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# *Behuria lumiarensis* (Melastomataceae), a new species on a mountaintop of the Brazilian Atlantic Forest

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## Abstract

We describe and illustrate *Behuria lumiarensis*, a new species from the state of Rio de Janeiro, Brazil. It has been collected only once in montane vegetation in the Municipality of Nova Friburgo. The new species can be recognized by the combination of leaf blades with adaxial surface covered with sessile glands and abaxial surface moderately covered with stalked glands only on the veins, hypanthium sparsely covered with stalked glands, a large calyx tube with narrow sepals that are not apiculate in the apex, small petals, and glabrous ovary apex.

**Keywords:** Atlantic Forest, endemism, southeastern Brazil.

## Resumo

Neste trabalho é descrita e ilustrada *Behuria lumiarensis*, uma nova espécie endêmica do estado do Rio de Janeiro, Brasil. A espécie foi coletada somente uma vez em vegetação montanhosa no município de Nova Friburgo. *Behuria lumiarensis* é reconhecida pela lâmina foliar recoberta por glândulas sésseis na face adaxial, moderadamente recoberta por tricomas pedunculados somente nas nervuras da face abaxial, hipanto esparsamente recoberto por tricomas pedunculados, tubo do cálice grande e com sépalas estreitas (não apiculadas no ápice), pétalas pequenas, e ápice do ovário glabro.

**Palavras-chave:** Mata Atlântica, endemismo, sudeste brasileiro.

## Introduction

The genus *Behuria* Chamisso (1834: 376) (Melastomataceae) is endemic to the Brazilian Atlantic Forest, occurring mostly on mountains near the Atlantic coast (Tavares 2005). *Behuria* comprises 16 species (Tavares 2005; Tavares *et al.* 2008; Goldenberg & Reginato 2009; Baumgratz & Tavares 2010; Iglesias *et al.* 2016; Baumgratz 2017), that can be recognized by their shrubby habit with (5–) 6-merous flowers with white or light-pink petals, yellow stamens with a bilateral symmetry arrangement at anthesis, with a single, dorsal, filliform or linear-subulate, straight appendage, capsular fruits, and elongated seeds (Tavares 2005; Goldenberg *et al.* 2012a).

The genus has been traditionally placed in tribe Merianieae Triana (1871: 65) based on fruit and anther morphology (Renner 1993; Baumgratz 2004; Goldenberg & Tavares 2007). However, a recent molecular study showed that the genus may not be closely related to Merianieae *s.str.* and actually belongs to a clade with no formal tribal definition (Goldenberg *et al.* 2012b). This clade includes five genera: *Behuria*, *Cambessedesia* De Candolle (1828: 110), *Dolichoura* Brade (1959: 12), *Huberia* De Candolle (1828: 167) and *Merianthera* Kuhlmann (1935: 231).

The species of *Behuria* grow on rocky hillsides and sunny areas, usually in shrubby, high montane vegetation (Tavares 2005) in the Brazilian states of Minas Gerais, Espírito Santo, Rio de Janeiro, São Paulo and Paraná (Baumgratz 2017). Rio de Janeiro is the most species-rich state (Tavares 2005), but recent collections and publications of three new species from Espírito Santo (Tavares *et al.* 2008; Goldenberg & Reginato 2008; Iglesias *et al.* 2016) have shown that these areas may be important for the knowledge of *Behuria* diversity in eastern Brazilian mountains.

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During fieldwork in Rio de Janeiro we found three species of *Behuria* known only from the type collections or similarly old specimens (Bochorny *et al.* 2017), as well as a new species for this genus. Here we describe *Behuria lumiarensis* with taxonomic comments, georeferenced data on the collection site, illustrations, photographs, distribution map and a preliminary assessment of its conservation status.

## Methods

The description and analysis of the new species were based on fresh and dried specimens collected by the authors. Comparisons with other species were taken directly from herbarium specimens at NY, RB and UPCB (acronyms according to Thiers 2016), or based on measurements and details from Tavares (2005). The terminology for vegetative and reproductive structures followed Radford (1979) as well as the recent publications of new species of *Behuria* (Goldenberg & Reginato 2008; Iglesias *et al.* 2016).

The conservation status assessment was based on range size (criterion B), according to IUCN and Petitions Subcommittee (2014) using GeoCAT (Geospatial Conservation Assessment Tool–Bachman *et al.* 2011). The map was created using QGIS (Quantum GIS Development Team).

## Taxonomy

***Behuria lumiarensis*** Bochorny, Michelang. & R. Goldenb. *sp. nov.* Figures 1–2

**Diagnosis:** *Behuria lumiarensis* is similar to *Behuria cordifolia* Cogniaux (1886:13–14) by the sessile glands on the adaxial surface of the leaf, the calyx tube size and the glabrous ovary apex. It can be distinguished by the smaller petals, 10–12 × 4–6 mm (versus 13–17 × 8–10 mm in *Behuria cordifolia*) and narrower sepals, 0.5 mm (vs. 1–1.5 mm wide) that are not apiculate in the apex (vs. apiculate).

**Type: —**BRAZIL. Rio de Janeiro: Nova Friburgo, Distrito de Lumiar, Área de Proteção Ambiental Macaé de Cima, no topo da Serra Queimada, 22°22’58’’S–42°17’36W, 1450 m, 22 January 2016, fl., fr., *T. Bochorny, Bacci & Bolson 200* (holotype: UEC!; isotypes: NY!, UPCB!).

Shrubs 1–1.5 m tall; branches, petioles, inflorescences, bracts and bracteoles sparsely covered with stalked glands, 0.5–1 mm long (the heads sometimes caducous). Branches terete, striate. Leaves opposite; petioles 1–3 cm long; blades 2–10.2 × 1–5.5 cm, ovate or elliptic, apex acute or acuminate, base rounded or subcordate (the insertion of the petiole into the base of the leafy is revolute on the adaxial surface), margins serrulate, plane, chartaceous, adaxial surface sparsely covered with sessile glands, 0.2–0.4 mm long, abaxial surface moderately covered with stalked glands, 0.5–1 mm long, only on the veins, acrodromous veins 5, with an additional faint submarginal pair, basal, main veins impressed adaxially and raised abaxially, transverse veins and reticulation barely visible on both surfaces. Thyrsoids 4.2–5.3 cm long, apical, with 5–10 flowers, these usually arranged in congested triads, but sometimes depauperate; bracts two, persistent, leafy, 1–1.8 × 0.5–0.8 mm long, petioles 1.5–2 mm long, blades elliptic or broadly elliptic; bracteoles two, persistent, leafy, 1–2 mm long, sessile, lanceolate. Flowers 6-merous, on pedicels 1.5–2 mm long. Hypanthium 4–6 × 4 mm, campanulate, green, sparsely covered with stalked glands, 0.5–1 mm long. Calyx tube 1 × 4–5.5 mm, green, with the same trichomes as the hypanthium; sepals 7–9 × 0.5 mm, green with pinkish apices, linear to very narrowly triangular, margins ciliolate (the cilia sometimes caducous), apex not apiculate, glabrous; external teeth absent. Petals 10–12 × 4–6 mm, left margin (in adaxial view) white, entire, right margin (in adaxial view), white to pinkish, obovate and asymmetric, apex rounded to emarginate, margin entire, not apiculate, both adaxial and abaxial surfaces glabrous. Stamens 10 to 12, yellow, subisomorphic, glabrous; filaments 6–10 mm long (antesepalous) or 4–8 mm long (antepetalous); connective not prolonged below the thecae, dorsal appendages ca. 3 mm long, yellow and pinkish in the apex, linear-subulate; anthers 3–4 mm long in both cycles, yellow, oblong-linear, the thecae prolonged up to 0.3 mm below the insertion of the filament, with a single, apical (but ventrally inclined) pore. Ovary 3–6 mm long, 2/3 basally adhered to the hypanthium, 4-locular, apex glabrous, without extended lobes; style 9–11 mm long, slightly curved or sigmoidal, glabrous. Capsules 5–8 × 6–8 mm, the carpels exceeding the hypanthium length by 1mm; seeds 1.5 × 0.5 mm, elongate or oblong, raphe almost equaling the seed length, testa granulate.

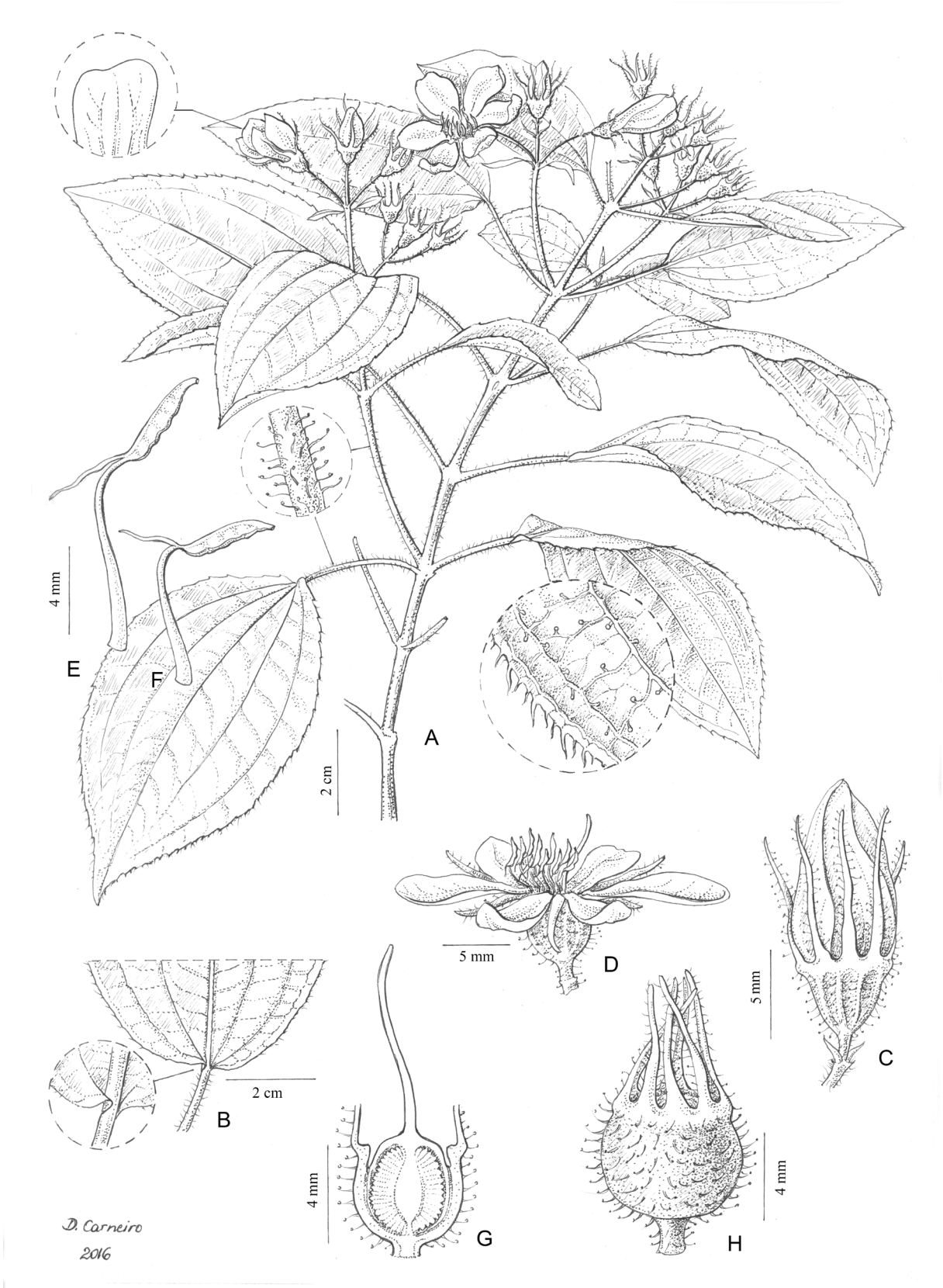


**FIGURE 1.** *Behuria lumiarensis.* A) Branch with details of the petal apex and the stalked-glands on the abaxial leaf surface and petiole; B) Insertion of the petiole in the leaf blade, adaxial surface; C) Flower bud; D) Flower, lateral view; E) Antesepalous stamen; F) Antepetalous stamen; G) Hypanthium and ovary, longitudinal section; H) Immature capsule. (All from Bochorny *et al.* 200, UEC).


**FIGURE 2.** *Behuria lumiarensis*. **A.** Habit; **B.** Inflorescence with flower buds, flowers and immature fruits; **C.** Flower buds; **D.** Stamens with dorsal appendages and style; **E.** Flowers, lateral view; **F.** Vegetation of the "Macaé de Cima Environmental Protection Area".

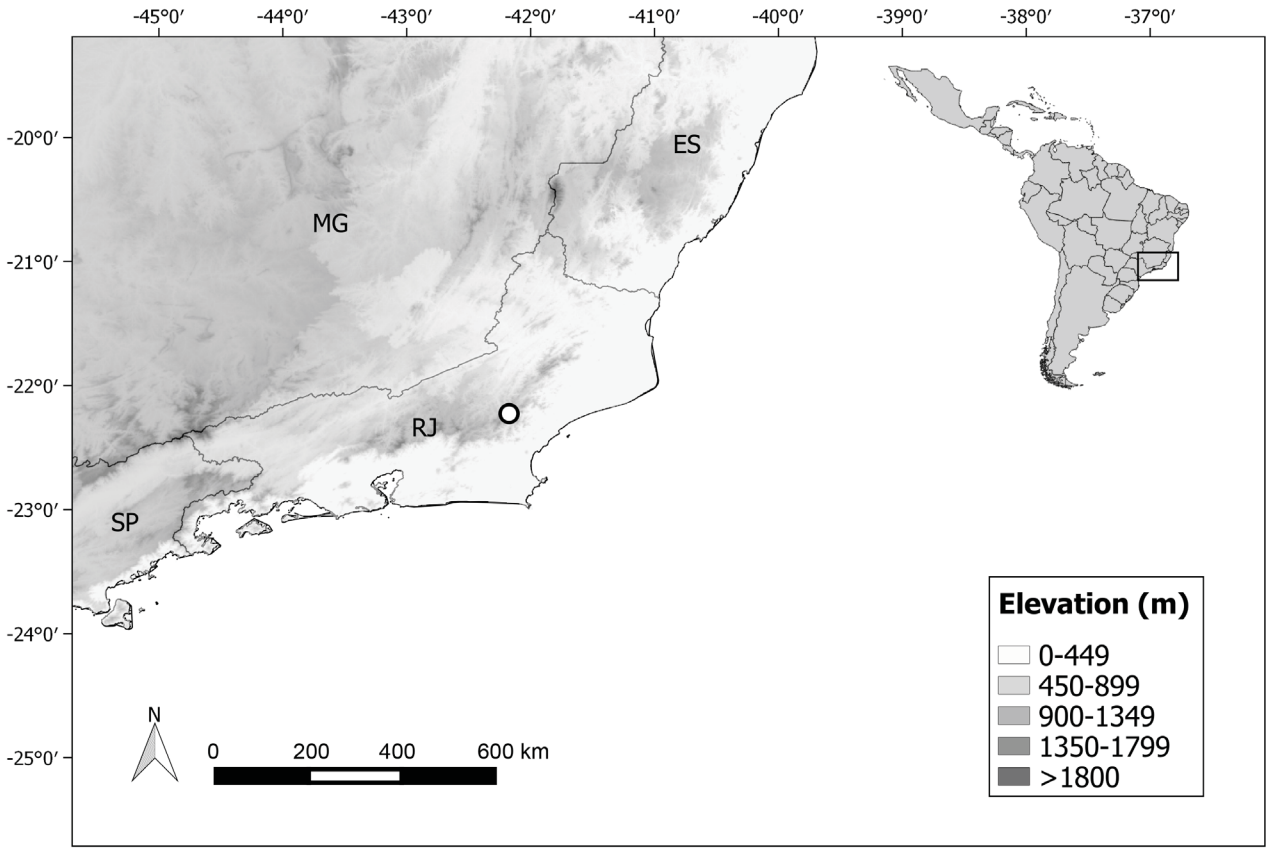


**FIGURE 3.** Map with the collection locality of *Behuria lumiarensis* at central Rio de Janeiro (RJ).

**Distribution, ecology and phenology:—***Behuria lumiarensis* has been collected only once at the hilltop of "Serra Queimada" peak (1.450 m elev.; see figure 3), in the district of Lumiar, municipality of Nova Friburgo, central Rio de Janeiro state. The "Serra Queimada" peak is located inside the region of Macaé de Cima Environmental Protection Area ("Área de Proteção Ambiental Macaé de Cima"), a partially protected area managed by the state. With 35.038 ha, it was established in September 2001 (INEA 2016) and is mostly covered with montane Atlantic rainforest ("Floresta Ombrófila Densa Submontana/Montana", following the official classification for Brazilian vegetation; IBGE 2012). This region includes a significant proportion of secondary vegetation, where wildfires are frequent (as suggested by the site name "Burned Mountain"). The trail that leads to "Serra Queimada" is also a crossing between the municipalities of Nova Friburgo and Macaé. *Behuria lumiarensis* occurs among small shrubs on steep slopes. It was collected with flowers and fruits in January.

**Etimology:—**The epithet "*lumiarensis*" refers to the district of Lumiar, where the species was collected.

**Conservation status:** This species is known only from the type collection. The locality lies inside a partially protected area that allows private properties and small-scale agricultural activities, such as cattle raising on pastures, which leads to fragmentation of the natural vegetation. According to IUCN Standards and Petitions Subcommittee (2014) we used the criteria B1ab(ii) + B2ab(ii) based on geographic ranges: criterion B1 (EOO, Extent of Occurrence estimated to be less than 100 km²) and criterion B2 (AOO, Area of Occupancy estimated to be less than 10 km²). The values for *Behuria lumiarensis* were EOO = 0 km² and AOO = 4.000 km², and by definition, is less than the threshold for classification as "critically endangered" (CR).

**Discussion:—***Behuria lumiarensis* can be distinguished from all other species in the genus by the combination of leaf blades with adaxial surface covered with sessile glands, abaxial surface moderately covered with stalked glands only on the veins, the hypanthium sparsely covered with stalked glands, long calyx tube, 1 × 4–5.5 mm, narrow sepals, 7–8 × 0.5 mm that are not apiculate in the apex, small petals, 10–12 × 4–6 mm, and glabrous ovary apex. This species is similar to three other ones (see table 1) from the state of Rio de Janeiro, among which it resembles most *Behuria cordifolia* (see details on the diagnosis above). *Behuria lumiarensis* differs from *Behuria edmundoi* Brade (1956: 221) by the smaller petals, 10–12 × 4–6 mm (vs. bigger petals, 13–14 × 6–6.5 mm in *B. edmundoi*), longer and narrower sepals, 7–9 × 0.5 mm (vs. shorter and wider sepals, 5.5–6 × 0.8–1 mm), narrower calyx tube, 1 × 4–5.5 mm (vs. wider

calyx tube, ca. 0.5 × 6 mm) and the glabrous ovary apex (vs. apex with stalked glands). It also differs from *Behuria glazioviana* Cogniaux (1891: 415) by the leaves with adaxial surface covered with sessile glands and abaxial surface sparsely covered with stalked glands only on the veins (vs. leaves with both adaxial and abaxial surfaces densely covered with stalked glands in *B. glazioviana*), hypanthium sparsely covered with stalked glands (vs. densely covered with stalked glands), sepals not apiculate in the apex (vs. apiculate), larger petals, 14–18 × 7–11 mm (vs. 10–12 × 4–6 mm) and ovary apex covered by stalked glands (vs. glabrous apex).

**TABLE 1.** Comparison between *Behuria lumiarensis* and the most similarly species in the genus *Behuria* (Melastomataceae).

| Species | Trichomes on the adaxial/ abaxial surface of the leaf | Petals size (mm) | Ovary apex | Calyx tube size (mm) | Sepals size (mm) | Sepals apex | Hypanthium pubescence |
|---|---|---|---|---|---|---|---|
| *B. cordifolia* | Both surfaces covered with sessile glands (rare stalked glands) | 13–17 × 8–10 | Glabrous | 0.5–1 × 4–7 | 4.5–7 × 1–1.5 | apiculate | Sparse sessile glands and stalked glands |
| *B. edmundoi* | Sessile glands/ Sessile glands and stalked glands | 13–14 × 6–6.5 | Stalked glands | ca. 0.5 × 6 | 5.5–6 × 0.8–1 | not apiculate | Sparse stalked glands |
| *B. glazioviana* | Both surfaces densely covered with stalked glands | 14–18 × 7–11 | Stalked glands | 0.5–1 × 4–5 | 6.5–8 × 0.5 | apiculate | Dense stalked glands |
| *B. lumiarensis* | Sessile glands/ Sparsely covered only on the veins with stalked glands | 10–12 × 4–6 | Glabrous | 1 × 4–5.5 | 7–9 × 0.5 | not apiculate | Sparse stalked glands |

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