



Original Paper

New species of *Philodendron* (Araceae) from the Brazilian Atlantic Forest

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Abstract

A new species of Araceae, *Philodendron madalenense*, endemic to the Atlantic Forest of Southeastern Brazil, is described. It belongs to the subgenus *Philodendron* sect. *Macrobelum* due to the cordate leaf blade, inflorescence longer than 5 cm in length, and ovary with 6–12 locules, basal placentation, and 3–4 ovules per locule. This species is rare, endemic to the state of Rio de Janeiro, and it is morphologically related to *Philodendron follii*.

Key words: conservation, endemism, Fluminense flora, Santa Maria Madalena municipality, section *Macrobelum*.

Resumo

Uma nova espécie de *Philodendron*, *P. madalenense*, endêmica da Mata Atlântica do Sudeste do Brasil, é descrita. Pertencente ao subg. *Philodendron* sect. *Macrobelum* por apresentar lâmina foliar cordada, inflorescência maior que 5 cm de comprimento, 6–12 lóculos, placentação basal e 3–4 óvulos por lóculo. Essa espécie é rara, endêmica do estado do Rio de Janeiro e morfologicamente semelhante a *Philodendron follii*.

Palavras-chave: conservação, endemismo, Flora fluminense, município Santa Maria Madalena, seção *Macrobelum*.

Introduction

Philodendron Schott is an exclusively neotropical genus (Mayo 1990) and currently, with 466 species, it is the second largest in the family (Boyce & Croat 2011 onwards; Sakuragui *et al.* 2018). It is also one of the most important for its ornamental use, due to the beauty of its foliage and, although it is preferentially a tropical forest group, it can occur in swamps, rocky outcrops, and even in semi-arid regions (Coelho 2000). *Philodendron* is distributed in the Tropical and Subtropical Americas, from Mexico to Uruguay, and in the West Indies (Mayo *et al.* 1997). In Brazil, it occurs in almost all states (Sakuragui *et al.* 2020) and is represented by 152 species

(Sakuragui *et al.* 2022). In the state of Rio de Janeiro, there are 26 species of *Philodendron* (Coelho *et al.* 2014; Sakuragui *et al.* 2020).

Rio de Janeiro is the Brazilian state with the highest percentage of preservation of forest remnants in the Atlantic Forest Biome (Bergallo *et al.* 2009). Since the colonization process in Brazil, the vegetation cover in this state has been drastically reduced, reaching their highest value in the last century (Bergallo *et al.* 2009). Compared to other states in the Southeast Region, the state of Rio de Janeiro has a small territorial area, however, in terms of Atlantic Forest vegetation it is the state in which it is best preserved (SOS Mata Atlântica 2017).

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The species of the genus are classified into two subgenera, *Philodendron* and *Pteromischum* (Schott) Mayo, the first being divided into 10 sections and the second in two sections (Mayo 1990; Grayum 1996; Sakuragui *et al.* 2018). The subgenus *Philodendron* sect. *Macrobelyium* Sakur. is the most representative in the Atlantic Forest Biome (Calazans 2020), characterized mainly by leaves with cordate base, and ovary with 6–12 locules, 3–4 ovules per locule, and basal placentation (Sakuragui *et al.* 2005). Taxonomic studies of subg. *Philodendron* in the Atlantic Forest Biome in the state of Rio de Janeiro have shown species still unknown to science in the last ten years (Sakuragui 2012; Calazans *et al.* 2015; Mattos unpublished data). In the present work a new species of this genus belonging to sect. *Macrobelyium* is described, with illustrations, distribution map, conservation status, and comments on taxonomic affinities.

Materials and Methods

The georeferenced collections were carried out in the mountain region of Santa Maria Madalena in 2013 and 2020. The samples were herborized according to Croat's methods (1985) and the specimens were incorporated into the RB Herbarium. Comparative analyzes were performed with herbarium specimens and virtual images available online from the R and RB herbaria (acronyms following Thiers, continuously updated). Live plants were collected for cultivation in the Rio de Janeiro Botanical Garden.

For the taxonomic treatment, morphological analysis of the specimens were performed using a stereoscopic microscope, with identification, measurements, descriptions of vegetative and reproductive characters of diagnostic value. The morphological descriptions were made based on the usual terminology for Araceae from Mayo *et al.* (1997) and, specifically for leaf blade architecture, the manual by Ellis *et al.* (2009).

A comparative table between the new species and the most morphologically similar species was elaborated based on herbarium specimens and literature data. Information about *P. altomacaense* Nadruz & Mayo, *P. cordatum* Kunth ex Schott and *P. follii* Nadruz were obtained from Coelho (2000), Sakuragui *et al.* (2005) and Coelho (2010), respectively.

The Atlantic Forest Biome and the different types of vegetation follow the classification of the Brazilian Institute of Geography and Statistics (IBGE 2012).

A map with the distribution of the species was prepared using the Esri Arcgis 10.8 program.

Results

Philodendron madalenense Mattos, Nadruz & Baumgratz, *sp. nov.* Type: BRAZIL. RIO DE JANEIRO: Santa Maria Madalena, Highway RJ 182 towards Conceição de Macabu-Santa Maria Madalena, 2 km after crossing the bridge over the Macabu River, on the right side of the road, 18.XII.2013, fl., *M. Nadruz & I.G. Costa 2818* (holotype RB RB00840956!). Fig. 1

Philodendron madalenense is morphologically similar to *P. follii*, but is distinguished by having 8–9 pairs of secondary veins, extrafloral nectaries absent in the petiole, spathe slightly constricted and externally green and white (*vs.* secondary veins 4–7, extrafloral nectaries present in the petiole, spathe without constriction and spathe externally green and reddish).

Herb, rupicolous, sciophilous. Stalk with cylindrical to flattened internodes 2.9–9.2 cm, brownish at the base and greenish on the apex. Root reddish. Prophyll 11–17.5 cm long, bicrenate, ovate, apex greenish to whitish, persistent. Petiole 17.5–81.5 cm long, greenish with light green streaks, adaxially flattened, abaxially obtuse. Leaf-blade 51.5–68.5 × 22–32 cm, membranous, discolored greenish, adaxial face shiny when young, opaque when adult, ovoid, anterior lobe with acute to apical apex, cordate base, with spatulate sinus and obtuse posterior lobes, entire margin; anterior division 43.1–45.2 cm length; posterior division 16.3–20.2 cm long, with rounded lobes, anterior/posterior division ratio 2.64–2.34; main rib flattened adaxially, obtuse abaxially, greenish-yellowish, with light green streaks; secondary ribs yellowish-green, 8–9 pairs; basal ribs with 2 basioscopic ribs and 4 acrosopic ribs on each side. Inflorescence 1–2 per floral sympodium, 16.4–19.5 cm long, unbranched spike type; peduncle 8–9 cm long, cylindrical, greenish; spathe with slightly constriction in the median region, the opening is restricted to the male area only, curved in the tip, greenish to yellowish externally, whitish in the blade and reddish in the tube internally. Spadix sessile, with apical sterile zone 4.6 cm long, whitish, male zone ca. 5 cm long, cream, intermediate sterile zone 1.2 cm long, whitish, and female zone 4.9 cm long, greenish. Androecium with 3–4 stamens, stamens 0.2–0.3 × 0.15–0.2 cm, oblong to obovate, anthers with longitudinal dehiscent slits. Gynoecium 0.1–0.15

× 0.3–0.35 cm, ovary obovate to oblong, 8-locular, 3–4 ovule per locule, basal placentation, funiculus with trichomes. Berries not seen.

Material examined: Santa Maria Madalena, Highway RJ 182 towards Santa Maria Madalena, in the woods on the right, 22°03'34"S, 41°55'04"W, 70 meters, 19.X.2020, J.R. Mattos, M. Nadruz & S. Wängler 969 (Paratype RB RB01442868).

Philodendron madalenense is endemic to the municipality of Santa Maria Madalena, since the area has been studied by researchers for a long time. It is located in the mountainous region of the state of Rio de Janeiro, with ca. 815 km², making it one of the largest municipality in the state (Lima 2021) (Fig. 2). The relief is mountainous, with well-formed mountain ranges

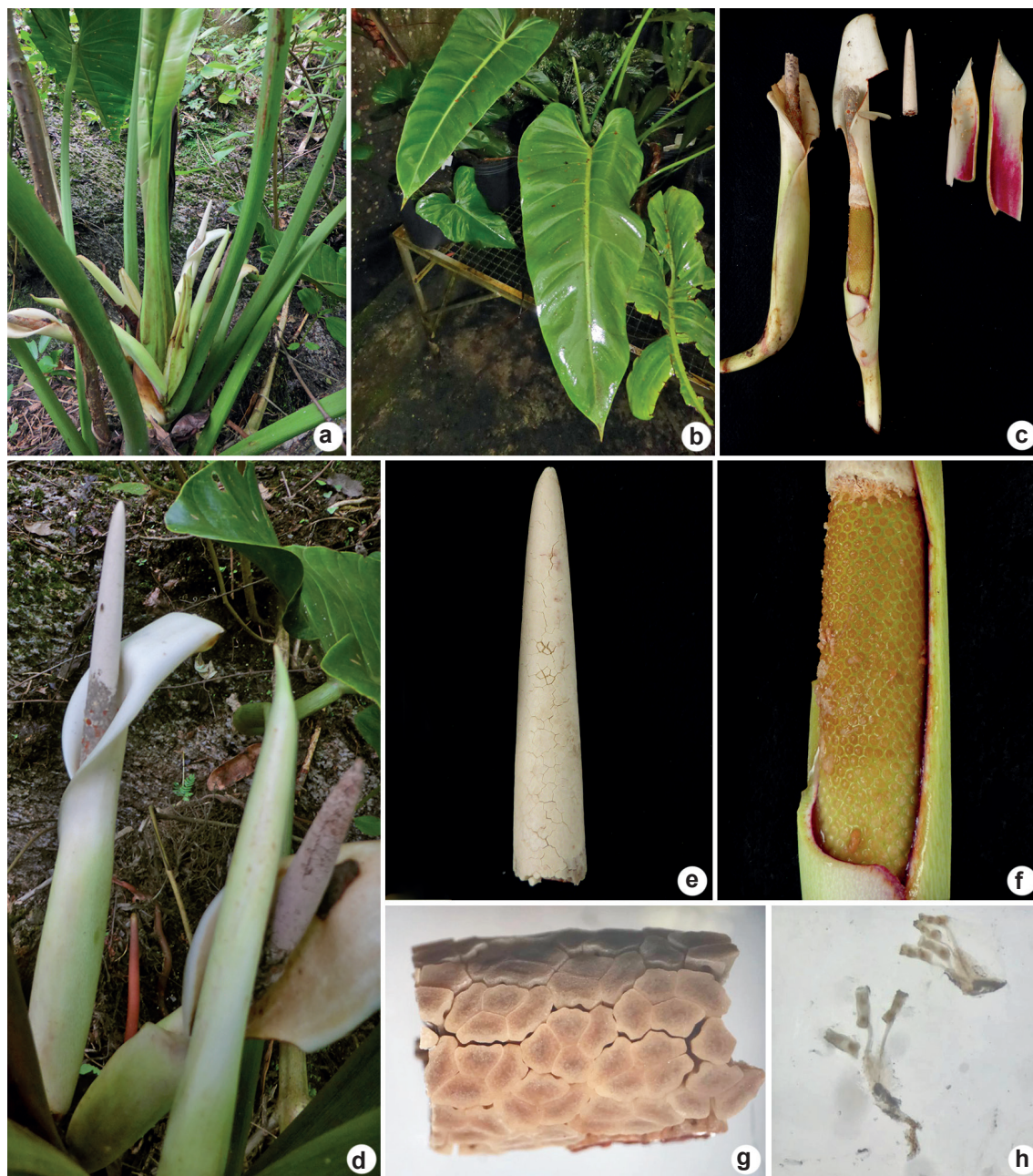


Figure 1 – a-h. *Philodendron madalenense* – a. habit; b. leaf and blade; c. inflorescence details; d. inflorescence; e. terminal appendix; f. feminine zone; g. stamens; h. ovules. Source: Photos by Marcus Nadruz and Juliana Mattos.

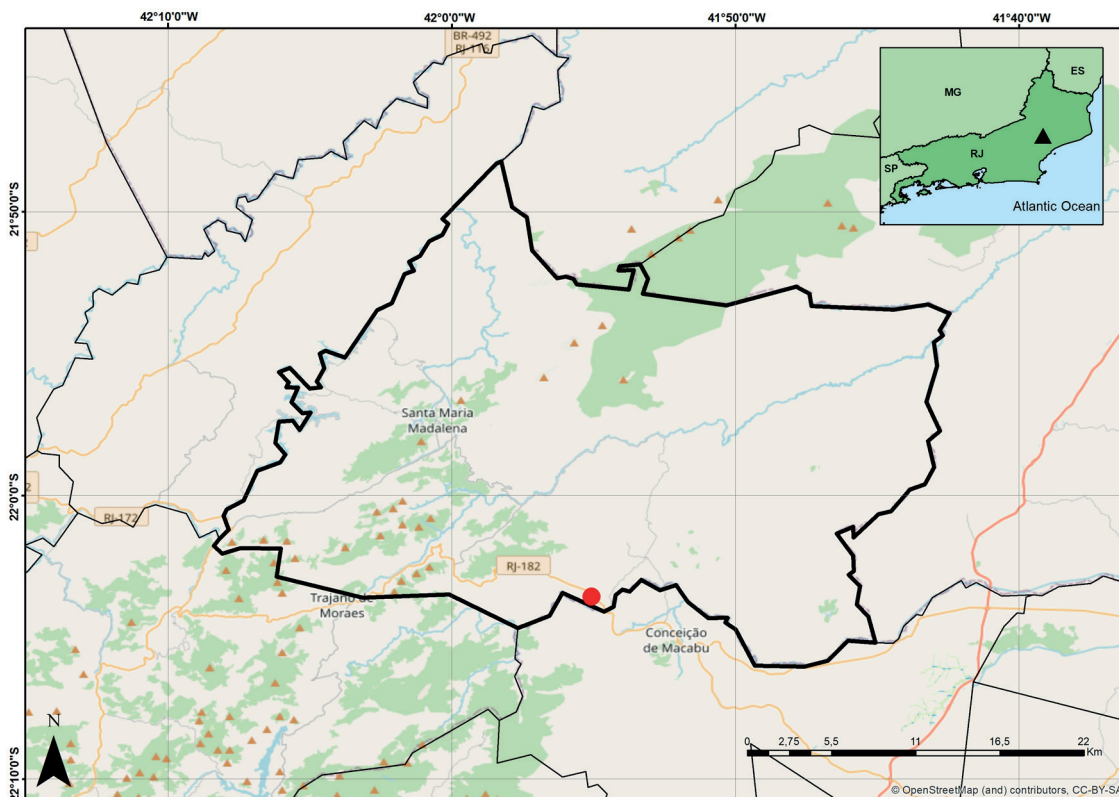


Figure 2 – Location of *Philodendron madalenense* in the municipality of Santa Maria Madalena.

(Lima 2021), where predominates remnants of Submontane Dense Ombrophilous Forest (IBGE 2004), besides areas with secondary vegetation, farming and pasture. The species was located in a disturbed secondary forest on the side of the road. The region is inside the Corredor Três Picos and Desengano area, witch was classified as extremely high priority for the conservation, owing to its soil erosion, exotic species, fire and hunting (Bohrer & Barros 2006).

The species described is considered rare so far, being known only from one location, in an unprotected area, probably a private property, where the original vegetation has been suffering significant reductions since 2001 (SGP 2008). At the moment the data are deficient to determine a status following the categories and criteria of the International Union for Conservation of Nature (IUCN 2021).

The specific epithet refers to the type locality, the municipality of Santa Maria Madalena.

Philodendron madalenense belongs to the subg. *Philodendron* sect. *Macrobelyium* owing to the presence of cordate leaf-blade, an inflorescence longer than 5 cm long, basal placentation, and 3–4 ovules per locule. The species is mainly recognized for leaf-blades with 8–9 secondary ribs, petiole without extrafloral nectaries, sinus spatulated at the base of the leaf blade, presence of a terminal appendix in the spadix and a slightly constricted spathe. *Philodendron madalenense* is also morphologically similar to *P. altomacaense* and *P. cordatum*, the closest species due to similarities in vegetative characters like leaf-blade shape. It differs from the first species by the spatulate shape of the sinus in the leaves and slightly constricted spathe (vs. parabolic sinus and unconstricted spathe), and it differs from *P. cordatum* by the absence of extra-floral nectaries on the petiole and the presence of terminal appendix in the spadix (vs. presence of nectaries and absence of terminal appendix). (Tab. 1).

Table 1 – Comparative analysis between *Philodendron madalenense* and the most morphologically related species, *P. altomacaense*, *P. cordatum* and *P. folii*, based on vegetative and floral characters.

Species	Petiole extrafloral nectaries	Spadix terminal appendix	Secondary ribs	Sinus	Spathe
<i>Philodendron altomacaense</i>	absent	present	6–7	parabolic	not constricted
<i>Philodendron madalenense</i>	absent	present	8–9	spatulate	slightly constricted
<i>Philodendron cordatum</i>	present	absent	5–7	spatulate	slightly constricted
<i>Philodendron folii</i>	present	present	4–7	spatulate	not constricted

Acknowledgements

We thank to Fundação de Amparo à Pesquisa do Estado do Rio de Janeiro-FAPERJ, for the scholarship granted to the first author; Rafael Ribeiro, for making the map; to Conselho Nacional de Desenvolvimento Científico e Tecnológico - CNPq (no. 310302), for the productivity scholarship to the third author; and Thomas B. Croat, for reviewing and translating the article.

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Area Editor: Dra. Cassia Sakuragui

Received in December 01, 2021. Accepted in August 17, 2022.



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