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A new species of *Pleroma* (Melastomataceae) from Mantiqueira Range, Minas

Gerais State, Brazil¹

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Título resumido: A new species of *Pleroma* (Melastomataceae) from Minas Gerais State.

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ABSTRACT – (A new species of *Pleroma* (Melastomataceae) from Mantiqueira Range, Minas Gerais State, Brazil). *Pleroma eglanduliferum*, Justino & P.J.F. Guim. *sp. nov.* a new species of Melastomataceae (Melastomateae) from the Atlantic Forest of Minas Gerais State, Brazil, is described and illustrated, with their affinities and diagnostic characters discussed. *Pleroma eglanduliferum* is closely related to *P. heteromallum* (D. Don) D. Don and *P. tedescoi* Meirelles, L. Kollmann & R. Goldenb.) P.J.F. Guim. & Michelang. by plant architecture, with quadrangular branches and similar leaf in shape and indument. However, they can be distinguished by the variation in the stamens morphology and sizes of bracteoles. *Pleroma eglanduliferum* must be included in Critically Endangered category, since it is known only from one population, in a restricted area.

Keywords: conservation, Melastomateae, Serra Negra, taxonomy, *Tibouchina*

RESUMO – (Uma nova espécie de *Pleroma* (Melastomataceae) da Serra da Mantiqueira, MG, Brasil). *Pleroma eglanduliferum* Justino & P.J.F. Guim. *sp. nov.*, uma nova espécie da Mata Atlântica do Estado de Minas Gerais é descrita e ilustrada, com suas afinidades e caracteres diagnósticos discutidos. *Pleroma eglanduliferum* é semelhante a *P. heteromallum* (D. Don) D. Don e *P. tedescoi* (Meirelles, L.Kollmann & R.Goldenb.) P.J.F.Guim. & Michelang. pela arquitetura da planta com ramos quadrangulares e no formato, e indumento das folhas. No entanto, podem ser diferenciadas pela morfologia dos estames e tamanho das bratéolas. *Pleroma eglanduliferum* deve ser incluída na categoria Criticamente Ameaçada, já que possui apenas uma população conhecida para uma área restrita.

Palavras-chave: conservação, Melastomateae, Serra Negra, taxonomia, *Tibouchina*.

Introduction

The Mantiqueira Range region is one of the most important orographic groups in Brazilian southeast, covering part of the States of Minas Gerais, São Paulo and Rio de Janeiro, and sheltering 20% of the remnants of the Atlantic Forest of Minas Gerais (Costa and Hermann 2006).

This mountain chain consists of a mosaic of environments of grassland and forest vegetation with high biological diversity and great occurrence of endemisms, a condition normally registered in tropical montane environments (Martinelli 2007, Salimena et al. 2013). The Serra Negra region, in the southern Minas Gerais, between the municipalities of Lima Duarte, Rio Preto, Santa Bárbara do Monte Verde and Olaria, is composed of vegetation characterized by forests and grassland, especially cloud forests and “campos rupestres” (rocky grasslands), occurring at altitudes between 1.300 to 1.700 m (Salimena et al. 2013). In addition, the region is notable for integrating the southeastern corridor of the Mantiqueira Complex, which is formed by remnants of primary vegetation with a high degree of connectivity between them (Salimena et al. 2013).

Among the most representative botanical families of the Atlantic Domain, the Melastomataceae stands out, with a total of 510 taxa (Flora do Brasil 2020). *Pleroma* D. Don is a genus of Melastomataceae with about 160 species with Neotropical distribution, found mainly in areas of Atlantic Forest and Cerrado domains, rarely in the Caatinga (Guimarães et al. 2019). Only five species reach the northwest and west of South America (Freitas et al. 2013; Fraga and Guimarães 2014, Oliveira et al. 2014, Guimarães et al. 2019). The group was traditionally treated as a synonym with of genus *Tibouchina* Aublet sensu Cogniaux (1885, 1891). *Tibouchina* was fragmented into four well-supported genera by morphological, molecular and geographic distribution characteristics (Michelangeli et al. 2013, Guimarães et al. 2019), being *Tibouchina* s.s.,

limited to only 35 taxa with distribution restricted to Cerrado environments (Silva et al. 2014, Guimarães 2014, Guimarães et al. 2019). The *Tibouchina* species found in eastern Brazil was transferred to two distinct groups, *Pleroma* and *Chaetogastra* DC. (Guimarães et al. 2019).

The taxa inserted in *Pleroma* are characterized by the deciduous sepals in the fruits, hypanthium without scale-like trichomes, stamens with anthers from purple to lilac (rarely cream or white), pedoconnective well developed below the thecae and filaments usually covered by setose or glandular trichomes. They occur in diverse environments, found from forest areas, fields of altitudes and rock fields, to shrub-tree restinga formations (Fraga and Guimarães 2014, Guimarães and Freitas 2015). In the floristic survey carried out in Serra Negra we found three species of *Chaetogastra* and ten species of *Pleroma* (Justino 2016), one of which is a new species described here.

Materials and methods

For this work, collections deposited at the CESJ herbarium (acronyms according Thiers 2020) were consulted. These specimens were compared, and had their macro and micro-morphological characters, geographical and ecological information analyzed. This taxonomic treatment was carried out according to the last phylogenetic of tribe Melastomateae (Michelangeli et al. 2013, Guimarães et al. 2019). We used taxonomic keys provided by Silva et al. (2014) and Guimarães and Silva (2014) to distinguish species of *Tibouchina* s.s. and allied genera from Brazil. The map was elaborated using ArcGIS software 9.3 (ESRI 2008). The conservation assessments follow criteria from International Union of Conservation of Nature (IUCN 2019).

Taxonomic treatment

Pleroma eglanduliferum Justino & P.J.F. Guim. *sp. nov.*- Type: Brazil. Minas Gerais: Rio Preto. Serra Negra, trail for the Burro de Ouro, 21° 58'11"S; 43°53'21"W, 1,400 m elev., 25 February 2015, fl., *L.L. Justino, J.H.C. Ribeiro, M.C.A. Mota, J.F.B. Pastore* 134 (holotype: CESJ; isotype: RB). (figures 1, 2)

Diagnosis: *Pleroma eglanduliferum* can be distinguished by its larger bracteoles with 7-11 × 3-7 mm, larger than hypanthia 4-5 × ca. 3 mm, which is covered with strigose eglandular trichomes, and dimorphic stamens with connective glabrous throughout, including appendages.

Shrubs 1-1.5 m tall. Young branches, petioles, inflorescences, hypanthia, sepals covered with strigose eglandular trichomes; stems and young branches 4-angled. Leaves chartaceous; petioles 3-7 mm long; blades 0.8-4.5 × 0.5-3.2 cm, ovate, base subcordate, apex obtuse, margins entire, ciliate, adaxial surface strigose-sericeous, abaxial surface velutinous, with hispidulous-sericeous trichomes above the midrib and lateral veins, 5-veined, with a thinner pair of main veins just inside the leaf margin, all nerves confluent at the base of blade. Thyrsus 5.5-11.5 cm long; bracteoles 7-11 × 3-7 mm, caducous at anthesis, lanceolate, concave, apex acute, adaxial surface glabrous, abaxial surface strigose. Flowers 5-merous; pedicellate, pedicels 1-3 mm; hypanthia 4-5 × ca. 3 mm, campanulate; sepals 1-2 × 3-5 mm, lanceolate, apex acute, margins ciliate, caducous in fruit; petals 1.8-2 × 1.9-2.2 cm, obovate, apex truncate, margin shortly ciliate, purple and white at the base, changing to red later; stamens 10, dimorphic, filaments covered with glandular trichomes, anthers subulate, with the apical pore 0.1 mm diam, pedoconnective prolonged ca. 1 mm, appendages 0.2-0.5 mm, bilobed, glabrous; antesealous with filaments 6-7 mm long, anthers 5-6 mm long, magenta; antepetalous with filaments 4-5 mm long, anthers ca. 4 mm long, white; ovary ca. 4 × 3 mm, 2/3 fused to the hypanthium, apex free, apical portion densely covered with setoso-

glandular trichomes; style ca. 4 mm long, sparsely setose. Capsule $4\text{-}5 \times 4\text{-}4.5$ mm, globose; seeds ca. 1×0.5 mm, cochleate, testa tuberculate.

Etymology - The epithet refers to the absence of glands over the stamen connective, including appendices of both whorles.

Habitat and distribution - *Pleroma eglanduliferum* is endemic to the State of Minas Gerais, Brazil, known only in the country of Rio Preto (figure 3). This region is characterized by rocky fields on sandy soil with outcrops, which rise more or less abruptly above the surrounding landscape dominated by the Atlantic Rain Forest. The habitat of *P. eglanduliferum* is characterized by rather sparse herbaceous and shrubby vegetation, growing on rocky outcrop with high solar incidence during the day (figure 2).

Conservation status - Following IUCN (2019) criteria B2a and D, we propose this specie to treated as ‘Critically Endangered’ (CR), since it is known only from one population, in a restricted area, despite the fact that this one population is located within a protected area (Minas Gerais 2018). This status is also given because the region is prone to the effects of human activity (*Pinus* and *Eucalyptus* planting, real-estate speculation, disorganized visitation, illegal collection of plant and grazing). We hope that the risks will be controlled and that the level of threat will decrease with the recent legalization of the area as a conservation unit. However, futher field studies are required to identify patterns, population size and threats, since the species was only found within the limits of the Parque Estadual da Serra Negra da Mantiqueira.

Notes - *Pleroma heteromallum* (D. Don) D. Don and *Pleroma tedescoi* (Meirelles, L.Kollmann & R.Goldenb.) P.J.F.Guim. & Michelang. are closely related by plant architecture, with quadrangular branches, similar leaf shape and indument, thysoid inflorescences, 5-merous flowers, purple petals and stamens with glandular trichomes

on their filaments. It is also important to highlight that all the three species share similar habitat growing on rocky outcrops. However, *P. heteromallum* can be distinguished from *P. eglanduliferum* by the presence of glandular trichomes in the pedoconnective of the antisepalous stamens, and bracteoles slightly smaller than the hypanthium. In addition, *P. tedescoi* can also be distinguished from *P. eglanduliferum* in having hypanthia covered with glandular trichomes, isomorphic stamens between the whorle, and bracteoles slightly smaller than the hypanthia.

Pleroma heteromallum has a wide distribution occurring in the southeastern and northeastern regions of Brazil and less frequently in the western center of the country (Guimarães 1997). In the State of Minas Gerais, *P. heteromallum* is registered to 700-1700 meters of elevation (Guimarães 1997). *Pleroma tedescoi*, on the other hand, occurs only in Espírito Santo State, to 1700-1800 meters of elevation (Meirelles et al. 2012). The summary and main characters comparison is presented in Table 1.

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Author Contributions

Luciana Leitão Justino: Substantial contribution in the concept and design of the study; Contribution to data collection; Contribution to data analysis and interpretation, Contribution to manuscript preparation.

Paulo José Fernandes Guimarães: Substantial Contribution in the concept of manuscript preparation; Contribution to data analysis and interpretation; Contribution to critical revision, adding intellectual content.

Berenice Chiavegatto Campos: Contribution to critical revision, adding intellectual content.

Fátima Regina Gonçalves Salimena: Contribution to data collection; Contribution to critical revision, adding intellectual content.

Conflicts of interest

There is no conflict of interest.

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Table 1. Morphological comparison between *Pleroma eglanduliferum* Justino & P.J.F. Guimarães, *P. heteromallum* (D. Don) D. Don and *Pleroma tedescoi* (Meirelles, L.Kollmann & R.Goldenb.) P.J.F.Guim. & Michelang.

Characters	<i>P. eglanduliferum</i>	<i>P. heteromallum</i>	<i>P. tedescoi</i>
Plant height (m)	0.7-2	0.7-2	1-1.5
Petiole (mm)	3-7	30-66	5-24
Leaf dimensions (length×width) (cm)	0.8-4.5 × 0.5-3.2	12.5-21 × 8.5-15	1.8-8.7 × 1.3-6
Bracteoles dimensions (length×width) (mm)	7-11 × 3-7	3-4 × 2-2.5	4.7-7.2 × ca. 1.8
Hypanthia dimensions (length×width) (mm)	4-5 × 3	4-5 × 3	6.2-8.5 x ca. 5
Stamens size, difference between whorls	dimorphic	dimorphic	isomorphic
Stamens connectives, indumentum	glabrous	glandular	glabrous
Distribution in Brazil	Minas Gerais State	wide distribution	Espírito Santo State

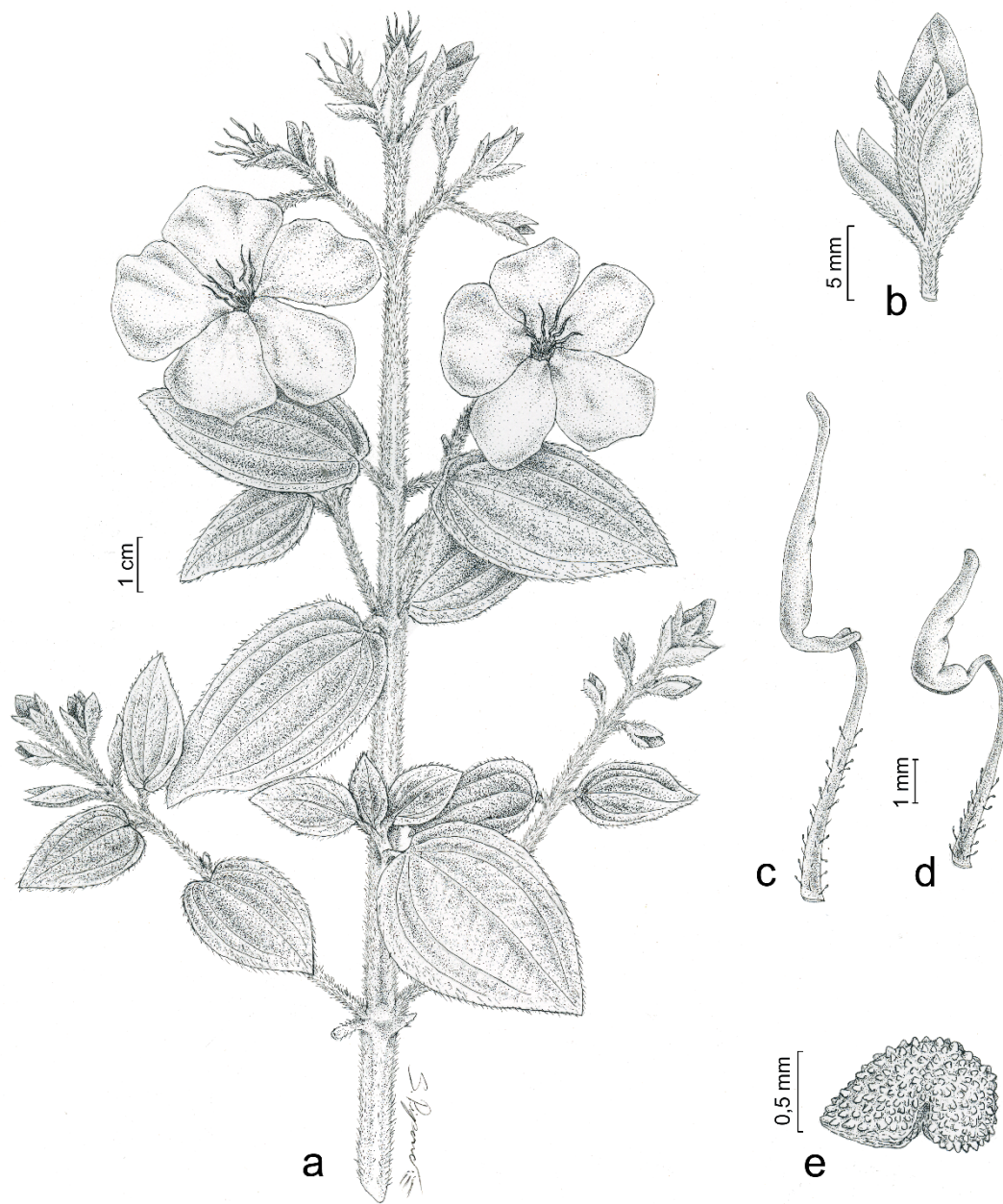


Figure 1. *Pleroma eglanduliferum* Justino & P.J.F. Guim. a. Flowering branches. b. Incomplete dichasium with two bracts and one lateral bud. c. Antesepalous stamen (lateral view). d. Antepetalous stamen (lateral view). e. Seed. Voucher: *Justino et al.* 134.



Figure 2. *Pleroma eglanduliferum* Justino & P.J.F. Guim., sp. nov. a. Flowering branches; b. Habitat in rocky fields on a soil with outcrops.

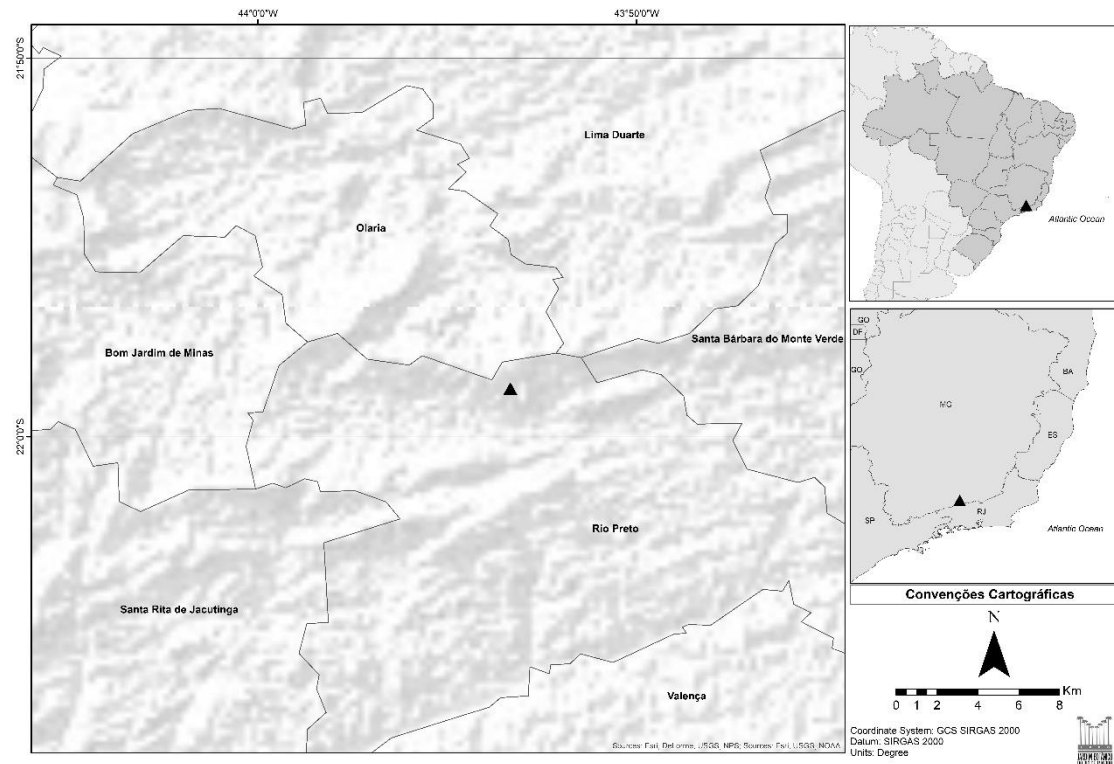


Figure 3. Map showing the geographical distribution of *Pleroma eglanduliferum* Justino & P.J.F. Guimarães in the municipality of Rio Preto, Minas Gerais State, Brazil (black triangles).

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