1916 - 2026

An Acad Bras Cienc (2026) 98(3): e20251282 DOI 10.1590/0001-3765202620251282
Anais da Academia Brasileira de Ciências | *Annals of the Brazilian Academy of Sciences*
Printed ISSN 0001-3765 I Online ISSN 1678-2690
www.scielo.br/aabc | www.fb.com/aabcjournal

ECOSYSTEMS

A new species of *Malanea* Aubl. (Rubiaceae, Guettardeae) from the Atlantic Forest of Espírito Santo, Brazil

RAFAELA S.P. ROXO & MARIA REGINA V. BARBOSA

Abstract: During a taxonomic revision of the Brazilian species of *Malanea*, a new species endemic to the Atlantic Forest of Brazil was discovered and is described here. The new species occurs in the submontane forest in Espírito Santo and differs from all the other species from the Atlantic Forest by its branchlets, stipules, petioles and leaves with golden villous trichomes, and fruits oblong slightly curved. Besides the diagnosis and description, we provide taxonomic comments, illustrations, a distribution map, and a preliminary conservation status assessment.

Key words: Brazilian Flora, Cinchonoideae, Dialypetalanthoideae, Diversity, Neotropical Region.

INTRODUCTION

The Brazilian Atlantic Forest comprises a mosaic of different types of vegetation (Thomas & Barbosa 2008, IBGE 2012) with only 28.1% of its natural vegetation remaining (Projeto MapBiomas 2025). This hotspot harbors more than 15,800 angiosperms species, of which ca. 55% are endemic (Flora e Funga do Brasil 2026). Part of this species richness is due to its latitudinal extension and consequent differing environmental conditions (Morellato & Haddad 2000).

The family Rubiaceae in Brazil have high diversity and endemicity in the Atlantic Forest, with ca. 550 species (Flora e Funga do Brasil 2026). The genus *Malanea* has one of its two centers of diversity in the Atlantic Forest, with seven species, six of which are endemic (Roxo & Barbosa 2023). *Malanea* can be distinguished from other genera of Rubiaceae by its vining habit, terminal stipules, axillary, paniculate, or spiciform inflorescences, sessile, small flowers with a turbinate hypanthium, pilose corolla throat and drupaceous fruits with a persistent calyx.

During the revision of the Brazilian species of *Malanea*, a new species from the Atlantic Forest in the state of Espírito Santo was found and is here described.

MATERIALS AND METHODS

The description was based on dried specimens using a stereomicroscope Zeiss Stemi 305. The terminology for general morphology was based on Radford et al. (1974), for stipules on Robbrecht (1988), for indument on Harris & Harris (2001), and for inflorescence on Weberling (1989). Photographs of characters' details were taken using a stereomicroscope Leica M205C equipped with Leica DFC295 Digital Color Camera and the Leica Application Suite package. The geographic distribution and phenologic data were obtained

from specimen labels. Georeferenced data were imported into GeoCat (Bachman et al. 2011), and a Preliminary Conservation Status Assessment was performed following the Red List categories and criteria of the IUCN (2012, 2022). The maps were created using QGIS v.3.14 (QGIS Development Team 2020).

RESULTS

Taxonomic treatment

Malanea villosa Roxo & M.R.V. Barbosa, *sp. nov.*

urn:lsid:ipni.org:names:77387467-1

Typus: BRAZIL, **Espírito Santo**, Santa Teresa, Penha; 19°56' 08"S, 40°36' 01"W; 10 Apr. 1984; fr.; *J. Vimercat 35* (holotype JPB [barcode JPB26130!], isotypes MBML, MO!). (Figures 1, 2).

Diagnosis: *Malanea villosa* resembles *M. martiana* Müll. Arg. and *M. forsteronioides* Müll. Arg. by the scandent habit, shape, texture and size of the leaves, size and indument of calyx, but can be distinguished from both by its branchlets, petioles, and leaves surface with golden villous

Figure 1. Isotype of *Malanea villosa* deposited in MBML (available at: https://specieslink.net/search/).

trichomes, and by its slightly curved oblong and wide fruits.

Description: Scandent shrub 1 m tall; branchlets brownish with elliptical lenticels, golden villous. Stipules ligulate, oblong, 9-11 × 4-4.5 mm, acute to acuminate, golden tomentose in the central portion. **Leaves** with petioles 0.3-0.5 cm long, golden villous at base; blades ovate to elliptic, 3.2-6.5 × 2.5-4.1 cm, truncate to cordate at base, acute to cuspidate at apex, margin flat, chartaceous, discolorous, sparse golden villous on the midrib above, lustrous, golden villous below; secondary veins 6-7 on each side of the midrib, impressed above, prominent below; tertiary veins inconspicuous. **Inflorescence** spiciform, (2-)6-6.5 cm long, 2 per axil, glomerules 3, with 5-7 flowers each; peduncle 3.2-4.5 cm long, puberulent; bracts lanceolate, 3.8 mm long, glabrescent; bracteoles 1.5 mm, triangular, puberulent. Flower buds strigose. Calyx unequally dentate; teeth triangular, 1.8-2 mm long, glabrescent. Corolla unknown. **Fruits** oblong slightly curved, 11-14 × 4.9-7.6 mm, purple or black, glabrous; persistent calyx lobes, glabrescent.

Etymology: The specific epithet "*villosa*" is referred to the golden villous indument in the branchlets, petiole and on both sides of the leaves.

Distribution, ecology and preliminary IUCN conservation assessment: *Malanea villosa* is found in enclaves of submontane moist

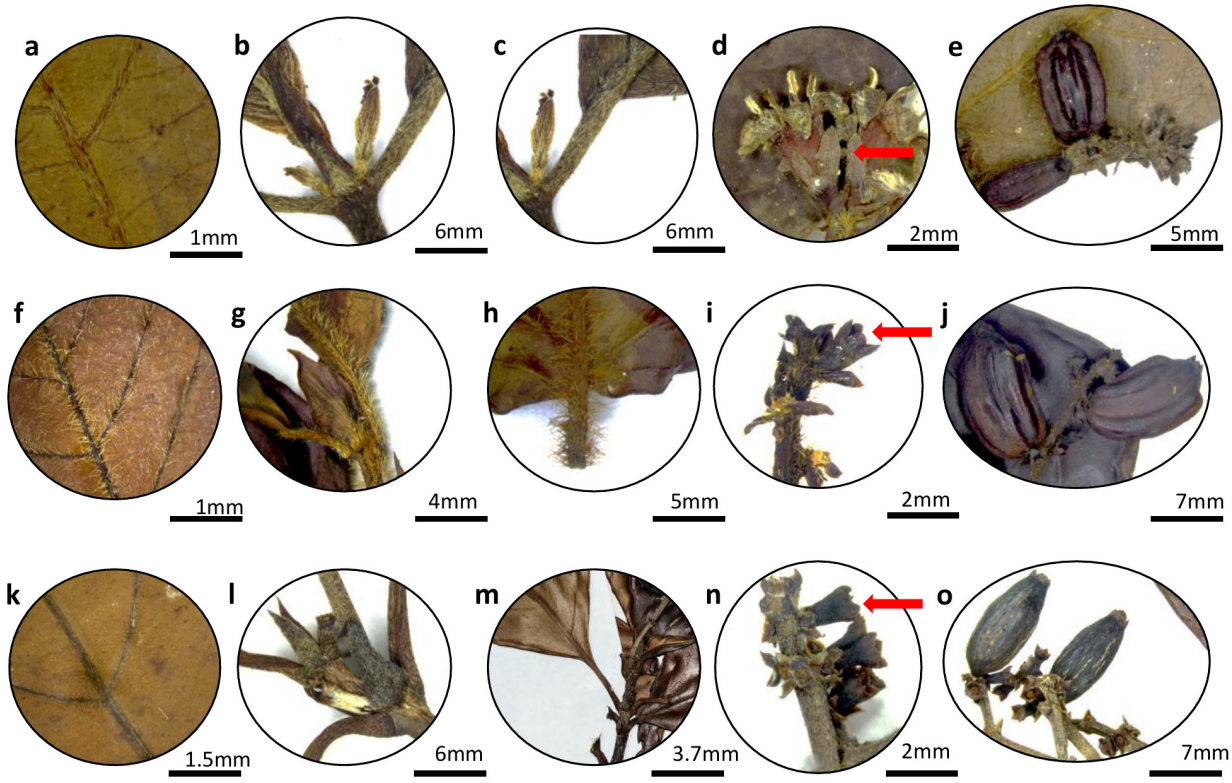

Figure 2. Morphological characters of *Malanea forsteronioides*, *M. martiana* and *M. villosa*: *Malanea forsteronioides*: a-e. *Malanea forsteronioides*: a. Leaf below (*F.C. Hoehne* 3547 [SP1096]), b. Stipule (*A. Furlan 1238* [HRCB 13385]), c. Petiole (*A. Furlan 1238* [HRCB 13385]), d. Calyx (*A. Furlan 1238* [HRCB 13385]), e. Fruits (*A. Furlan 1238* [HRCB 13385]). f-j. *Malanea martiana* (M.L. Guedes 24971 [ALCB033453]): f. Leaf below, g. Stipule, h. Petiole, i. Calyx, j. Fruits; k-o. *Malanea villosa* (*J. Vimercat 35* [JPB26130]): k. Leaf below, l. Stipule, m. Petiole, n. Calyx, o. Fruits.

forest in Santa Tereza, state of Espírito Santo, southeastern Brazil (Figure 3). The vegetation in Santa Tereza is mainly forest with rocky outcrops and dark soil at an elevation up to 650m (Mendes & Padovan 2000). The climate is wet subtropical without a dry season, and the temperature of the hottest months is higher than 22°C and the coldest month is between 3 and 18°C (Mendes & Padovan 2000).

Malanea villosa has been recorded only at the type locality. To calculate the Area of Occupancy (AOO) and Extension of Occurrence (EOO), more records are needed. So, we classified the new species as Data Deficit (D.D.), according to the IUCN criteria (IUCN 2012, 2022).

DISCUSSION

Malanea villosa is similar to *M. forsteronioides* and *M. martiana*, from which it can be distinguished by the characters summarized in Table I.

Malanea villosa is here described without flower characters, which is not uncommon, due to the difficulty of collecting climbing plants in fertile stage (e.g., Kirkbride 1997). However, the golden villous indument of the branchlets, petiole and leaves, and the wide, oblong, slightly curved fruits are enough to distinguish the new species from the other species of the Atlantic Forest. Roxo & Barbosa (2023) recognized seven species of *Malanea* in the Atlantic Forest, of which six are endemic to this phytogeographic domain. In Espírito Santo only two species were registered until now, *M. forsteronioides* and *M.*

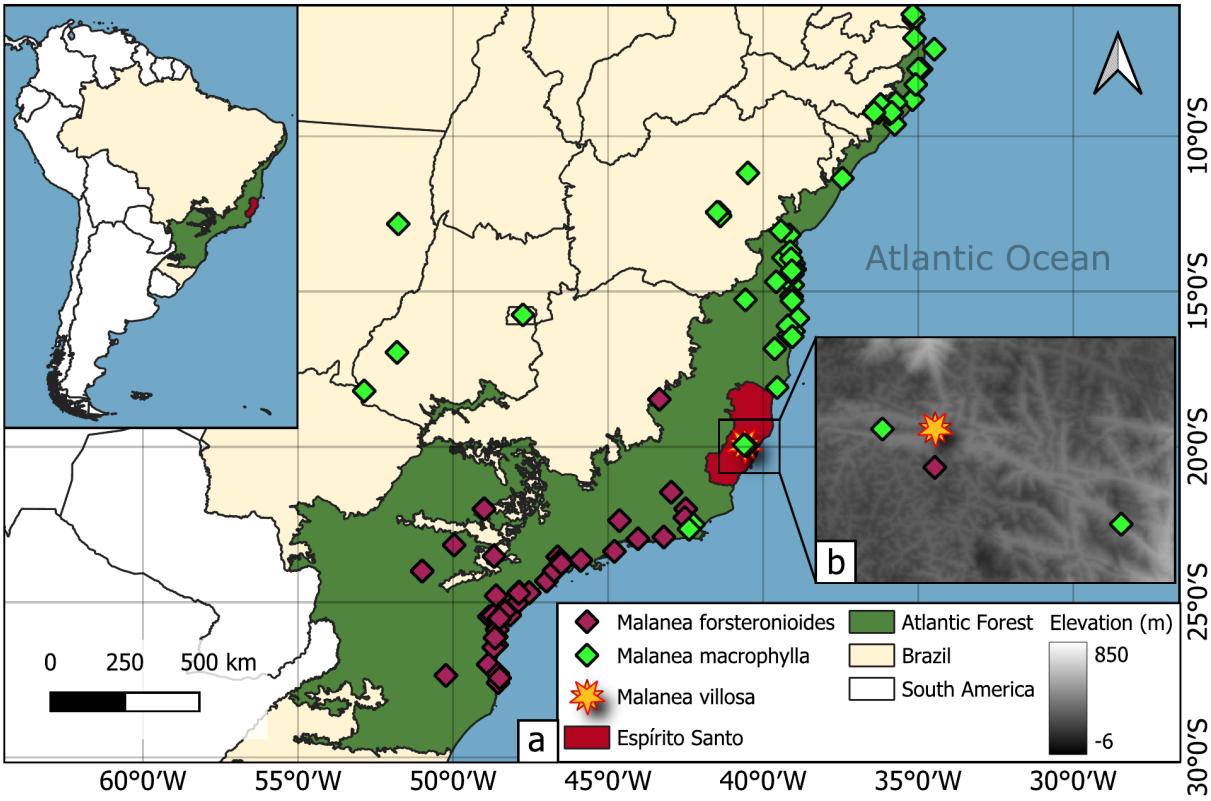

Figure 3. Distribution of *Malanea forsteronioides*, *M. macrophylla*, and *M. villosa* in the Atlantic Forest of Brazil (a), and in the state of Espírito Santo (b).

macrophylla Bartl. ex Griseb. *Malanea villosa* is the third (see key below).

The state of Espírito Santo has only 9% of native forest cover (Projeto MapBiomas 2025), and houses 20 endemic species of Rubiaceae (Flora e Funga do Brasil 2026). In the last ten years, many new species of the family were described from the state (Bruniera et al. 2015, Margalho et al. 2017, Torres-Leite et al. 2018), and some of them are evaluated as threatened or Data Deficient, such as *Malanea villosa*. It shows that Espírito Santo has potential areas to be protected and the absent of data to proceed preliminary IUCN conservation assessments can encourage the taxonomists to focus in remote and difficult access areas to cover this knowledge gap.

Key to identify the species of *Malanea* in Espírito Santo

1. Stipules round at the apex…….. ***Malanea macrophylla***

– Stipules acute to acuminate at the apex.....2

2. Stipules triangular-lanceolate; blades oblong-lanceolate, narrow lanceolate or narrow elliptic, obtuse at the base, acuminate at the apex, secondary veins 4-6 on each side of the midrib, calyx lobes unequal, fruits fusiform..... ***Malanea forsteronioides***

– Stipules ligulate oblong; blades obovate or elliptic, truncate or cordate at the base, acute or cuspidate at the apex, secondary veins 6-7 on each side of the midrib, calyx lobes unequally dentate, fruits oblong, slightly

Table I. Main morphological differences between *Malanea forsteronioides*, *M. martiana,* and *M. villosa*.

Morphological Character	*M. forsteronioides*	*M. martiana*	*M. villosa*
Distribution	Santa Catarina to Rio de Janeiro	North of Pernambuco to south Bahia	Endemic of Espírito Santo
Branchlets Indument	Glabrous	Glabrous	Golden villous
Stipule indument	Tomentose	Strigose	Tomentose in the central portion
Petiole size	0.5-0.8 cm	(0.2-)0.3-0.5 cm	0.3-0.5 cm
Petiole indument	Densely hirsute-hispid	Glabrescent at base	Golden villous
Leaf shape at base	Obtuse	Cuneate to attenuate	Truncate to cordate
Leaf indument above	Glabrous or hirsute on midrib	Glabrous	Villous on the midrib
Leaf indument below	Tomentose	Sparse pubescent	Villous
Number of secondary veins	4-6	4-5	6-7
Inflorescence type	Spiciform	Paniculate	Spiciform
Inflorescence size	2.5-3 cm	5-12.5 cm	(2-)6-6.5 cm
Calyx lobes	Unequally lobed	Equally dentate	Unequally dentate
Fruits shape	Fusiform	Fusiform	Oblong
Fruits size	8.6-9.5 × 3.8-5.2 mm	8-14 × 2-3 mm	11-14 × 4.9-7.6 mm

curved..... ***Malanea villosa***

Acknowledgments

We would like to thank all the staff and curators of the herbaria JPB, MBML and MO; the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) for funding RSPR (Process 140237/2023-2) and MRVB (Process 316098/2021-3), and MBML and CRIA - SpeciesLink for providing online access to the isotype image of the new species described here, contributing to broader scientific accessibility. We also thank Maria do Céo Rodrigues Pessoa and William Wayt Thomas for their valuable suggestions to the first draft of the manuscript.

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Author contributions

Roxo analyzed data from the materials consulted, drafted the results, created the map, figures and developed the evaluation of preliminary IUCN conservation assessment. Barbosa conducted a critical review of the manuscript. All authors contributed equally to the development, analysis, and review of the manuscript.

How to cite

ROXO RSP & BARBOSA MRV. 2026. A new species of *Malanea* Aubl. (Rubiaceae, Guettardeae) from the Atlantic Forest of Espírito Santo, Brazil. An Acad Bras Cienc 98: e20251282. DOI 10.1590/0001-3765202620251282.

Manuscript received on December 4, 2025;
accepted for publication on May 11, 2026

Handling editor

Marcia Couri

Data availability

The data that support the findings of this study were published in this article.