

Begonia tessellata (Begoniaceae) a new species from the Colombian eastern Cordillera

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Abstract

A new endemic species of *Begonia* section *Casparya*, *Begonia tessellata*, is described and illustrated. This new species has only been recorded in a high-mountain forest dominated by *Quercus humboldtii* in the Department of Santander (Colombia). The novelty is recognised because the stamens are closely packed forming a globular structure, having an externally tessellated appearance. A preliminary Red List assessment of the new species suggests that it is Data Deficient (DD) due to limited information on habitat changes in the region; however, conservation recommendations are provided.

Keywords Andean flora · *Casparya* · Colombian Cordillera Oriental · endemism · Santander department · Málaga

Introduction

Begonia L. is one of the most species-rich genera of angiosperms, including 2,144 species and 70 sections currently recognized (WFO, 2024; Moonlight et al., 2018, Moonlight et al., 2024). The Northern Andes is one of the centres of diversity for the genus, with Sections *Ruizopavonia* and *Casparya* being the most diverse sections in the region. Section *Casparya* is distinguished from other sections because of the form of the fruits, which have no lateral

wings as in most *Begonia* species, but instead have three horn-like extensions diverging from the carpelar zone, each opening on the proximal zone, instead of longitudinally through each locule as in other species of the genus. Section *Casparya* includes 51 currently recognized species, 33 of which are native to Colombia, of which 18 species are found in the Colombian Cordillera Oriental, encompassing the Serranía del Perijá range.

During systematic studies on Andean begonias, a morphologically distinctive species was discovered in the eastern cordillera of Colombia, specifically in the Department of Santander. This new species, named *Begonia tessellata*, stands out notably within its section due to unique features of the androecium. In this study, we provide a detailed description and illustration of *B. tessellata* along with insights into its habitat, conservation status, and possible affinity within section *Casparya*.

Materials & Methods

Measurements and observations were made on dry specimens and spirit-preserved samples of flowers and fruits. A conventional ruler was used for measurements longer than one cm, and a calliper with a precision of 0.1 mm was used for shorter measurements. Botanical terminology follows Harris & Harris (1994) and Font Quer (2001).

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Results & Discussion

The fruit morphology of the newly discovered species aligns it with the section *Casparya*, but the configuration of its androecium distinguishes it from other members within this section. The androecium exhibits a distinctive globular shape, characterized by a central column bearing numerous stamens, with short and truncate anthers

(Fig. 1E). This unique floral feature has not been documented in any other known species within the section. The newly discovered species is likely closely related to members of Section *Casparya* found in the northern region of the Colombian Cordillera Oriental, likely falling within clade II as defined by Jara-Muñoz et al. (2019). Compared to species in this clade, *B. tessellata* shares unisexual inflorescences and a short to absent apical column in fruit, but

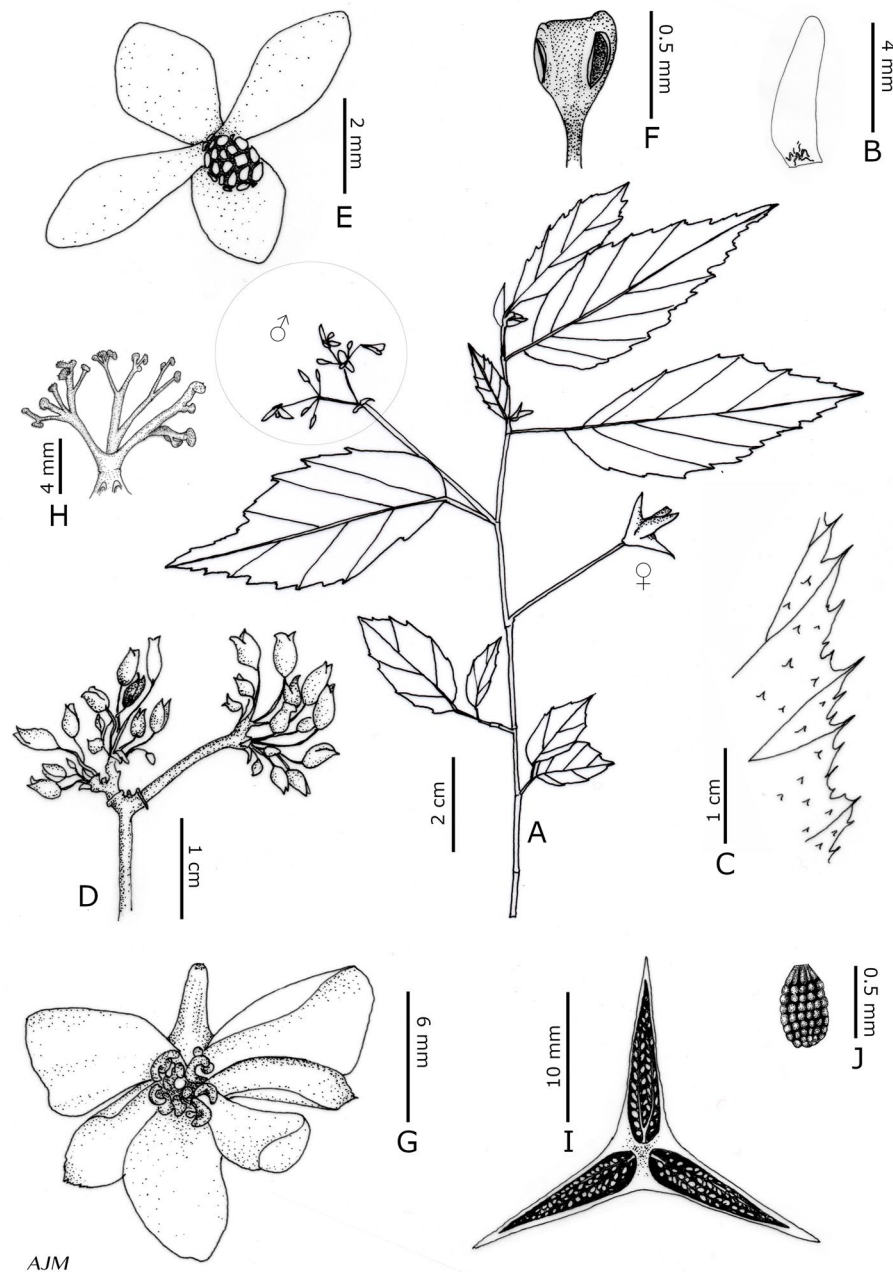


Fig. 1. *Begonia tessellata*. **A.** Habit, including pistillate inflorescence and immature fruit. **B.** Stipule. **C.** Leaf margin. **D.** Inflorescence. **E.** Male flower. **F.** Stamen. **G.** Female flower. **H.** Styles. **I.** Cross section of the fruit. **J.** Side view of the seed. (From the holotype, drawn by A. Jara).

can be distinguished through the characters indicated in the diagnosis (see also Table 1).

This new taxonomic finding in section *Casparya*, in a region with a long history of human population and strong transformation of the landscape, highlights the imperative to continue exploration efforts in the northern Andean region, particularly in the Colombian Cordillera Oriental. Among the endemic taxa of the region are two species of Lamiaceae: *Salvia guaneorum* Fern.Alonso (Fernández-Alonso, 2014) and *Condea jacobi* (Fern.Alonso) Harley & J.F.B.Pastore (Fernández Alonso, 2010), and three species of Orchidaceae: *Specklinia tenax* (Luer & R. Escobar) Pridgeon & M.W. Chase, *Lepanthes cocculifera* Luer & R. Escobar, and a new species recently found of *Lepanthes* which is in process of description (pers. com.).

Taxonomic Treatment

***Begonia tessellata* Jara & H.Caro, sp. nov.** (sect. *Casparya*).
TYPE: Colombia: Santander, Málaga, vereda Pescaderito, lat. 6.7329°, lon. -72.7561°, 3,029 m, 22 Jul 2022, H. Caro & S. Arango 198 (holotype: COL 636116 (♂ fl. [!]; isotype: MO (♂ ♀ fl. [!])). Figs. 1–2.

Diagnosis. *Begonia tessellata* can be distinguished from the other species in the *Begonia* sect. *Casparya* having white flowers and separate male and female inflorescences due to the following characters: (1) presence of a long apical column in the fruit (vs. a very short or absent apical appendix), (2) anthers obdeltoid (vs. oblong or linear-oblong), and (3) androecium globular, with the expanded apex of the anthers forming a tessellated pattern (vs. stamens separate or connivent but not forming a globular structure).

Description. Caulescent monoecious herb, to 1 m high. Stems erect, red in the nodes with internodes green, or completely red; internodes to 5.6 cm long, to 4 mm thick, glabrous. Stipules sub-persistent, ovate, 2.6–8.2 × 1.1–3.5 mm, apex obtuse, setulose, pale green, with scattered indumentum along the midvein abaxially, margin entire. Leaves straight to the petiole; petiole 4–18 mm long, red, glabrous; leaf blade

asymmetric, ovate or elliptic or lanceolate, rarely sub-oblong, 1.1–7.3 × 1.5–2.9 cm, membranous, apex acuminate, base unequal, rounded on one side, acute on the other side, margin doubly-serrate, ciliate, upper surface dark green, sparsely pilose between secondary veins, lower surface pale green, pilose on the veins, veins pinnate, 5–7 veined pairs from the base, slightly impressed above side. Inflorescence unisexual in monoecious plants; male inflorescence axillary, erect, once divided, ending in two or four umbel-like cincinnii, bearing up to 16 flowers each one; peduncle to 37 mm long, glabrous, bracts deciduous (not seen), separate 2–5 mm each other. Male flowers: pedicels 3.5–6 mm long, glabrous; tepals 4, spreading, outer 2 elliptic to slightly obovate, 5–6 × 3.1–3.4 mm, apex rounded, white, glabrous, margin entire, inner 2, obovate, ca. 9 × 3 mm, apex rounded, white, glabrous, margin entire; stamens ca. 30, grouped forming a globular structure ca. 2.5 × 2 mm, on a ca. 0.7 mm long axis, filaments 0.4–0.7 mm long, anthers obdeltoid with the apex expanded, ca. 0.5 × 0.5 mm, dehiscence thought a longitudinal line, introrse, connectives not produced. Female inflorescence, axillary solitary flowers; peduncle to 33 mm long. Female flowers: pedicels to 6 mm long; bracteoles 2, just below the ovary, falling early; ovary obdeltoid, ca. 8 × 13 mm, glabrous, equally 3-horned, horns slightly curved upward; placenta branches bifid, bearing ovules on both surfaces; tepals 6, spreading, mostly white with the apex greenish, glabrous, the largest obovate, ca. 13 × 9 mm, apex rounded sometimes with some small teeth, margin entire, the smallest, ca. 10 × 3.5 mm, apex obtuse, white, glabrous, margin entire or short ciliate apically; styles 3 slightly basally fused, 2–3 times branched, yellow, ca. 7 mm long, stigma at the end of each stylar branch, clavate or capitate. Fruit a capsule, body and horns same shape as in the ovary, to 11 × 26 mm, apical column ca. 7 mm. Seed ellipsoid with the micropylar end flattened, ca. 0.7 × 0.4 mm, with a clear line of collar cells, slightly longer than the other testa cells.

Floral formula: ♂ P⁺ 2 + 2 A* ∞ G 0, ♀ P 3+2 +1 A ∞ G (3) Vp∞.

Additional Specimens Examined. COLOMBIA. Santander: Málaga, vereda Pescaderito, lat. 6.7329, lon. -72.7561, 3,029 m, 20 Jul 2022 (♂ ♀ fl.), H. Caro & S. Arango 147 (UIS); ibid., (♂ ♀ fl.), H. Caro & S. Arango 194 (COL). Ibid., 22 Jul 2022 (♂ fl.), H. Caro & S. Arango 196 (JBB);

Table 1. Comparative table with characters to differentiate *Begonia tessellata* from similar species in *Begonia* sect. *Casparya*.

Species	Form of the anthers	Placenta division	Apex of the horns	Column of the fruit long. (vs. horns long.)
<i>B. tessellata</i>	obdeltoid	bifid	acute	shorter
<i>B. diffusa</i>	oblong	simple	acute	sub-equal
<i>B. solaniflora</i>	oblong-lanceolate	simple	acute	shorter
<i>B. ursina</i>	oblong	bifid?	obtuse or truncate	shorter
<i>B. montana</i>	linear-oblong	bifid	apiculate	longer



Fig. 2. *Begonia tessellata*. **A.** Habitat. **B.** Branch with female flowers. **C.** Branch with male flowers. (Photos by Heidy Caro).

ibid., (♂ ♀ fl.), H. Caro & S. Arango 197 (JBB). Ibid., S. Arango & H. Caro 114 (HUA); Santa Bárbara, vereda La Salina, trocha subiendo desde el campamento (lat. 7.0029722, lon. -72.873972) hacia el páramo, 7.005 N, -72.868 W, 3,055 m, 14 Sep 2018, A. Celis *et al.* 93 (FMB, UIS).

Etymology. The specific epithet of *Begonia tessellata* alludes to the tessellated appearance of the androecium. This distinct pattern is created by the closely packed anthers, which are touching each other on the borders and have a broad apex. Notably, this characteristic sets *Begonia tessellata* apart, rendering it unique among all recognized species in *Begonia* sect. *Casparya*.

Distribution & Habitat. *Begonia tessellata* is an endemic species confined to a limited geographic range, currently documented exclusively within the Colombian Cordillera Oriental, specifically in the municipalities of Málaga and Santa Barbara (Santander) (Fig. 3). This species is found in high-elevation mountain forests, typically found at around 3,000 meters above sea level. It is commonly sighted in rocky soils within the remnants of forest ecosystems, where the prevailing oak species is *Quercus humboldtii* Bonpland (Fagaceae). Other frequently occurring species in these ecosystems include *Disterigma*

alaternoides (Kunth) Nied. and *Thibaudia floribunda* Kunth (both Ericaceae), *Oligactis volubilis* (Kunth) Cass. (Asteraceae), *Hedyosmum racemosum* (Ruiz & Pav.) G. Don (Chloranthaceae), and various species of *Clusia* (Clusiaceae).

Oak forests in Colombia, where the new species grows, are primarily dominated by *Quercus humboldtii*, and occasionally by *Colombobalanus excelsa* (Lozano, Hern. Cam. & Henao) Nixon & Crepet. *Quercus humboldtii* is the only species of that genus native to South America, and it is ecologically dominant in some areas of the three cordilleras at elevations ranging from 700 to 3,500 meters, supporting high biodiversity despite its dominance (Avella & Rangel, 2014; see also the secondary references cited therein). However, the conservation status of these forests remains a concern, with nearly a 60% reduction according to Rangel (2005).

Phenology. This species has been documented to flower from October to November and from July to August.

Notes on Conservation. The natural cover of the Colombian high-Andean region is strongly fragmented due to deforestation by the conversion to pasture for livestock,

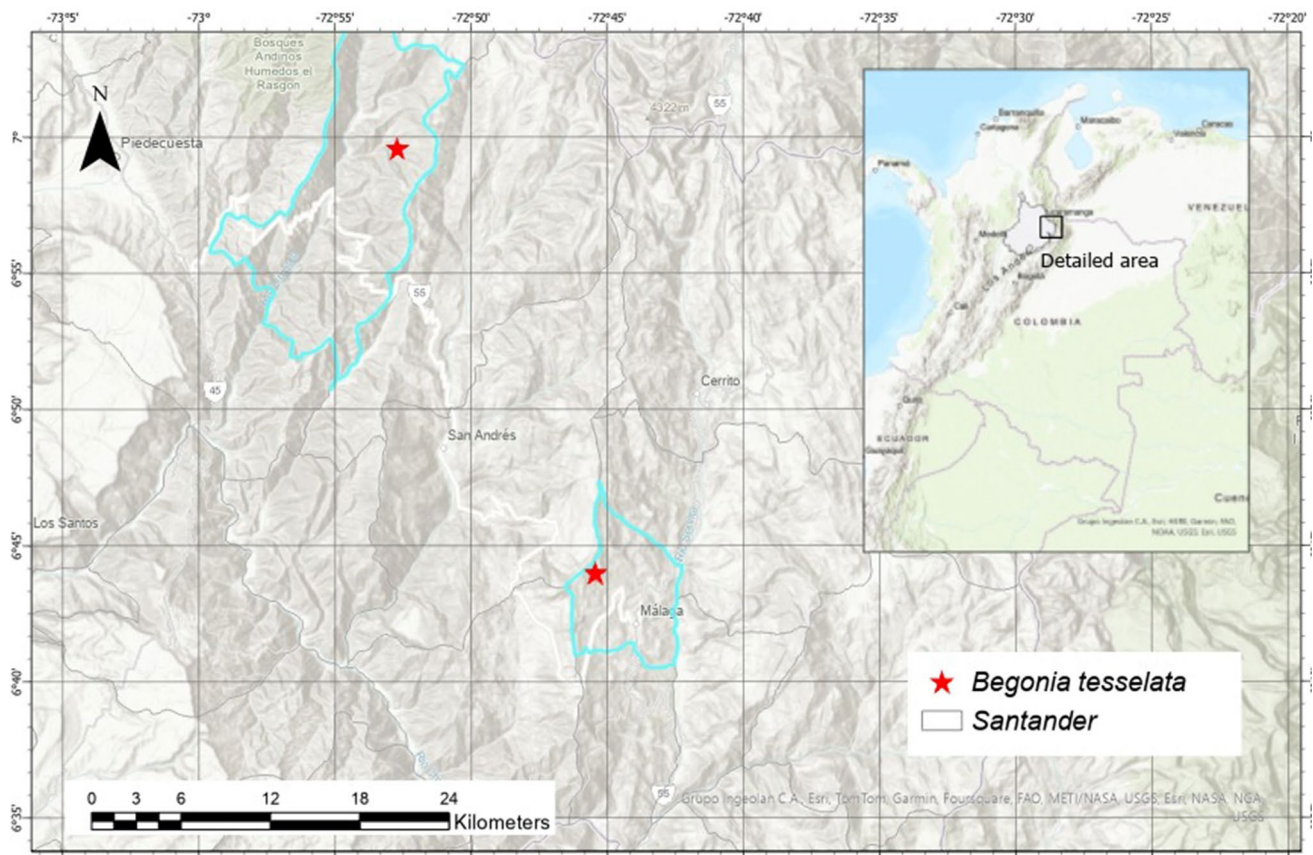


Fig. 3. Geographical distribution of *Begonia tessellata* in Santander Department, Colombia.

crop establishment, and the effects of wildfire (Aguilar-Garavito et al., 2020; Armenteras et al., 2003; Carvajal-Ortiz et al., 2024; Chaves & Arango, 1998; GIDROT, 2011; Etter, 1993). This transformation poses a significant threat to the new species because *Begonia*, particularly species of the section *Casparya*, have stringent habitat requirements and depend on well preserved forests for their survival (Jara-Muñoz & Sánchez, 2019). Although there is no evidence of selective extraction of this species for ornamental or other purposes, it is clear that the herbaceous plants in the oak forests where it is found are highly vulnerable to livestock grazing. In this context, the scarcity of conserved areas in the region is also a factor of concern. In Málaga, for example, there is only one protected area, the La Llanada Natural Reserve of Civil Society, spanning 281 hectares, but the species has not been recorded there. There are only two collection sites for the species in the municipalities of Málaga and Santa Bárbara (Santander department), which are approximately 33 km apart, where it inhabits forest patches. Currently, there is insufficient evidence to evaluate the conservation status of *B. tessellata*, due to limited data on changes in its geographic range, population trends, or habitat conditions.

As such, the species should provisionally be categorized as Data Deficient (DD), in accordance with the IUCN Standards and Petitions Committee (2022). However, if future data indicate declines or extreme fluctuations in these parameters, the species would qualify as Endangered (EN) under criterion B2(a)(iii). Monitoring its populations and assessing current and potential threats to its habitat are essential for implementing effective conservation measures and obtaining reliable data for a comprehensive future assessment.

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Author's contributions

OAJ and HCC collected morphological data and prepared the manuscript, HCC, SMA and DS conducted the field work.

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Data availability

We consider this not applicable, as the morphological information obtained in this study is fully available within the published article and the cited specimens. Further details can be provided by the corresponding author upon reasonable request.

Declarations

Competing interests

We affirm that there are no conflicts of interest associated with the publication of this article.

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