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A new species of *Philodendron* (Araceae) and a key to Brazilian Atlantic Forest species of *P.* subgenus *Pteromischum*

LUANA S.B. CALAZANS[1*] & CASSIA M. SAKURAGUI[1]

[1]*Universidade Federal do Rio de Janeiro, CCS, Instituto de Biologia, Departamento de Botânica, Av. Carlos Chagas Filho, 373 - Sala A1-088 - Bloco A, Ilha do Fundão, Rio de Janeiro, RJ, CEP 21941-902, Brazil.*
**Corresponding author: luanasbcalazans@gmail.com*

Abstract

This paper describes and illustrates a new *Philodendron* subgenus *Pteromischum* species from Espírito Santo State, in Southeastern Brazil, including information on its conservation in a high priority area for conservation of the Atlantic Forest. The work also includes a key to the Brazilian Atlantic Forest species of the subgenus.

Key words: aroids, endemism, humid flora, taxonomy

Introduction

Philodendron Schott (1829: 780) is the second largest genus of Araceae, being exclusively Neotropical with ca. 480 published species and ca. 700 estimated (Boyce & Croat 2012). In Brazil it has ca. 165 species (Sakuragui *et al.* 2012) in several biomes, especially in Amazonian and Atlantic rainforests, with 59% and 39% of the diversity respectively (Sakuragui *et. al.* 2012). The infrageneric classification into three subgenera is widely accepted: *Philodendron* (80% of the species), *Pteromischum* (Schott 1856: 77) Mayo (1989: 168) (15% of the species) and *Meconostigma* (Schott 1832: 20) Engler (1899: 554) (5% of the species).

The species of the subgenus *Pteromischum*, originally a section of subgenus *Euphilodendron* Engler (1899: 510) (e.g. in Krause 1913), can be morphologically characterized by the well-developed foliar sheath and anisophyllous sympodial growth, bearing many leaves per article (Grayum 1996). Mayo (1989), based on anatomical investigations, elevated *Pteromischum* to the status of subgenus, a decision that was later supported by a molecular phylogenetic study (Gauthier *et al.* 2008), which indicated that the other two subgenera were also monophyletic.

Philodendron subg. *Pteromischum* has two centers of diversity, one in Central America and another in West Amazonia (Grayum 1996), but is poorly represented in extra-Amazonian South America. Grayum's (1996) detailed revision of species occurring in Central America and the Pacific Coast of South America is the only modern study of the group. However, in that work, most Brazilian species were not discussed.

Here we describe *Philodendron rhodospermum sp. nov.* and propose an updated key to Brazilian species of the subgenus from the Atlantic Forest.

Methods

During field expeditions and a visit to the MBML herbarium, in Espírito Santo State, we found an unidentified specimen of *Philodendron* subgenus *Pteromischum* from Reserva Biológica Augusto Ruschi (REBIO Augusto Ruschi). To provide a more detailed description of the species and its habitat, the first author visited

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the area during the plant´s fertile period and collected fresh material. A taxonomic analysis of the specimen revealed that it belonged to a new species, which is described here.

The descriptive terminology follows Stearn (2004) and Mayo (1991). The new species was compared with the type of species morphologically similar to the collected material, as well as to the descriptions in works including species of *Philodendron* subg. *Pteromischum* (e.g. Grayum 1996, Krause 1913). The key is based on the original descriptions of species.

Taxonomy

Philodendron rhodospermum Calazans & Sakur., *sp. nov.* (Figures 1, 2)

Philodendron rhodospermum is most similar to *Philodendron propinquum* Schott (1856: 78), but the former has broader ovate leaves, sometimes slightly asymmetric, fewer primary lateral veins (3–5 pairs), lamina notable thinner with secondary lateral veins prominent in dry material, and reddish seeds.

Type:—BRAZIL. Espírito Santo: Santa Teresa, Reserva Biológica Augusto Ruschi, road to Goiapaba-açu, 19° 54' 26.7" S, 40° 32' 53.7" W, 24 November 2012, *L.S.B. Calazans & R.T. Valadares 213* (holotype: RB!; isotypes: CEPEC!, K!).

Herb perennial, hemiepiphytic near the ground. *Stem* branched; internodes 1.5–5.5(–7.5) cm long, cylindrical, dark green to brownish, matte, drying paler brown, epidermis vertically cracked; flagellar shoots present. *Petiole* 11.6–16.7 × 1.0–1.5 cm, sheath 11.0–15.6 × 1.0–1.5 cm, horizontally splayed, glossy green, apical ligule 0.6–1.1 cm long, acute to narrowly rounded, slightly unequal, unsheathed portion of petiole 0.3–1.5 cm long, adaxially flattened, abaxially rounded; *leaf blade* 13.0–22.0 × (5.0–)7.5–13.5 cm, often pendulous from the petiole apex, elliptic to broadly ovate, sometimes slightly asymmetric, apex acuminate to cuspidate, margin entire, base rounded to subcordate, smooth, glossy green on both faces, drying membranaceous to subchartaceous , striated, olive-green to brownish; midrib and primary lateral veins adaxially sunken, abaxially raised, primary lateral veins 3–5 pairs, arising at (30–)45–60º angle from midrib, arcuate to margin, drying prominent and greenish-yellow abaxially, secondary veins discrete, parallel to primary veins, numerous, drying prominent on both surfaces. *Inflorescence* solitary; peduncle 2.0–4.5 cm long, cylindrical, striated; spathe 6.0–9.0 cm long, ovate, acuminate (the acumen ca. 1.0 cm long), constriction not evident, externally pale yellow, becoming green in fruit, internally cream, resin canals internally visible; stipe of spadix up to 1.5 cm long; spadix 5.1–6.2(–7.2) cm long, slender; fertile male zone 2.8–3.4 cm long, not obviously exerted in fruit; intermediate sterile zone 0.4–0.55 cm long; female zone 1.7–2.0 cm long; stamens ca. 1.0 mm long, in groups of 4–6, prismatic; intermediate staminodes ca. 1.5 mm long, clavate; gynoecium 1.0–2.0 mm long, ovary flask-shaped, slightly broader than style, 2–3(–4)-locular, multi-ovulated, placentation axile. *Juvenile berries* pale green. *Seeds* ca. 1 mm long, fusiform, slightly curved, longitudinally striated, reddish-pink, drying purplish-red to brownish.

Phenology:—Collected in flower from September to November and in fruit from September to January.

Etymology:—The specific epithet alludes to the remarkable reddish-pink coloration of the seeds (Figure 2b–c), a very useful character for field identification.

Distribution and habitat:—Known only from two localities in the Espírito Santo State, Atlantic Forest; 600–850 m elevation. Almost all collections are from REBIO Augusto Ruschi, municipality of Santa Teresa, where the species is common and can be easily found on the edge of the trails. Until now, only one collection outside this area is known, at Pedra de Santa Luzia, municipality of Governador Lindenberg, ca. 70 km distant from Santa Teresa. Both localities are situated in an extension of the Serra da Mantiqueira, suggesting a possible broader area of occurrence along this mountain region.

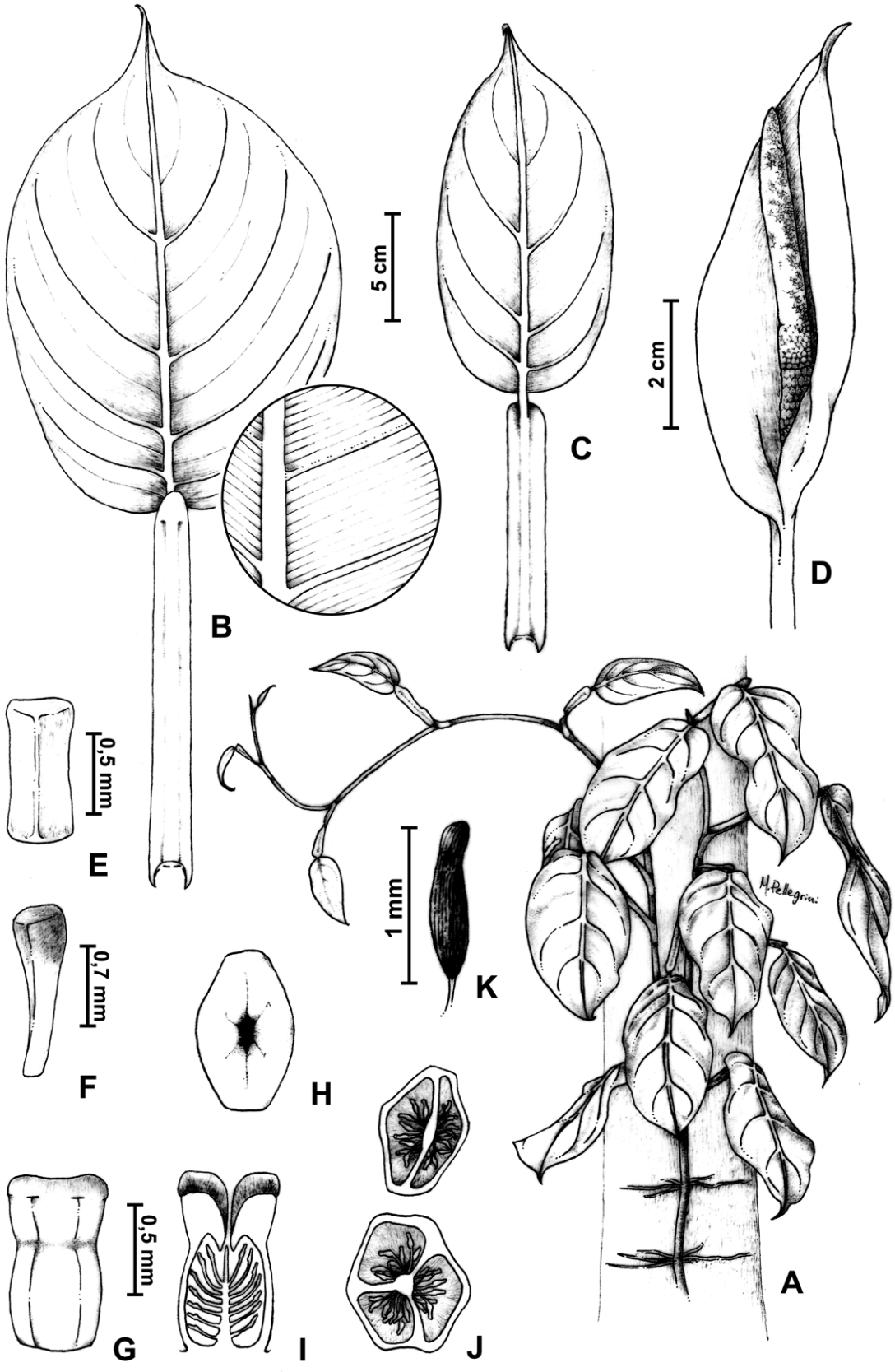

FIGURE 1. *Philodendron rhodospermum*. **A.** Habit. **B.** Dry broadly ovate leaf, adaxial view, nervation (detail). **C.** Dry ovate leaf, abaxial view. **D.** Inflorescence. **E.** Stamen. **F.** Staminode. **G.** Side view of a female flower. **H.** Top view of a female flower. **I.** Longitudinal cut of a female flower. **J.** Transversal cut of a female flower showing the 2–3-locular ovary. **K.** Seed. **A–C, K** from *Calazans & Valadares 213* (RB); **D–J** from *Vervloet et al. 1150* (MBML).

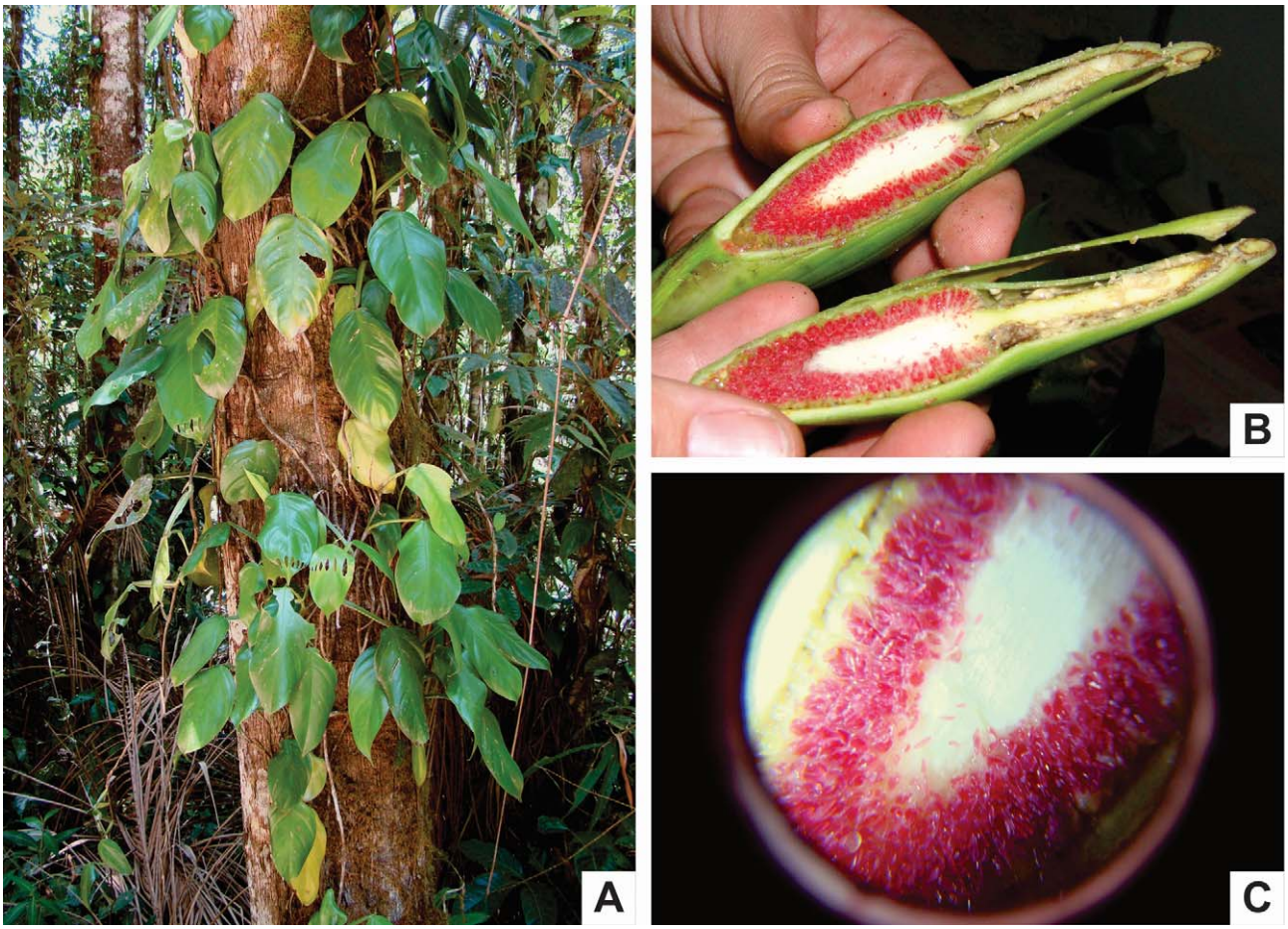

FIGURE 2. *Philodendron rhodospermum*. **A.** Habit. **B.** Immature infrutescence cut open to show the reddish seeds. **C.** Detail of the reddish-pink seeds.

Conservation:—Collections made so far are located in remnants of Atlantic Forest (Figure 3). The fragment at Santa Teresa, in the southern part of Espírito Santo State, is extensive and includes a Federal Conservation Unit (REBIO Augusto Ruschi), which ensures some protection for the species. Moreover, there are contiguous protected fragments in the region, such as the Parque Natural Municipal de São Lourenço.

The fragment located at Governador Lindenberg is extremely small and is located outside the conservation area, however it is in an area of high priority for conservation, according to Brazilian federal law (Brasil 2007) (Figure 3). Furthermore, according to the laws of Espírito Santo State (Brasil 2011), this fragment is also inserted in a priority area for conservation of Atlantic Forest named Marilândia, which is important for harbouring threatened and endemic species as well as possible taxa new to science. It also consists of a large area of unprotected fragments that contribute to the connectivity of other priority areas for conservation. Official guidelines for the area include biological inventories of fauna and flora, diagnosis of forest fragments and the creation of new protected areas. The presence of this new *Philodendron* in the area highlights the importance and urgency of these conservation actions in the state.

Due to the lack of ecological data and records we are unable to suggest a conservation status for the species at this moment, which should remain as *data deficient* for conservation purposes.

Paratypes:—BRAZIL. Espírito Santo: Santa Teresa, Reserva Biológica Augusto Ruschi, 24 September 2002, *R.R. Vervloet et al. 1036* (MBML!); *loc. cit.*, 03 October 2002, *R.R. Vervloet et al. 1150* (MBML!); *loc. cit.*, 29 October 2002, *R.R. Vervloet et al. 1309* (MBML!); *loc. cit.*, 09 January 2003, *R.R. Vervloet et al. 1672* (MBML!).

FIGURE 3. Distribution of *Philodendron rhodospermum*. The Northern point is situated in municipality of Governador Lindenberg and the Southern point in municipality of Santa Teresa. Delimitation of high priority conservation area according to Portaria MMA No. 09, 23 January 2007.

Additional examined material:—**BRAZIL. Espírito Santo:** Governador Lindenberg, Pedra de Santa Luzia, 19° 17' 17" S, 40° 27' 56" W, 07 November 2007, *V. Demuner et al. 4483* (MBML!); Santa Teresa, Reserva Biológica Augusto Ruschi, 19 September 2001, *L. Kollmann et al. 4684* (MBML!).

Affinities:—According to Grayum's concepts (1996) of sections in subgenus *Pteromischum*, *Philodendron rhodospermum* belongs to section *Fruticosa* Grayum (1996: 117), displaying proleptic growth, stem branched and shrubby, lack of nodal anchor roots, extensive sheath and solitary inflorescences lacking cataphylls. It is similar to *P. propinquum* Schott (1856: 78), differing by its broader ovate leaves, often pendulous leaf blade (i.e. the acute angle between petiole and lamina), fewer primary lateral veins and reddish seeds (vs. oblong or ovate-oblong leaves, often erect leaf blade, 5–7 primary lateral veins and pale brown seeds). In dry material of *P. rhodospermum* the leaves are notable thinner and the numerous secondary lateral veins become prominent, providing a striated appearance to the lamina, which is also useful in separating these species.

The new species resembles *P. romeroi* Grayum (1996: 70), an endemic species of Sierra Nevada de Santa Marta, Colombia. This latter can be distinguished by its appressed climbing habit, larger leaves, stout inflorescences and granular abaxial surface on dry leaves, being a member of section *Pteromischum* (Schott 1856: 77) Engler (1878: 133). Although the previously listed characters indicate the inclusion of *P. rhodospermum* in section *Fruticosa*, its similarity with a member of another section emphasizes the complexity involving classification below subgenus level in *Pteromischum*, as in the whole genus.

Preliminary key to the *Philodendron* subgenus *Pteromischum* from Brazilian Atlantic Forest

1. Stem subtetragonal, primary lateral veins not visible, plants from Northeastern Brazil (Bahia State) and Northern (Amazonian Forest)..... ***P. surinamense* (Miquel 1851: 211) Engler (1879: 361)**
– Stem terete, primary lateral veins visible (4–16), plants from Southern and Southeastern Brazil..... 2.
2. Petiolar sheath closed and upright ..... ***P. oblongum* (Vellozo 1831: t115) Kunth (1841: 51)**
– Petiolar sheath horizontally expanded..... 3.
3. Leaf blade asymmetric, apex obtuse to rotundate, abruptly acuminate..... ***P. rudgeanum* Schott (1856: 78)**
– Leaf blade symmetric, apex acuminate or cuspidate ..... 4.
4. Leaf blade elliptic or ovate-lanceolate, apex acuminate, apical sterile male zone present in spadix, plants from Southern Brazil (RS, SC, PR), Argentina and Paraguay ..... ***P. missionum* (Hauman 1917: 412) Hauman (1925: 101)**
– Leaf blade elliptic, ovate-oblong or broadly ovate, apex cuspidate, apical sterile male zone absent in spadix,plants from Southeastern, Northeastern and Southern Brazil (PR) ..... 5.
5. Primary lateral veins 7–16, ovary 4–6 locular..... ***P. ochrostemon* Schott (1860: 229)**
– Primary lateral veins up to 7, ovary 2–4 locular..... 6.
6. Leaf base rounded to subcordate, primary lateral veins 3–5, ovary 2–3-locular, seeds reddish-pink, plants endemic to Espírito Santo State ..... ***P. rhodospermum* Calazans & Sakur.**
– Leaf base attenuate or obtuse to rounded, primary lateral veins 5–7, ovary 4-locular, seeds yellowish (*P. propinquum*), plants widely distributed in the Eastern Brazil ..... 7.
7. Leaf blade oblong or ovate-oblong, petiolar sheath extending to the leaf base, locules 2-seriate ..... ***P. propinquum* Schott (1856: 78)**
– Leaf blade oblong to elongate, petiolar sheath ending below the leaf base, locules 4-seriate ..... ***P. sonderianum* Schott (1857: 237)**

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