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Securidaca paulensis (Polygalaceae, Polygaleae), a new species from the Atlantic Forest of Brazil

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Abstract

Securidaca paulensis (Polygalaceae), a new species endemic to the Serra do Mar in São Paulo, Brazil, is described. It is compared to *S. lanceolata*, from which it differs mainly by its slender branches, leaves with an attenuate apex, racemes predominantly terminal and smaller samaras with non-reticulate seed-bearing core. The study provides a taxonomic description, distribution maps, preliminary conservation status assessment, and an identification key for *Securidaca* species of the Atlantic Forest.

Key words: endemic flora, Fabales, Parque Estadual da Serra do Mar, taxonomy

Introduction

Securidaca L. (Polygalaceae) is a predominantly Neotropical genus belonging to the tribe Polygaleae, comprising approximately 70 species (Aymard 2022), with seven species occurring in the Paleotropics. *Securidaca* is characterized by the presence of nodal glands at the base of the petiole; lateral sepals developed as wings; the abaxial petal modified into a keel, with or without a crest; and a pseudomonomerous, gibbous ovary that develops into samaras may bear a single lateral wing (unialate), two opposite wings of similar size (bialate), or, in some cases, a well-developed wing accompanied by a smaller one, partially adnate to the seed-bearing body (Marques 1996).

Securidaca has, so far, been addressed primarily in floristic studies. Among the main contributions are the Flora of Ecuador (Eriksen *et al*. 2000), Flora of the Venezuelan Guayana (Aymard *et al*. 2004), Manual de Plantas de Costa Rica (Morales Quirós 2014), and Aymard (2022), which covers the floras of Colombia and Venezuela. For Brazil, the genus is treated in the Flora and Funga of Brazil (available at: http://floradobrasil.jbrj.gov.br/).

Among the countries that host species of *Securidaca*, Brazil stands out for having the greatest diversity, with approximately 30 species and two varieties recorded. These taxa occur primarily in humid forest formations of the Amazon and the Atlantic Forest, although they are also found in more open vegetation types such as the Cerrado, arboreal restingas, and, less frequently, in the Caatinga and Campo rupestre. Several regional floristic studies have been conducted in Brazil, for instance, in the states of Roraima (Costa *et al*. 2012), Pará (Mesquita *et al*. 2013; Pastore & Silveira, 2016), Pernambuco (Ferreira *et al*. 2017), Ceará (Lima *et al*. 2018), and the Amazon region of Maranhão (Anjos 2022).

In the Brazilian Atlantic Forest, seven species of the genus have been recorded to date (Flora and Funga of Brazil 2020). This biome is recognized as one of the main global biodiversity hotspots, characterized by high levels of endemism (Carnaval *et al*. 2009; Ribeiro *et al*. 2009). In the state of São Paulo, the Parque Estadual da Serra do Mar,

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particularly the Núcleo Curucutu, constitutes one of the last significant remnants of this biome, comprising grassland and forest formations located on the slopes of the Serra do Mar, at altitudes ranging from 750 to 850 m (Garcia & Pirani 2005). The floristic diversity of the region has been documented through several surveys (Bianchi & Affonso 2020; Hora & Affonso 2021; Santos & Affonso 2022), as well as through the description of new species, such as *Ocotea curucutuensis* J.B. Baitello (Baitello 2001) and *Pleroma curucutuense* F.S.Mey. & R.Goldenb. (Meyer & Goldenberg 2023).

During a review of the genus *Securidaca*, including study of all pantropical species, a new species endemic from to the region Brazilian Atlantic Forest, in the state of São Paulo, Brazil was recognised and is described here as *S. paulensis*.

Material e methods

The botanical material analyzed was obtained from the herbaria K, PMSP, and SPF, following the standard abbreviations proposed by Thiers (2025). Morphological structures were examined using a Tecnival stereomicroscope, and descriptions and measurements were carried out according to the traditional terminology of the group (Chodat 1893; Marques 1996). Branches, leaves, inflorescences and samaras were documented through digital photography. Floral parts were dissected and photographed using a scale and the ToupView® software, with the resulting images subsequently edited in Corel® PHOTO-PAINT™ X7 for the preparation of illustrative plates.

Geographic coordinates were obtained from the specimen labels. These data were processed and edited using QGIS software version 2.18.14 (QGIS Development Team 2016) to generate the distribution maps. Conservation status assessment followed the criteria established by the IUCN (2019), using the GeoCat tool (Bachman *et al*. 2011), with a 2 × 2 km grid size applied to estimate the extent of occurrence (EOO) and area of occupancy (AOO).

Results and discussion

Taxonomy

Securidaca paulensis Chodat ex C.B.Anjos & J.F.B.Pastore ***sp. nov.*** (Figs. 1–3)

Type:—BRAZIL. São Paulo, Sítio Curucutu, 30. November 2022, *S. Honda et al. 2273* (holotype CTBS!; isotypes PMSP!)

Diagnosis:—*Securidaca paulensis* can be identified by its predominantly acute leaf apex and its habit as a small scandent subshrub, occasionally resembling an herbaceous plant. It shares similarities with *Securidaca lanceolata* St.-Hil. & Moq., but can be distinguished by its consistently terminal racemes (vs. axillary or terminal in *S. lanceolata*) and slender branches (vs. thick in *S. lanceolata*). In addition, *S. paulensis* has smaller samaras, 3–4.8 cm long, with a non-reticulate seed-bearing core (vs. samaras 7–9 cm long with a reticulate seed-bearing core in *S. lanceolata*) and a bilobed stylet (vs. truncate in *S. lanceolata*).

Climbing subshrub. Cylindrical and slender branches with longitudinal strations, glabrous or slightly puberulent, silver trichomes. **Leaves** alternate, chartaceous; Petiole 2–3 mm long., pubescent or tomentose, nodal gland the base of petiole, sessile, orbicular; Leaf blade 3.2–7.3 × 0.7–1.8 cm, lanceolate; acute or obtuse base, atenuate apex, margin revolute, adaxial surface glabrous or slightly puberulent and abaxial surface pubescent. **Raceme** 1.5–3 cm long., terminal, laxiflorous; rachis pubescent, nodal gland sessile, orbicularis; bracts and bracteoles ca. 2 x 1 mm, lanceolate, apex and base acute. **Flower** purple or pink, 1.9–2.1 cm long; pedicel 6–9 mm, pubescent with silver trichomes; external sepals pubescent on adaxial surface, with ciliate margins: upper sepals ca. 4–5 × 2–3 mm, ovate, with an obtuse apex and base; lower sepal ca. 5–3 × 3 mm, concave, with an obtuse apex and base; internal sepals 0.9–1.0 × 0.5–0.7 cm, ovate, glabrous, with a rounded apex, smooth and revolute margin; lateral petals 9–10 × 2–3 mm, spatulate, narrowing in the median portion; rudimentary petal ca. 1 mm, lanceolate; keel 0.7–0.9 × 2–4 mm, glabrous, crested, with a slightly ciliate margin; claw 2 mm, cucullate portion 5 mm, crest 2 mm; filament sheath 7–9 × 0.2–0.4 mm, slightly ciliate on the margin; ovary ca. 1–2 × 1 mm, glabrous; style 3–4 × 1–2 mm, bilobade, glabrous. **Samara** winged, 4.3 cm long, pubescent, with a non-reticulate seed-bearing core.

Distribution and Ecology:—This species is endemic to the Atlantic Forest in the state of São Paulo, specifically in the Serra do Mar region (Map 1). Specimens were collected in protected areas, including Parque Estadual da Serra

do Mar (Núcleo Curucutu), Reserva Biológica do Alto da Serra de Paranapiacaba, Parque Natural Municipal Cratera de Colônia and RPPN Sítio Curucutu. Its predominant habitat is forest edges and high-altitude grasslands.

Etymology:—The specific epithet refers to the State São Paulo, the only place of occurrence for the species until now.

Phenology:—*Securidaca paulensis* blooms in January to November, and bears fruits in July to December.

FIGURE 1. *Securidaca paulensis*. **A** habit; **B** abaxial surface of the leaves; **C** raceme with flowers and floral buds. (*S. Honda 2273*) Photo by Roso, V.

Notes:—The species was originally named by Chodat on labes associated with a collection of F. C. Hoehne (without number) in 1917, but he never formally published a description of the species. Later, in the Flora of São Paulo, the species was mentioned by Marques and Gomes (2002) as *Securidaca* sp. 1, with a morphological description and a list of analysed specimens.

Preliminary Conservation status:—The EOO covers 353 km², while the AOO is 36 km². Based on the EOO, the new species can be categorized as Critically Endangered (EN) and considering the AOO it is Endangered (EN) (IUCN 2019), given the nine known locations which are threatened. However, given the limited data available from collections of the species, it is not possible to determine whether this information accurately reflects the actual conservation status of *S. paulensis*. Most collections have been made in protected areas, such as the REBIO do Alto da Serra de Paranapiacaba, RPPN Sítio Curucutu, Parque Estadual da Serra do Mar (Núcleo Curucutu), which represent some of the last remaining fragments of the Atlantic Forest (Garcia & Pirani, 2005). *Securidaca paulensis* is therefore provisionally assessed, following IUCN (2019) criteria, as Endangered [EN B2ab(ii,iii)], based on its limited distribution, number of locations, and dependence on a protected area under threat, pending further information to clarify its range.

Examined material:—**BRAZIL**. SÃO PAULO: Santo André: REBIO Alto da Serra, 19 Jul. 1917, *F. C. Hoehne s.n.* (SPF); REBIO do Alto da Serra de Paranapiacaba, 17 Jan. 1917, *F. C. Hoehne s.n.* (SPF); REBIO do Alto da Serra de Paranapiacaba, 10 Jul. 1907, *A. Usteri 37a* (K). São Paulo: Parque Estadual da Serra do Mar, Núcleo Curucutu, 18 Jan. 1996, *R. Simão-Bianchini et al. 925* (PMSP); Parque Estadual da Serra do Mar, Núcleo Curucutu, Trilha do Mirante, 18 Mar. 1999, *P. Affonso 358* (PMSP); Parque Natural Municipal Cratera de Colônia, 21 Nov. 2006, *S. Honda et al. 19* (PMSP, CTBS); RPPN Sítio Curucutu, 30 Nov. 2022, *S. Honda 2273* (PMSP, CTBS); Parque Estadual da Serra do Mar, Núcleo Curucutu, 15 Nov. 1997, *J.V. Coffani Nunes 172* (PMSP).

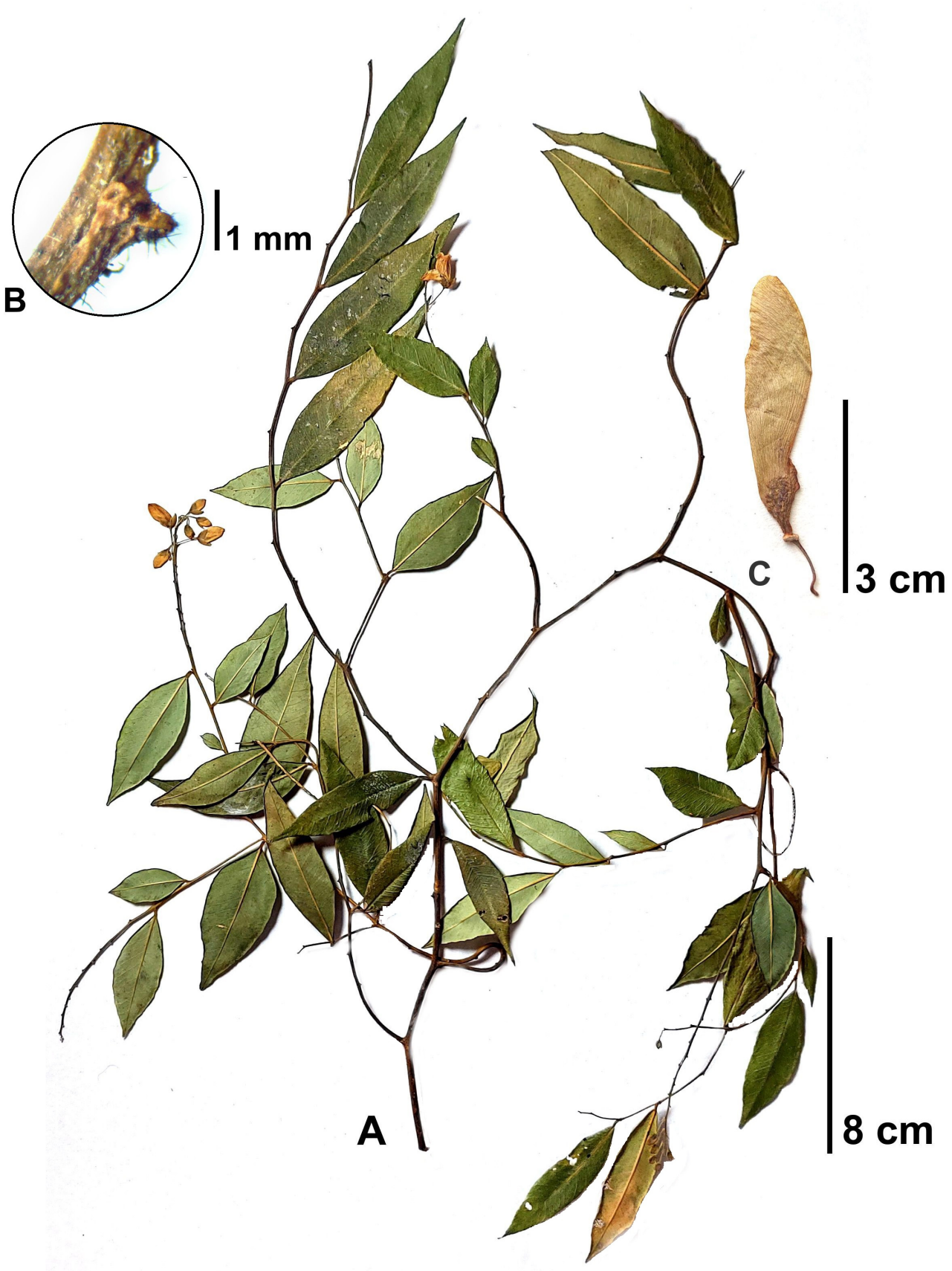


FIGURE 2. *Securidaca paulensis.* **A** branch with inflorescences; **B** nodal gland; **C** samara. (*S. Honda 2273*) Photos by Anjos, C.B.

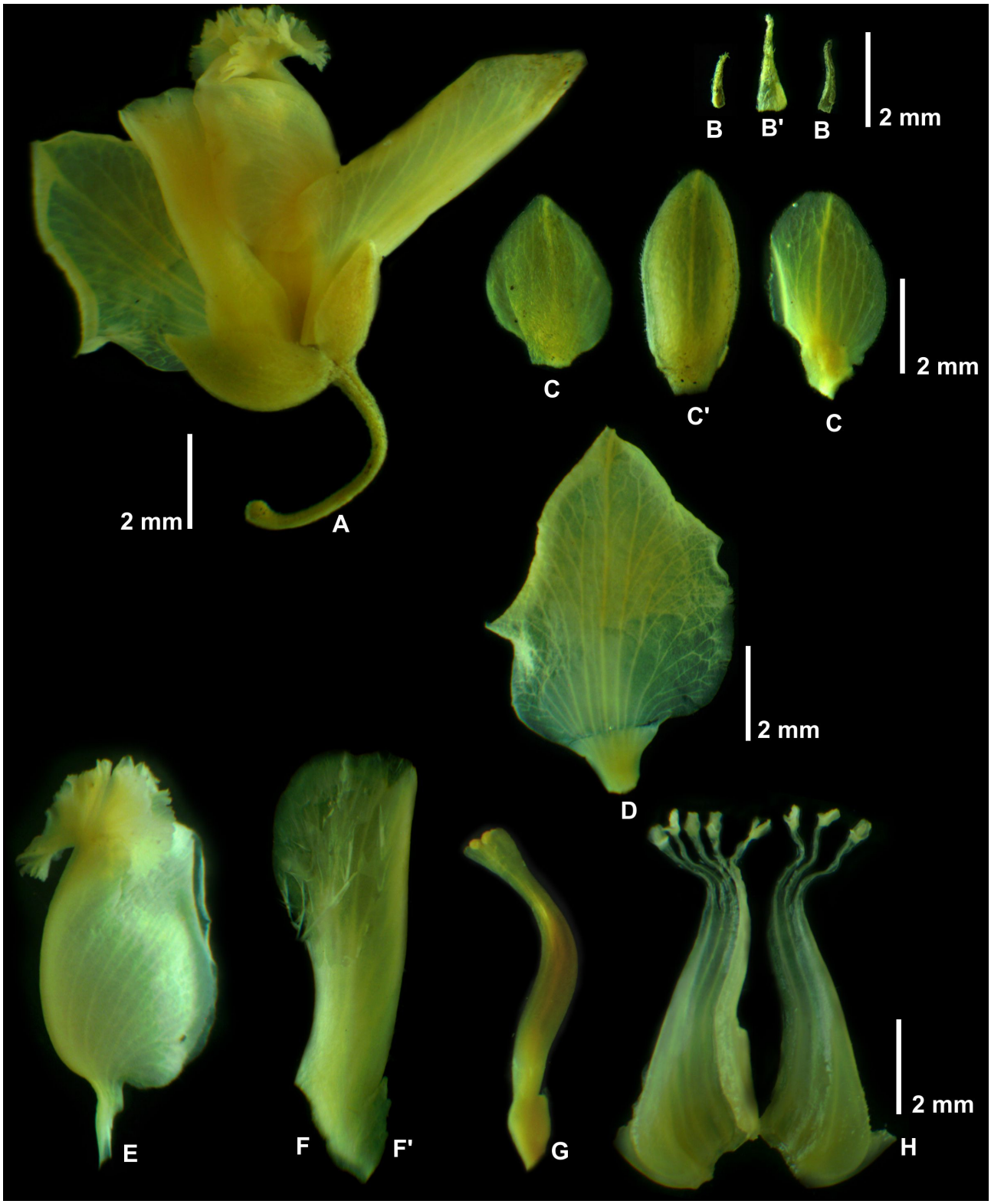
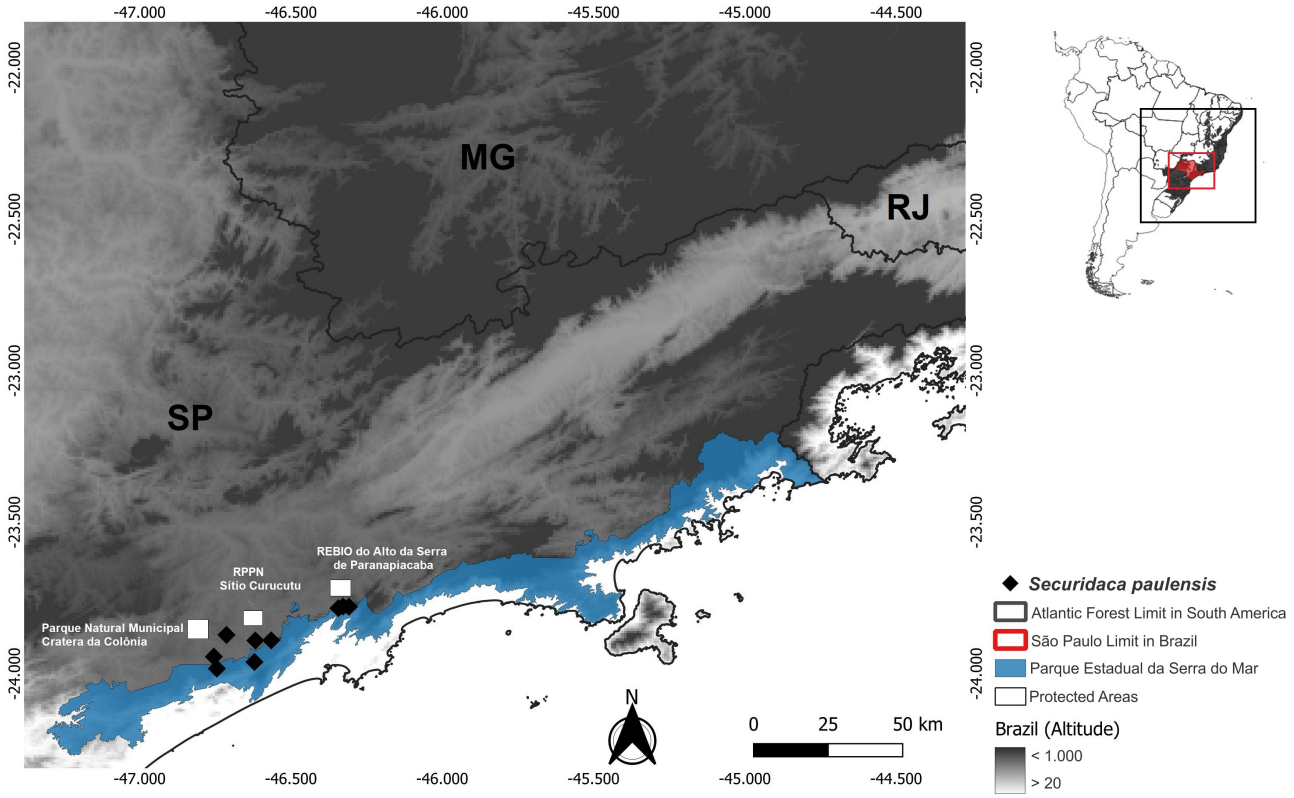


FIGURE 3. *Securidaca paulensis* floral parts. **A** flower; **B** bracts; **B'** bracteole; **C** upper external sepal; **C'** lower external sepal; **D** one of the two inner sepals; **E** one of the two lateral petals; F keel; **F'** rudimentary petal; **G** androecium; **H** gynoecium. (*S. Honda 2273*) Photos by Anjos, C.B.



MAP 1. Distribution of *Securidaca paulensis* in São Paulo State.

Key to *Securidaca paulensis* and Species of the Atlantic Forest

1	Branches slender	2
-	Branches thick	3
2.	Leaf blade membranous, ovate; samara's seminiferous core obovate	*S. ovalifolia*
-	Leaf blade chartaceous, lanceolate; samara's seminiferous core orbicular	4
3.	Abaxial surface of the leaf blade densely adpressed-puberulous	*S. diversifolia*
-	Abaxial surface of the leaf blade pubescent to velutinous	5
4	Leaf blade with atenuate apex	***S. paulensis***
-	Leaf blade with obtuse apex obtuse	*S. lanceolada*
5.	Samara with a non-reticulate seed core	*S. falcata*
-	Samara with a reticulate seed core	6
6.	Leaves pubescent to velutinous, apex obtuse or rounded	7
-	Leaves glabrous, apex acuminate or acute	*S. macrocarpa*
7.	Inflorescences in terminal and axillary panicles	*S. revoluta*
-	Inflorescences in simple terminal racemes	*S. rivinifolia*

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