacking appendages or with dorsal ones, the anthers with a moderate to large pore. It differs from the above cited species by the rounded to subcordate leaf bases, and the persistent calyx with a truncate inner membrane, lacking well-defined lobes. This new species is described, illustrated, and compared with the species mentioned above. According to IUCN guidelines and criteria, we recommend to assess *M. bahiana* as Endangered (EN).

Keywords – Atlantic Forest; Melastomataceae; *Miconia*; seasonal forest; taxonomy.

INTRODUCTION

In its strict sense, *Miconia* Ruiz & Pav. has about 1100 species, all of them in tropical and subtropical areas in the New World, from Mexico and Antilles to Northern Argentina and Uruguay (Goldenberg et al. 2013). The species in this genus have been traditionally distinguished from others in tribe Miconieae by the terminal inflorescences and rounded or emarginate petals (Triana 1872; Cogniaux 1891), but these characters seem to be homoplastic (Michelangeli et al. 2004; Goldenberg et al. 2008; Majure et al. 2013). In consequence, there is a recent, alternative interpretation for classification

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of Miconieae, in which a single genus, *Miconia* s. lat., would include all species from all genera in the tribe (i.e., *Clidemia* D.Don, *Leandra* Raddi and *Ossaea* DC., and also *Anaectocalyx* Triana ex Benth. & Hook.f., *Calycogonium* DC., *Catocoryne* Hook.f., *Charianthus* D.Don, *Conostegia* D.Don, *Killipia* Gleason, *Maieta* Aubl., *Mecranium* Hook.f., *Necramium* Britton, *Pachyanthus* A.Rich., *Pleiochiton* Naudin ex A.Gray, *Sagraea* DC., *Tetrazygia* Rich. ex DC. and *Tococa* Aubl.; Michelangeli et al. 2016, 2019).

Within the Brazilian Atlantic Forest, it seems clear that most species of Miconieae are the consequence of four main diversification events, belonging to clades "*Leandra* s. str." (Reginato & Michelangeli 2016), "*Miconia discolor* group" (Caddah 2013), *Miconia* sect. *Chaenanthera* (Naudin) Cogn. (Goldenberg et al. 2018) and also several lineages within the grade "*Miconia* IV" (Goldenberg et al. 2008, excluding "*Miconia discolor* group"). The *Miconia discolor* group is defined by species with discolorous leaves with dense indumentum on the abaxial leaf surface, and inflorescences with branches partially secund/scorpioid. Our new species shares these characters, and likely belongs to this group.

The species presented here has been recently collected in the state of Bahia, Brazil, in four different localities. All of them may be broadly understood as belonging to the Brazilian Atlantic Forest, but they are actually dry, seasonal forests, known in the Brazilian official classification as "Semideciduous Forests" ("Floresta Semidecidual", Velloso et al. 1991). These are mountainous transitional areas between Bahian rainforests and caatinga, spanning 60–370 km in a straight line from the Atlantic Ocean. These semideciduous forests are particularly strongly depauperate in species of Melastomataceae when compared to the rain forests of Bahia and other seasonally dry but more open biomes like cerrado and campos rupestres. Nevertheless, the few species occurring in these places seem to be adapted and restricted to these particular conditions and are remarkably poorly studied. A number of new entities have recently been described from plants collected nearby, including another species of *Miconia* (Goldenberg & Chagas 2014), as well as other Melastomes (Amorim et al. 2014; Goldenberg et al. 2016; Bacci et al. 2016a, 2018) and angiosperms (Fiaschi et al. 2013; Amorim et al. 2017; Azevedo et al. 2018).

MATERIAL AND METHODS

This study was based on literature review of taxonomic revisions (Cogniaux 1886–1888, 1891; Caddah 2013) and regional floras (Wurdack 1962; Goldenberg 2004, 2009; Chagas 2012; Bacci et al. 2016b). We analysed herbarium specimens of *Miconia* from the herbaria ALCB, CEPEC, HUEFS, HUESC, MO, NY, RB, UESB, UPCB, and US (acronyms following Thiers continuously updated). Web-based resources such as CRIA (2019), GPI (2019), REFLORA (2019), Meise Botanic Garden (2019) enabled us to check additional specimens, including types.

Description of branches, inflorescences and leaves was based on dried material. Flower measurements and drawings were based on ethanol-preserved material. For leaf description, we avoided the first (distal) pair of leaves, since sometimes the leaves in this pair are not fully developed. The geographic distribution map was created using the website SimpleMappr (Shorthouse 2010). The conservation status for the new species was assessed using IUCN (2017) guidelines and criteria, with area of occupancy and extent of occurrence calculated using GeoCAT (Bachman et al. 2011).

SPECIES DESCRIPTION AND DISCUSSION

Miconia bahiana R.Goldenb. & J.Coelho, **sp. nov.**

Figs 1–2

Diagnosis – *Miconia bahiana* differs from *M. capixaba* R.Goldenb. due to its rounded to subcordate or seldom obtuse leaf bases (vs. cuneate and shortly decurrent in *M. capixaba*), persistent calyx (vs. caducous) with a truncate inner membrane, lacking well-defined lobes (vs. with well defined, triangular lobes) and stamens with dorsally appendaged connectives (vs. lacking dorsal appendages).

Type – Brazil, Bahia, Municipio de Vitória da Conquista, Matinha da Universidade Estadual do Sudoeste da Bahia, 14º52′49″S, 40º47′34″W, elevation ca. 900 m, 14 Apr. 2017, fl, *A.M. Amorim & C. Pessoa 10459* (holotype: CEPEC [fl, fl buds]; isotypes: HUESC, NY, RB, UESB, UPCB).

Description – Shrubs 1.6–3 m tall; Indumentum on young branches, inflorescences, bracts, bracteoles, hypanthia, and calyx with a dense covering of sessile, stellate or short-dendritic trichomes ca. 0.1 mm diam., these with a wide central portion and short to medium-sized branches. Young branches slightly quadrangular, lacking interpetiolar lines or these very thin; older branches terete, not decorticating. Leaves opposite; petiole 5–30 mm long; blade 3.5–10 × 1.6–4.2 cm, ovate to elliptic or elliptic-lanceolate, apex acuminate and usually mucronulate (with a tiny subulate projection), base rounded to subcordate or seldom obtuse, margins denticulate on the distal ½ or ⅔ of the blade, chartaceous, strongly discolorous (both in fresh and dried specimens), green on the adaxial surface, beige on the abaxial surface, but with the nerves a bit darker, ochraceous to light brown, longitudinal nerves (midrib plus laterals) 3, with an additional faint submarginal pair very close to the margin, acrodromous, basal to seldom very slightly suprabasal (the laterals joining the midrib up to 1 mm from the base), free (not joined by a membrane at their bases), midrib and laterals impressed, transverse nerves very slightly impressed, and reticulation barely visible in adaxial view, midrib and laterals strongly prominent, transverse slightly prominent, and reticulation very slightly raised, despite hidden by the indumentum in abaxial view; adaxial surface with dense indumentum on young leaves, then caducous/glabrescent on older leaves, the trichomes stellate to shortly dendritic, ca. 0.1 mm diam.; abaxial surface densely covered with trichomes similar to those of the branches and inflorescences (see above). Panicles 1.4–3.7 × 2–3.1 cm, with tawny to sometimes reddish axes, terminal, with only one main axis or sometimes with two additional lateral-basal axes, main axes with 1–3 pairs of paraclades, these without accessory branches, flowers on short dichasia, with secund/scorpioid distal ramifications (sometimes not easily distinctive), not glomerulate; bracts in proximal nodes absent, in distal branches similar to the bracteoles; bracteoles 0.4–0.5 × 0.1–0.2 mm, triangular to narrowly triangular, persistent

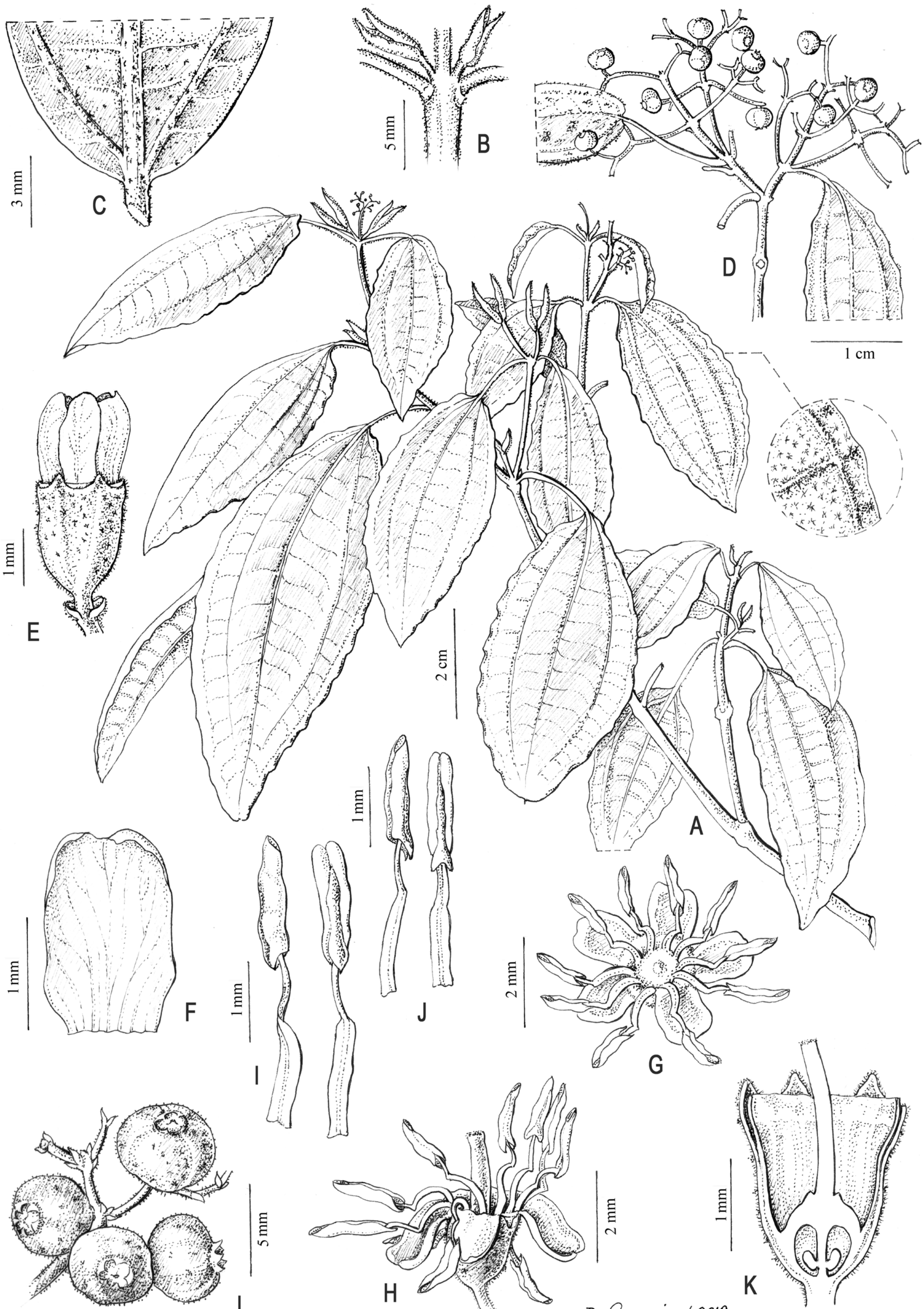

Figure 1 – *Miconia bahiana*. **A**. Fertile branch. **B**. Detail of the nodal region of a young branch. **C**. Leaf base, abaxial view. **D**. Branch with fruits. **E**. Flower bud, with bracteoles and the short pedicel. **F**. Petal, adaxial view. **G**. Flower, top view. **H**. Flower, lateral view. **I**. Antepetalous stamens, lateral (left) and dorsal (right) views. **J**. Antesepalous stamens, lateral (left) and dorsal (right) views. **K**. Flower, longitudinal section, petals and stamens removed. **L**. Fruits. A–C from *Goldenberg 1792* (NY). D from *Fiaschi 1394* (NY). E–K from *Amorim 10459* (CEPEC). L from *Coelho 161* (ALCB). Illustration by Diana Carneiro.

(sometimes still persistent in fruits). Flowers (4–)5-merous, sessile or on short pedicels up to 0.4 mm long. Hypanthium 1.7–2.2 × 1.6–2 mm, campanulate, inner surface glabrous, outer surface plane to slightly costate, torus glabrous. Calyx persistent, the truncate tube 0.3–0.4 mm high, inner surface glabrous, margin glabrous except where the tube is surpassed by the calyx outer projections, where it is moderately ciliate; outer teeth projecting 0.1–0.2 mm above the tube, triangular, with the same trichomes as the hypanthium. Corolla with (4–) 5 petals 1.8–2.4 × 1.1–1.3 mm, white, oblong to broadly oblong, apex slightly cucullate, emarginate and usually asymmetric, margins entire or irregularly denticulate at the very

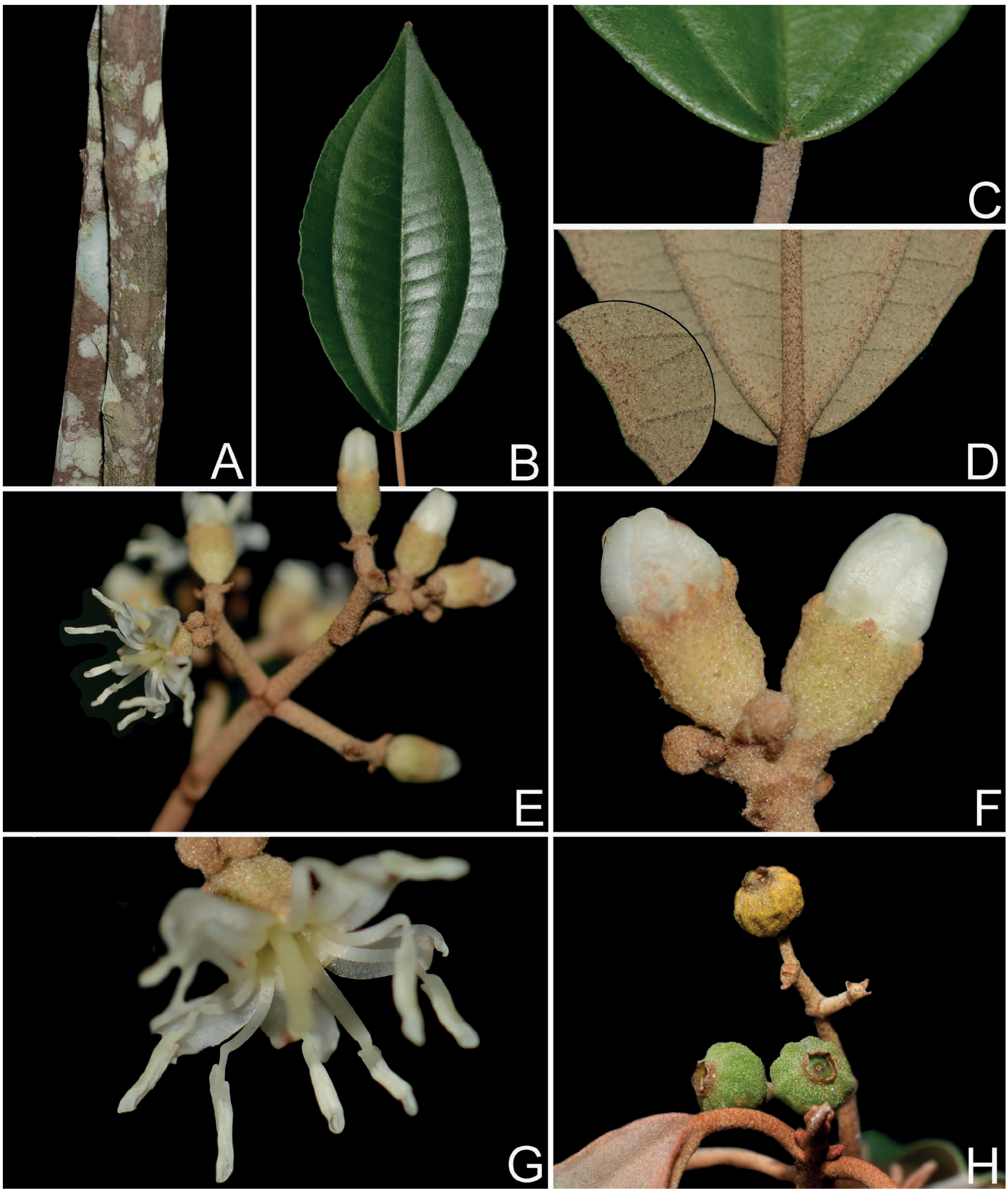

Figure 2 – *Miconia bahiana*, living plants. **A**. Old branch. **B**. Leaf adaxial view. **C**. Leaf base, adaxial view. **D**. Leaf base, abaxial view, with the detail of the margin. **E**. Inflorescence branch with a flower and pre-anthesis buds. **F**. Pre-anthesis buds. **G**. Flower. **H**. Fruits. A–G from *Amorim 10459* (CEPEC). H from *Goldenberg 1792* (NY). Photographs A–G by André Amorim and H by Renato Goldenberg.

apex, glabrous. Androecium actinomorphic, with slightly dimorphic stamens, white; filaments 1.7–2.3 mm long (in both cycles), glabrous; connective prolonged 0.2–0.3 mm (in both cycles) below the thecae, with one broad, bifid, 0.2–0.4 mm long, dorsal appendage, each lobe acute to narrowly rounded (antesepalous) or with a single, blunt, dorsal tooth 0.1–0.15 mm long (antepetalous); anthers 1.2–1.4 mm long (in both cycles), linear-oblong, straight, with a rounded or emarginate apex and a single, broad, ventral pore (0.2–0.3 mm diam.). Gynoecium 0.8–1.1 mm long, basally ca. ½ adherent to the hypanthium, 3-celled, the apex glabrous; style 2.2–2.9 mm long, straight, glabrous, stigma truncate to slightly convex, not laterally expanded. Fruits baccate, 3.4–4 × 3.8–5 mm, globose, slightly sulcate/costate, glabrescent, green when young then yellow/orange when ripe, the persistent calyx reddish. Seeds 6–11 in each berry, 2–4 in each locule (sometimes part of them empty and underdeveloped in mature fruits), 1.2–1.5 × 1–1.3 mm long, pyramidal to ovoid, the surfaces flat on the faces contacting neighboring seeds, and convex when facing the pericarp, testa smooth, appendage absent.

Distribution – Endemic to the state of Bahia, Brazil. This species has been collected ten times, in four different localities since 2001 (fig. 3).

Habitat, ecology and phenology – This species occurs in semideciduous forests (“mata seca” in *Fiaschi 1364* and *Goldenberg 1792*; “floresta semidecidual” in *Coelho 161*), in transitional areas between rainforest (to the east) and caatinga (to the west), from 800–1041 m elevation. Collected with young flower buds in November, mature flower buds

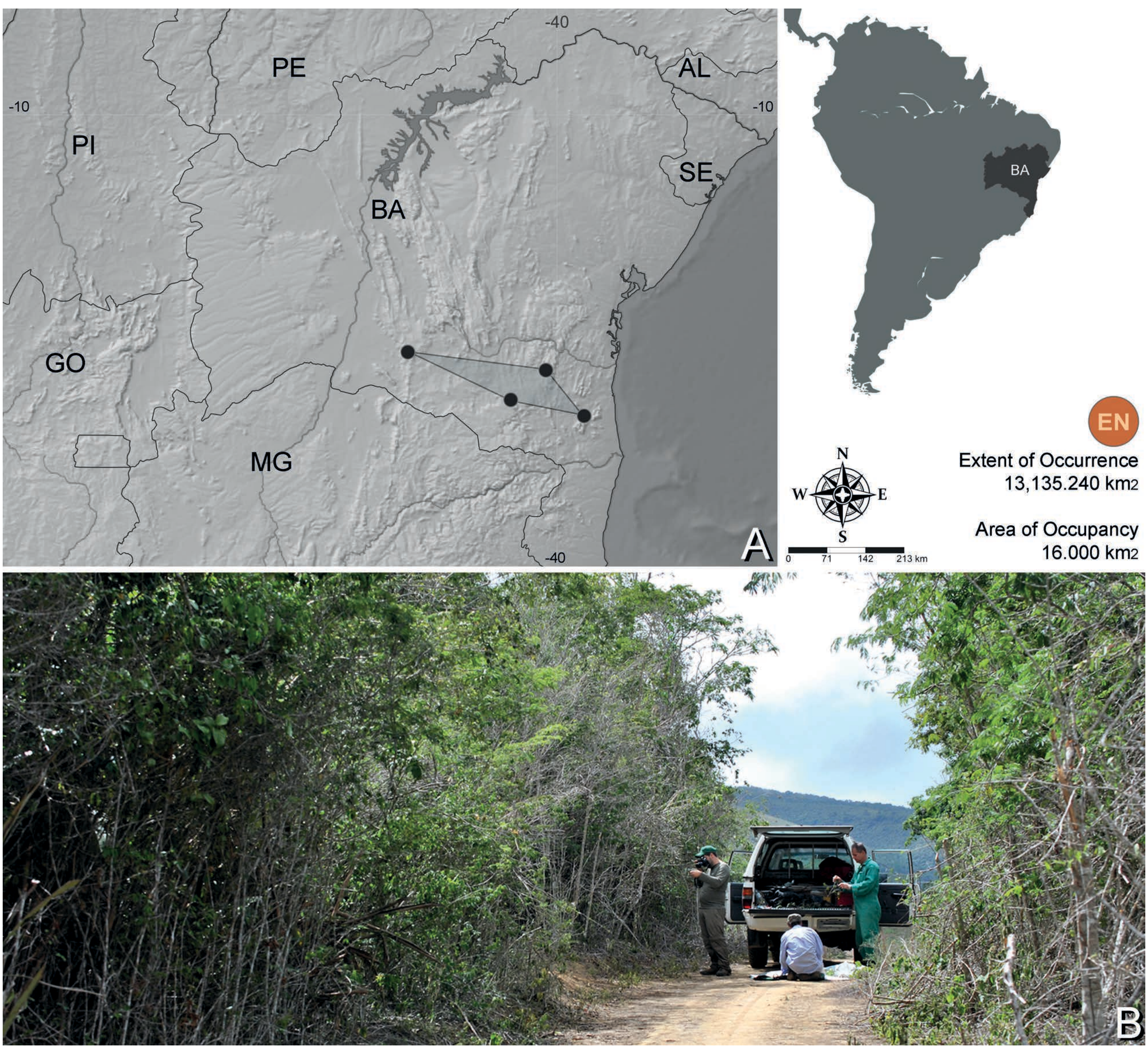

Figure 3 – *Miconia bahiana*, geographic distribution with conservation assessment and habitat. **A**. Distribution map of *M. bahiana* in the state of Bahia, Brazil, with the detail of the state’s location in South America; black circles indicate the localities where the plants were collected, and the polygon represents the area of occupancy of *M. bahiana*. **B**. Habitat of *M. bahiana* in Boa Nova, Bahia, Brazil. Photograph by Renato Goldenberg.

Table 1 – **Comparative morphological features among *Miconia bahiana* and morphologically similar relatives.**

	M. bahiana	*M. capixaba*	*M. cipoensis*	*M. cubatanensis*	*M. setosociliata*
Leaf base	rounded to subcordate or seldom obtuse	cuneate and shortly decurrent	subcordate or seldom rounded	acute	acute
Leaf margins	denticulate	entire to repand	denticulate	entire	entire or denticulate-ciliate
Leaf abaxial surface, trichomes	dense, stellate and short dendritic	dense, stellate	dense, short dendritic	dense, stellate to lepidote	dense to moderate, stellate
Calyx persistence	persistent	caducous	persistent	caducous	caducous
Inner portion of the calyx	truncate (lacking well-defined lobes)	well defined, triangular lobes	well defined, triangular lobes	well defined, triangular lobes	well defined, triangular lobes
Connective dorsal appendages (antesepalous)	bifid, each lobe obtuse to rounded	absent	absent	undivided, blunt	undivided, blunt
Connective dorsal appendages (antepetalous)	undivided, blunt	absent	absent	undivided, blunt	undivided, blunt
Ovary apex	glabrous	papillose	stellate-puberulous	stellate-puberulous	stellate-puberulous
Distribution in Brazilian states	Bahia	Espírito Santo	Minas Gerais	Bahia, Goiás, Distrito Federal, Minas Gerais, Espírito Santo, Rio de Janeiro, São Paulo, Paraná and Santa Catarina	Espírito Santo, Rio de Janeiro

and open flowers in April to May, and with fruits from February to May.

Etymology – The epithet refers to people and things native to the state of Bahia, Brazil, where this species seems to be endemic.

Conservation assessment – *Miconia bahiana*'s extent of occurrence is 13,135.240 km^2, and its area of occupancy is estimated at 16,000 km^2 (Fig. 3). Two of the localities where it has been found are legally protected: "Matinha da UESB", in Vitória da Conquista is a State Protection Unit, and "RPPN Serra do Teimoso", in Jussari, is a private reserve with federal protection status; the remaining known subpopulations are all outside environmentally protected areas. All these places have been strongly disturbed for wood extraction, cultivation and cattle raising, and also subject to induced fires in order to clean the soil for planting coffee and *Eucalyptus*. We recommend that *Miconia bahiana* should be considered Endangered (EN) according to IUCN (2017) criteria; it occurs in four localities and is subject to a continuing decline in habitat area and quality (B2a + C).

Additional specimens studied (paratypes) – **Brazil**: **Bahia**: Mun. Boa Nova, Fazenda Cotermaia (logo na saída para Dário Meira, à esquerda após a ponte), 14º22′25″S, 40º11′15″W, 8 Mar. 2003, *P. Fiaschi et al. 1394* (CEPEC, NY, SPF, UPCB); Mun. Boa Nova, Fazenda Cotermaia (prop. Alipio Maia), entrada a esq. ca. 1.2 km a E de Boa Nova, na estrada para Dário Meira, 14º22′26″S, 40º11′17″W, 23 Feb. 2014, *R. Goldenberg et al. 1792* (CEPEC, NY, UFU, UPCB); Mun. Jussari, Entrada 7.5 km Rd. Jussari/ Palmira, Fazenda Teimoso, 1.7 km da entrada, RPPN Serra do Teimoso, parcela 48, Árvore 1331, 15º09′37″S, 39º32′10″W, elevation 800 m, 12 Sep. 2001, *J.G. Jardim 3885* (CEPEC); Mun. Licínio de Almeida, Xaxá, Mata de Cima, 14°03′46.2″S, 42°33′16.9″W, 946 m, 12 May 2015, *J. Coelho et al. 48* (ALCB); Mun. Licínio de Almeida, Xaxá, 14°03′46.2″S, 42°33′16.9″W, 1041 m, 31 May 2016, *J. Coelho & V. Amorim 109* (ALCB); Mun. Licínio de Almeida, Mata do Xaxá, final da trilha, 14°03′46.2″S, 42°33′16.9″W, 1041 m, 21 Mar. 2017, *J. Coelho et al. 161* (ALCB); Mun. Vitória da Conquista, Matinha da Universidade Estadual do Sudoeste da Bahia, 14º52′49″S, 40º47′34″W, elevation 1000 m, Nov. 2010, *A.F.P. Machado 1009* (HUEFS); Mun. Vitória da Conquista, Matinha da Universidade Estadual do Sudoeste da Bahia, 14º52′49″S, 40º47′34″W, elevation 1000 m, 19 Nov. 2013, *P.B.L. Oliveira 07* (HUEFS); Mun. Vitória da Conquista, Matinha da Universidade Estadual do Sudoeste da Bahia, 14º52′49″S, 40º47′34″W, elevation ca. 900 m, 14 Apr. 2017, *A.M. Amorim & C. Pessoa* 10469 (CEPEC).

Taxonomic notes – Among the species of *Miconia* s. str. from the Atlantic Forest, *Miconia bahiana* resembles *M. capixaba* R.Goldenb., *M. cubatanensis* Hoehne and *M. setosociliata* Cogn., due to the leaves with an acuminate apex, abaxial surfaces densely (seldom moderately) covered with branched trichomes, inflorescences without accessory branches, and with paraclades with a first dichasial branching, then uniparous (scorpioid) branchings, even though sometimes with only one or two uniparous branchings, such as the ones in *M. bahiana* and *M. capixaba* (in the latter, the inflorescences have been described as dichasial, but they are actually shortly scorpioid). The stamens in these species are all white, glabrous, the anthers with a moderate to large pore, and stamens without appendages or with dorsal ones; all these species, except for *M. bahiana*, have stamens that had been described as having a pair of very small ventral appendages, but these are so minute that we avoided this character in our comparisons. The differences between *M. bahiana*, *M. capixaba*, *M. cubatanensis* and *M. setosociliata* are summarized in table 1.

Miconia cipoensis R.Goldenb. is another species that resembles *M. bahiana*, and it also has been collected in dry areas, albeit in this case in campos rupestres, i.e., not in forested areas). It also has rounded to subcordate, discolorous leaves with denticulate margins and persistent sepals, but its inflorescences are a bit different, in that they are not secund/scorpioid, but this difference is not always easy to discern. More differences between *M. bahiana* and *M. cipoensis* are listed in table 1.

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