A new species of *Pleroma* (Melastomataceae) from the Southern Espinhaço, Minas Gerais, Brazil

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**Abstract.** *Pleroma barbellatum* P.J.F.Guim., D.Nunes & I.M.Araújo a new species of Melastomataceae (Melastomataceae) from the Espinhaço Range of Minas Gerais State, Brazil, is described and illustrated, and their affinities and diagnostic characters are here discussed. *Pleroma barbellatum* is closely related to *P. formosum*, *P. martiale*, and *P. riedelianum*. They share a similar habit and leaves that are alike in size and shape. However, they can be distinguished by differences in the trichomes of the branches, leaves and inflorescences, in addition to other characters related to the type of inflorescence and size of the bracteoles. We recommend a conservation status of Endangered for *P. barbellatum*.

**Keywords:** Campos rupestres, Diamantina Plateau, Espinhaço Meridional, Grão-Mogol, Melastomataceae.

**INTRODUCTION**

*Pleroma* is a Neotropical genus of the tribe Melastomateae whose morphological characteristics are the extension of the connective beyond the thecae called pedoconnective, ovary apex with a persistent crown of erect trichomes surrounding the base of the style and cochleate seeds (Renner 1993; Guimarães et al. 2019; Veranso-Libalah et al. 2022). In Brazil there are 159 species of *Pleroma* distributed mainly in the Atlantic Forest with 105 species and Cerrado with 58 species, of which 4 are shared between these biomes (Guimarães 2022). The main features of *Pleroma* are the shrubby habit, rarely arboreal or herbaceous, flowers with 5 petals, purple to lilac or rarely white, anthers purple or pink, filaments with the frequent presence of trichomes...
capitate-glandular, and deciduous sepals that are absent on hypanthia that envelop mature capsules (Guimarães et al. 2019). The Espinhaço Range is a major center of plant diversity in eastern Brazil (Giulietti and Pirani 1988; Giulietti et al. 1997; Colli-Silva et al. 2019) that extends for more than 1200 km along the states of Bahia and Minas Gerais (Almeida-Abreu and Reneger 2002), with a predominance of campo rupestre vegetation (Vasconcelos 2011; Alves et al. 2014). This imposing mountainous expanse is composed mainly of herbaceous, subshrubby and shrubby life forms (Colli-Silva et al. 2019), originating from the Cerrado, Caatinga and Atlantic Forest (Conceição et al. 2016), and can be divided into two physiographic domains known as Chapada da Diamantina (comprising the northern portion, in the state of Bahia) and Serra do Espinhaço (southern portion, Minas Gerais) (Danderfer and Dardenne 2002; Gontijo 2008). These domains were recognized and characterized by Colli-Silva et al. (2019), respectively, as Chapada da Diamantina and Southern Espinhaço provinces. Following the classification by Colli-Silva et al. (2019), the Southern Espinhaço is subdivided into three districts: Grão-Mogol, Diamantina Plateau, and Iron Quadrangle. In the Southern Espinhaço, Melastomataceae stand out as one of the vascular plant families with the most endemic species in the province (Colli-Silva et al. 2019). While in Grão-Mogol and Diamantina Plateau districts, the family is one of the richest [e.g., Pirani et al. (2003, 2015); see also Paranhos (2020) for an updated list of Melastomataceae from the Diamantina Plateau]. However, the richness of the family in Grão-Mogol and Diamantina Plateau has increased significantly with 46 new species being described in the last 10 years (Supplementary file). Furthermore, floristic studies have contributed to the review of species occurrence and diversity within the provinces [e.g., Candido 2005; Martins et al. 2009; Araújo 2013; Paranhos 2020].

During a floristic study focused on Melastomataceae from Biribiri State Park, in the state of Minas Gerais (Araújo 2013), an enigmatic species of *Pleroma* was found, but initially identified as *Pleroma formosum* (Cogn.) P.J.F.Guim. & Michelang. When we examined specimens more closely, we confirm that it is a new species endemic to the Southern Espinhaço, occurring in the Diamantina Plateau and Grão-Mogol districts, Minas Gerais, Brazil. We here describe, illustrate and compare this new species to morphologically similar species. In addition, notes on its geographic distribution and conservation status, photos of living specimens, and scanning electron microscopy (SEM) images are provided.

**MATERIALS & METHODS**

Beentje (2016) was adopted for general morphological terminology. We emphasize that the term trichome barbellate is adopted here following Beentje (2016), but in Wurdack (1986) this same trichome is described as “elongated moderately roughened hairs”. The stamen dimetristism index (SDI) was used to measure to the difference (or not) in the length between the antesepalous and antepetalous stamens (Melo et al. 2021). The morphological characteristics of the species that are compared to the new species were obtained from Guimarães (1997, 2022) and personal observations by the same author. The herbaria acronyms follow Index Herbariorum (Thiers 2022). The SEM images are based on herbarium specimens and taken with a EVO* 10 Zeiss microscope. The geographic distribution map was prepared using ArcGIS 10.5 (https://www.arcgis.com/features/index.html). The conservation status follows IUCN (2012, 2022) guidelines and criteria. The area of occupancy (AOO) and extent of occurrence (EOO) were calculated using the software GeoCAT (Bachman et al. 2011), with a user-defined cell width of 2 km.

**TAXONOMIC TREATMENT**

*Pleroma barbellatum* P.J.F.Guim., D.Nunes & I.M.Araújo, sp. nov. (Figures 1, 2, and 3).


**Diagnosis**

A shrub or tree 1–2 m or 2–3 m tall, is readily recognized by its barbellate and eglandular trichomes (on the branches, petioles, leaf blade surfaces, pedicels, bracts and bracteoles, hypanthia, outer surface and margins of sepals, and base of style), oblong, elliptic or lanceolate leaf blades 15–44 × 6.5–13.5 mm, with strigose indumentum on the adaxial surface, and obtuse, rounded or cuneate base, terminal cyme inflorescences 3–5 cm long with up to 5 flowers or flowers solitary and terminal, campanulate hypanthia covered by a strigose bristly indumentum, and ensiform sepals 4–6 × 1.5–2.5 mm. *Pleroma barbellatum* is similar to *Pleroma formosum* (Cogn.) P.J.F.Guim.
& Michelang., but is readily distinguished by shorter leaf blades 15–44 mm long (versus 40–55 mm long in *P. formosa*), cyme inflorescences (vs. thyrsoids), 1–5 flowers per inflorescence (vs. 35–58 flowers per inflorescence), bracteoles 10–17.5 × 6.5–10 mm (vs. 4–6 × 1.4–2 mm), sepals 4–6 mm long (vs. 2.5–2 mm long).

**Description**

Shrub 1–2 m tall or treelet 2–3 m tall, with branching bi- or trichotomic; branches covered by a strigose indumentum of barbellate trichomes 0.3–0.8 mm long, eglandular, brownish yellow; internodes 5–13 mm long; distal branches quadrangular, light green, beige or brownish yellow; proximal branches circular, grey or dark greish brown, sometimes with galls in the dichotomy (see Figure 3D). Leaves decussate, isomorphic in size per node, chartaceous, petiolate; hypostomatic; covered by a strigose indumentum of trichomes that are thick and stiff adaxially and pilose with trichomes covered by a strigose indumentum of trichomes that size per node, chartaceous, petiolate; hypostomatic; petiole flat, ca. 1 mm long; bracteoles brous or with sparse barbellate trichomes 0.3–0.5 mm long, eglandular, brownish yellow (when dry), the glands inconspicuous; sepals 5, obovoid, 11–17 × 6–8 mm, purple, the margins ciliate, white, trichomes capitateglandular, 0.3–0.8 mm long, apex rounded, inner and outer surfaces glabrous; stamens 10, isomorphic or subdimetric in length (SDI = 0.07–0.15), subisomorphic, filaments filiform, erect, lilac with a white base, indumentum pilose from base to ½ of the total length, white, trichomes capitateglandular, appendages ventrally bituberculate, glabrous, lilac, dorsal appendages absent or present, when present calcarate, ca. 0.1 × 0.1 mm, glabrous, pedoconnectives slightly curved, lilac with a white base, anthers oblong, slightly curved, ventral surface rugulose, apex attenuate with a small ventral pore, purple or lilac with white apex; antesepalous stamens (larger) 5, 17–28 mm long, filaments 9–13 mm long, trichomes 0.3–2 mm long, ventral appendages 0.2–0.3 × 0.2–0.3 mm, pedoconnectives 1–3 mm long, anthers 7–12 mm long; antepetalous stamens (smaller) 5, 14.8–20.5 mm long, filaments 7.5–10 mm long, trichomes 0.3–0.5(–1) mm long, ventral appendages ca. 0.2 × 0.2 mm, pedoconnectives 0.3–0.5 mm long, anthers 7–10 mm long; ovary ovoid, 4–5.5 × 2.5–3 mm, light green, apical half with a puberulous indumentum of eglandular trichomes 0.5–1 mm long, 5-loccular, pluriovulate, axile placentation; style filiform, ca. 15 mm long, straight or sigmoid, terete, glabrous or subglabrous with barbellate trichomes, erect and terete, purple or lilac with a white apex, stigma punctiform, white. Fruit a loculicidal capsule covered by the persistent globose hypanthium, capsule ovoid, ca. 6.2 × 4 mm, brownish, 5-loccular; seeds elongate-cochlate, ca. 1 × 0.5 mm, brownish, testa tuberculate, cells of testa isodiametric; hilum terminal and elongate.
Figure 1. *Pleroma barbellatum* P.J.F.Guim., D.Nunes & I.M.Araújo. (a) Flowering branch. (b) Barbellate trichomes on the branch. (c) Floral bud. (d) Outer surface of bracteole. (e) Inner surface of bracteole. (f) Flower with petals removed. (g) Petal. (h) Antesepalous stamen. (i) Detail of the trichomes on the filament. (j) Anther apex. (k) Flower in longitudinal section. From *W.R. Anderson et al. 35497* (at RB).
Etymology

The specific epithet, *barbellatum*, refers to short- ly barbed trichomes (see Beentje 2016) that are easily observed on branches, leaves, pedicels, bracts and brac - teoles, hypanthia, outer surface and margins of sepals, and base of the style (see Figures 1B and 2).

Distribution and habitat

*Pleroma barbellatum* is endemic to the state of Minas Gerais, Brazil, where it occurs mainly in the Espinhaço Range, between 950–1400 m elevation around the city of Diamantina, including Datas, Go - veia and São Gonçalo do Rio Preto. It also occurs fur - ther north in Grão-Mogol, about 200 km away from Diamantina (Figure 4). Outside the Espinhaço Range towards southwest, *P. barbellatum* was also been col - lected in São Gonçalo do Abaeté, about 250 km away from Diamantina (Figure 4). This species has been found in the Cerrado, in campos rupestres, on steep rocky slopes with extensive outcrops (Figures 3A and 3B), as well as along the borders of gallery forests, preferably in sandy or fine gravel soils.

Conservation status

Based on distributional data of *Pleroma barbellatum*, the AOO is restricted to 68 km² and the AOO is equal to 34,283 km². To date, the species has only been collected in campos rupestres, especially along the southern por - tion of the Espinhaço Range (Figure 4), which is threat - ened by activities such as mining, fires, and agricultural activities (Verdi et al. 2015). *Pleroma barbellatum* occurs only in one Conservation Unit (UC), the Biribiri State Park. Even within the limits of this UC, its long-term survival is directly affected by the degradation of natural resources, areas of swidden and pasture, mineral extrac - tion, damming of streams, accumulation of garbage, bushfires, transmission lines, exotic vegetation, excessive trails and disorderly tourism (STCP Engenharia de Pro - jetos 2004). In view of this panorama, we recommend a conservation status of Endangered [EN B2b(iv)].

**Additional specimens examined (Paratypes)**

Figure 2. Images of *Pleroma barbellatum* P.J.F.Guim., D.Nunes & L.M.Araújo. SEM: (a) Adaxial leaf surface [bar = 300 µm]. (b) Adaxial leaf surface [bar = 1 mm]. (c) Adaxial leaf surface [bar = 100 µm]. (d) Abaxial leaf surface [bar = 20 µm]. Macro photography: (e) Floral bud [bar = 3.5 mm]. (f) Hypanthium with barbellate trichomes and capitate-glandular trichomes at red arrows [bar = 0.25 mm]. A–D: From W.R. Anderson et al. 35497 (at RB); E–F: From A.C. Brade 13756 (at RB).
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P.E. Biribiri, Salto do Mocotó, próximo ao Rio do Biribi, 18°08’38.8”S, 43°36’44.5”W, 1065 m, 13 Mar. 2012 (fl., fr.), I.M. Araújo et al. 239 (HUFU! barcode HUFU00067346, RB! barcode 01460890); Parque Estadual do Biribiri, 18°11’24”S, 43°37’36”W, 1108 m, 18 May 2011 (fl.), I.M. Araújo et al. 91 (HUFU! barcode HUFU00067344, RB! barcode 01460881); Parque Estadual do Biribiri, 18°12’59”S, 43°37’24.4”W, 1172 m, 21 Sep. 2010 (fr.), A.R. Rezende et al. 45 (HUFU! barcode HUFU00067349, RB! barcode 01460893); estrada

**Figure 3.** Environments and living specimens of *Pleroma barbellatum* P.J.F. Guim., D.Nunes & I.M. Araújo. (a) Rocky outcrop of campo rupestrin Biribiri State Park. (b) Steep rocky slopes with extensive outcrops in Biribiri State Park. (c) Flower. (d) Leaf blades and gall. (e) Detail of bracts. (f) Fruits. Living specimens from I.M. Araújo et al. 261. Photos: I.M. Araújo.
para Biribiri, ca. 4 km aquém de Biribiri, 18°10'13.3"S, 43°36'53.8"W, 950 m, 23 Jan. 2007 (bud, fl.), J.R. Pirani et al. 5690 (K! barcode K001072465, HUFU! barcode HUFU00067347, SPF! barcode SPF00179063); estrada vicinal entre Sopa e São João da Chapada, sentido Diamantina - São João da Chapada, 18°11'57"S, 43°42'11"W, 1304 m, 07 Feb. 2015 (bud, fl., fr.), C.N. Fraga et al. 3633 (MBML! barcode MBML00038817, NY! barcode 00941882, UB! barcode UB0120839, US! barcode 01906484); Serra do Espinhaço, ca. 20 km S.W. of Diamantina, 1200 m, 20 Jan. 1969 (bud, fl.), H.S. Irwin et al. 22307 (CAS herbarium number 573142, NY! barcode 00941882, UB! barcode UB0120840, US! barcode 01906487); Serra do Espinhaço, ca. 20 km S.W. of Diamantina, 1300 m, 21 Jan. 1969 (bud, fl.), H.S. Irwin et al. 22397 (NY! barcode 00941883, UB! barcode UB0120841, US! barcode 01906486); Serra do Mendanha, 28 Nov. 1937, (bud, fl.), Mello Barreto 10058 (HB! herbarium number 24879 [2 sheets], Jardim Botânico de Belo Horizonte [not found at BHCB] herbarium number 23098, RB! barcode 00231478); s.l., 1400 m, Jun. 1934 (bud, fl.), A.C. Brade 13756 (RB! barcode 00231052); s.l., 17 Jan. 1947 (bud, fl.), D. Romariz 0118 (RB! barcode 00231689); Gouveia, Contagem, vale do Ribeirão da Contagem ao longo da estrada para Prata, a ca 4 km E da BR-259 (Rod. Gouveia-Curvelo), 18°36’51”S, 43°53’07”W, 1108 m, 22 Jan. 2004 (bud, fl.), J.R. Pirani et al. 5235 (K! barcode K001072464, SPF! barcode SPF00168490); Grão-Mogol, Torre Telemig, 1000 m, 12 Jun. 1990 (fl., fr.), G. Hatschbach et al. 54175 (MBML! herbarium number 137956, US! barcode 01906482); São

Table 1. Main characters that distinguish *Pleroma barbellatum* P.J.F.Guim., D.Nunes & I.M.Araújo and relative species.

<table>
<thead>
<tr>
<th>Character</th>
<th><em>P. barbellatum</em></th>
<th><em>P. formosum</em></th>
<th><em>P. martiale</em></th>
<th><em>P. riedelianum</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Trichome surface on branches, both sides of leaf blade and inflorescence</td>
<td>Barbellate</td>
<td>Barbellate</td>
<td>Smooth</td>
<td>Smooth</td>
</tr>
<tr>
<td>Inflorescence</td>
<td>Cyme</td>
<td>Thyroid</td>
<td>Dichasium or Thyroid</td>
<td>Cyme</td>
</tr>
<tr>
<td>Number of flowers per inflorescence</td>
<td>Solitary or up to 5</td>
<td>35–58</td>
<td>3 or 7–19</td>
<td>Solitary or up to 5</td>
</tr>
<tr>
<td>Bracteoles (mm)</td>
<td>10–17.5 × 6.5–10</td>
<td>4–6 × 1.4–2</td>
<td>3–5 × 1.5–2</td>
<td>6–8 × 3–5</td>
</tr>
<tr>
<td>Sepal length (mm)</td>
<td>4–6</td>
<td>2.5–2</td>
<td>ca. 4</td>
<td>ca. 4</td>
</tr>
</tbody>
</table>

Figure 4. Map showing the geographical distribution of *Pleroma barbellatum* P.J.F.Guim., D.Nunes & I.M.Araújo (black triangles).
A new species of *Pleroma* (Melastomataceae) from the Southern Espinhaço, Minas Gerais, Brazil


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