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A new species of *Philodendron* (Araceae) from an enclave of Atlantic rainforest in Minas Gerais State, Brazil

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Abstract

During a field expedition in the Reserva Biológica da Mata Escura, an enclave of Atlantic Rainforest in Minas Gerais State, Southeastern Brazil, a remarkable new species of *Philodendron* was found. Here the new species is described, illustrated and compared to morphologically close species.

Keywords: aroids, conservation, Jequitinhonha, taxonomy

Introduction

The second largest genus of Araceae, *Philodendron* Schott (1829: 780) (Boyce & Croat 2018), is especially highly diverse in tropical rainforests, such as the Atlantic and Amazonian Forests (Loss-Oliveira *et al.* 2016). Despite the increased level of deforestation (SOS Mata Atlântica & INPE 2019), the Atlantic Forest houses an incredible diversity of species and holds the majority of endemic species of the genus in Brazil (BFG 2015).

Traditionally divided into the subgenera *Philodendron*, *Pteromischum* (Schott 1856: 77) Mayo (1989: 168) and *Meconostigma* (Schott 1832: 20) Engler (1899: 554), the genus was recently recircumscribed to encompass only the subgenera *Philodendron* and *Pteromischum*, whereas the subgenus *Meconostigma* was recognized as a distinct lineage named *Thaumatophyllum* Schott (1859: 31.) (Sakuragui *et al.* 2018). *Philodendron* subgen. *Philodendron* is the richest group, being itself dived into ten non-natural sections (Vasconcelos *et al.* 2018), of which section *Macrobelium* (Schott 1856: 96) Sakur. (Sakuragui *et al.* 2005: 469) is the most representative in the Atlantic Forest, accounting to ca. 45% of the species richness in the biome (BFG 2015). This section is surely the best known in Brazil, since it was the only subjected to a taxonomic revision (Sakuragui *et al.* 2005), and shows two major geographic groups of species in the Atlantic and Amazonian forests (Sakuragui 2001). In the last years, many new species belonging to this section were described, especially from the Atlantic Forest, but the general geographic pattern remains the same: even species with wide distribution (as *P. cordatum* Kunth ex Schott (1860: 268) in the Atlantic Forest or *P. megalophyllum* Schott (1860: 279) in Amazonia) are restricted to their biomes. The only exception is *P. acutatum* Schott (1856: 94), which occurs in both biomes (Sakuragui 2001, BFG 2015).

Here a new species of *Philodendron* subgen. *Philodendron* sect. *Macrobelium* from the Brazilian Atlantic Forest recently collected is reported, described and illustrated. The new species is similar to two Amazonian species of section *Macrobelium*, comes from an enclave of Atlantic Forest in Minas Gerais State, Brazil, and represents an interesting addition to the *Philodendron* composition in this vegetation domain.

Material and methods

During a fieldwork conducted in Reserva Biológica da Mata Escura (RBME), a protected area of Atlantic Forest in Minas Gerais State, a new species of *Philodendron* was found. It was recognized as belonging to subgenus *Philodendron*

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section *Macrobelium* and analyzed through the identification key of the section (Sakuragui *et al.* 2005). The species was also compared to morphologically similar species using material from INPA, K and RB herbarium (acronyms according to Thiers, continuously updated). The descriptive terminology follows Stearn (2004) and Mayo (1991). Morphological analyzes of fresh and dry materials were performed with the aid of a stereoscopic microscope.

Taxonomy

Philodendron theofiloanum Calazans, *sp. nov.* (Figs 1, 2)

Philodendron theofiloanum is most similar to the Amazonian *Philodendron megalophyllum* Schott, but the former has cordate-sagittate leaves, ovary 7–8-locular and locules 3–4-ovulated.

Type:—BRAZIL. Minas Gerais: Jequitinhonha, Reserva Biológica da Mata Escura, estrada para o Mirante da Preguiça, 16º20’27.5”S, 40º59’25.8”W, 11 December 2018, *R.T. Valadares 1947* (holotype: VIES!; isotypes: BHCB!, HDJF!, HVC!, R!).

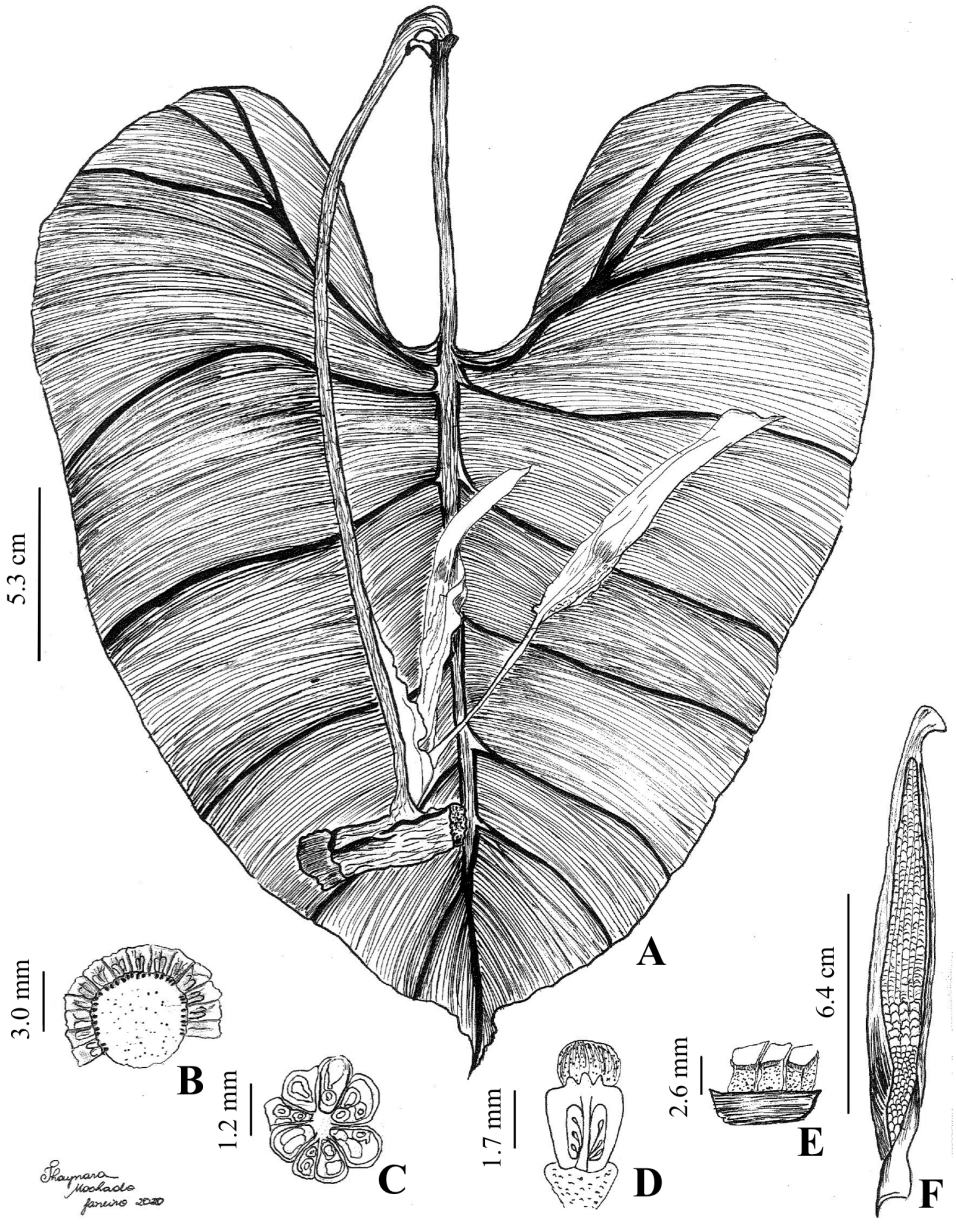

FIGURE 1. *Philodendron theofiloanum*. **A.** Dry leaf and inflorescences. **B.** Transversal cut of fertile male zone of the spadix showing the stamens in longitudinal cut. **C.** Transversal cut of a female flower showing the 8-locular ovary. **D.** Longitudinal cut of a female flower showing locules 3–4-ovulated with basal placentation. **E.** Side view of staminodes. **F.** Inflorescence (spathe partially removed). **A–F** from *R.T. Valadares 1947* (VIES).

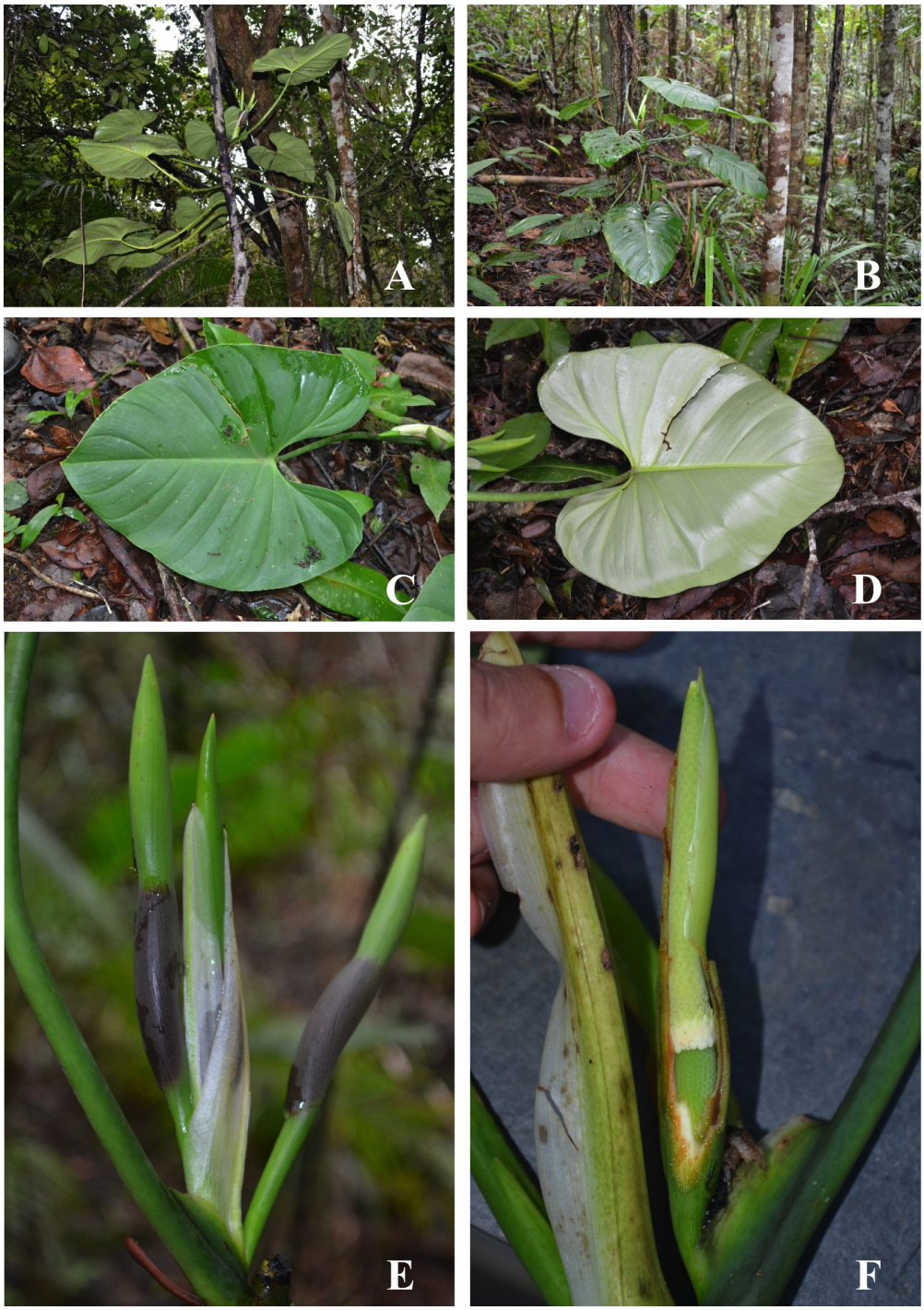

FIGURE 2. *Philodendron theofiloanum*. **A–B.** Habit in riparian forest inside Seasonal Semideciduous Forest. **C.** Leaf in adaxial view. **D.** Leaf in abaxial view. **E.** Group of inflorescences of a floral sympodium evidencing the external coloring of the spathe. **F.** Inflorescence with a longitudinal cut on the spathe to show the spadix and floral zones coloration. Photos from R.T. Valadares.

Herb perennial, hemiepiphytic. *Internodes* 0.5–3.0 cm long, cylindrical, glossy green to brownish, drying paler brown; intravaginal squamules absent. *Prophyll* 10.5–12.0 × 0.7–1.0 cm, navicular, deciduous, 2-keeled, smooth, cream, drying dark brown. *Petiole* 15.0–32.0 × 0.5 cm, semiterete to terete, glossy green, not striated, drying brown; leaf blade 23–32 × 16–24 cm, broad ovate to ovate, cordate-sagittate, sometimes slightly asymmetric, apex acuminate, acumen 0.5 cm long, curved, margin entire, base cordate, membranaceous, smooth, strongly discolor, glossy green adaxially, paler abaxially, drying chartaceous, striated, brownish, slightly discolor; anterior division 16.5–24.0 cm long, midrib impressed on both faces, drying paler to dark brown, primary lateral veins 5–6 pairs, arising from midrib at 50–60º angle, arcuate to margin, impressed on both faces, drying paler to dark brown on both faces, prominent abaxially, secondary veins conspicuous, parallel to primary veins, numerous, drying evident and prominent on both

faces; posterior divisions 6.0–8.0 cm long, cordate, 2–3 primary acroscopic veins, basal denudation 1.5–2.5 cm long. *Inflorescence* 2–3 per floral sympodium; peduncle 15–30 cm long, longer in the external inflorescences, cylindrical, glossy green, striated; spathe 6.5–13.5 cm long, ovate, acuminate, acumen 0.5–1.0 cm long, slightly constricted, externally green towards the apex, dark violet at the base, striated, internally green towards the apex, reddish-green to vinaceous at the base, resin canals internally visible; stipe absent; spadix 6.0–11.5 cm long, thick; fertile male zone 4.5–7.0 cm long, greenish; intermediate sterile zone 0.3–0.5 cm long, cream; female zone 2.0–3.5 cm long, green; stamens ca. 2.0 mm long, (2–) 4 grouped, prismatic; intermediate staminodes ca. 3.0 mm long, prismatic; gynoecium 3.0–4.0 mm long, ovary barrel-shaped, 7–8-locular, 3–4-ovulated, placentation basal. *Berries* unknown. *Seeds* unknown.

Distribution and ecology:—The new species is only known from the populations at RBME, a conservation unit located nears the Jequitinhonha River, in Jequitinhonha municipality, northeastern region of Minas Gerais State (Figure 3). RBME represents remnants of Atlantic Forest surrounded by Cerrado and Caatinga in patches of Seasonal Semideciduous Forest, Seasonal Deciduous Forest, Ombrophilous Dense Forest and high-altitude grassland with sandy soil ("refúgios ecológicos", sensu IBGE 2012) (Melo 2005) (Figure 4). *Philodendron theofiloanum* was only found growing as hemiepiphyte in Ombrophilous Dense Forest and riparian forest inside Seasonal Semideciduous Forest, ranging from 950 to 1100 m in elevation.

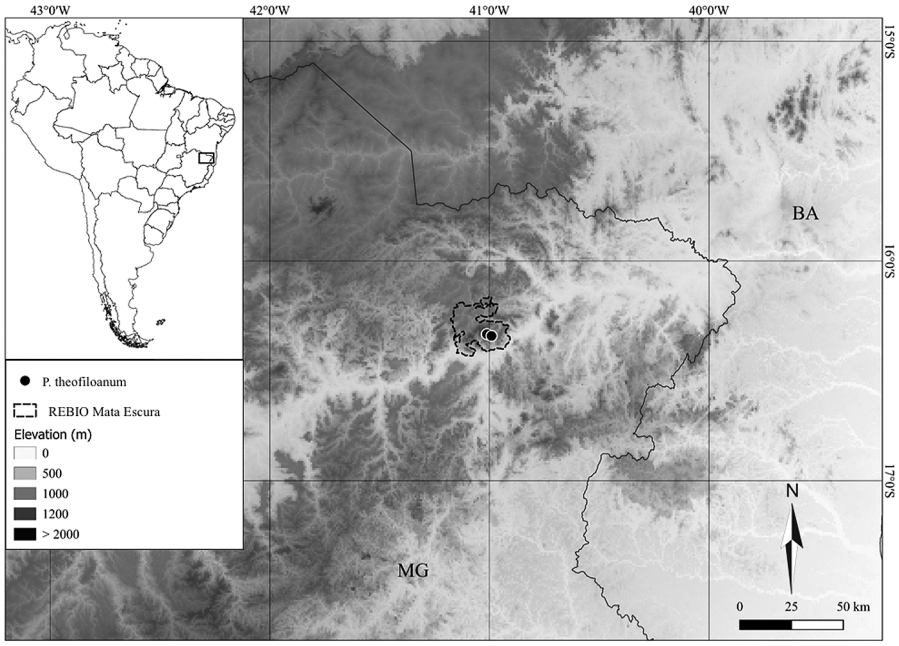

FIGURE 3. Distribution map of *Philodendron theofiloanum*.

Field observations indicate that populations in riparian forest present adult individuals smaller than that from Ombrophilous Dense Forest (R.T. Valadares, pers. comm.). The species is also frequently found growing together with *P. cordatum*, *P. ornatum* Schott (1853: 378) and *Anthurium intermedium* Kunth (1841: 70).

Conservation status:—For now, the species must be considered as Data Deficient (DD), as more information is needed regarding the populations and their geographic distribution. However, due to the singularity of RBME, compound of patches of different phytophysiognomies of Atlantic Forest and ecotones, and to the surrounding area highly deforested (Melo 2005), it will not be surprisingly if *P. theofiloanum* are restrict to there. Satellite images show that the peculiar vegetation of RBME extend northwest close to the limits of Espinhaço Range, but are strongly modified, especially by mining activity, and probably other areas suitable to the occurrence of *P. theofiloanum* must be almost completely degraded.

As a general field observation, in the mountain ranges of the Southern Brazilian Atlantic Forest, many species of *Philodendron* founds optimal conditions to grown up to 800-900 m in elevation, especially in those relatively close to the coast. This can be easily observed through the altitudinal gradient in mountain ranges like Serra dos Órgãos (Rio de Janeiro State), Itatiaia (Rio de Janeiro and São Paulo States) or Caparaó (Espírito Santo and Minas Gerais States). In RBME, however, *Philodendron* species occur beyond this altitudinal range and form dense populations much more distant from the influence of coastal moisture, what can indicate some peculiarity in this Atlantic Forest remnant or perhaps in the species adaptability.

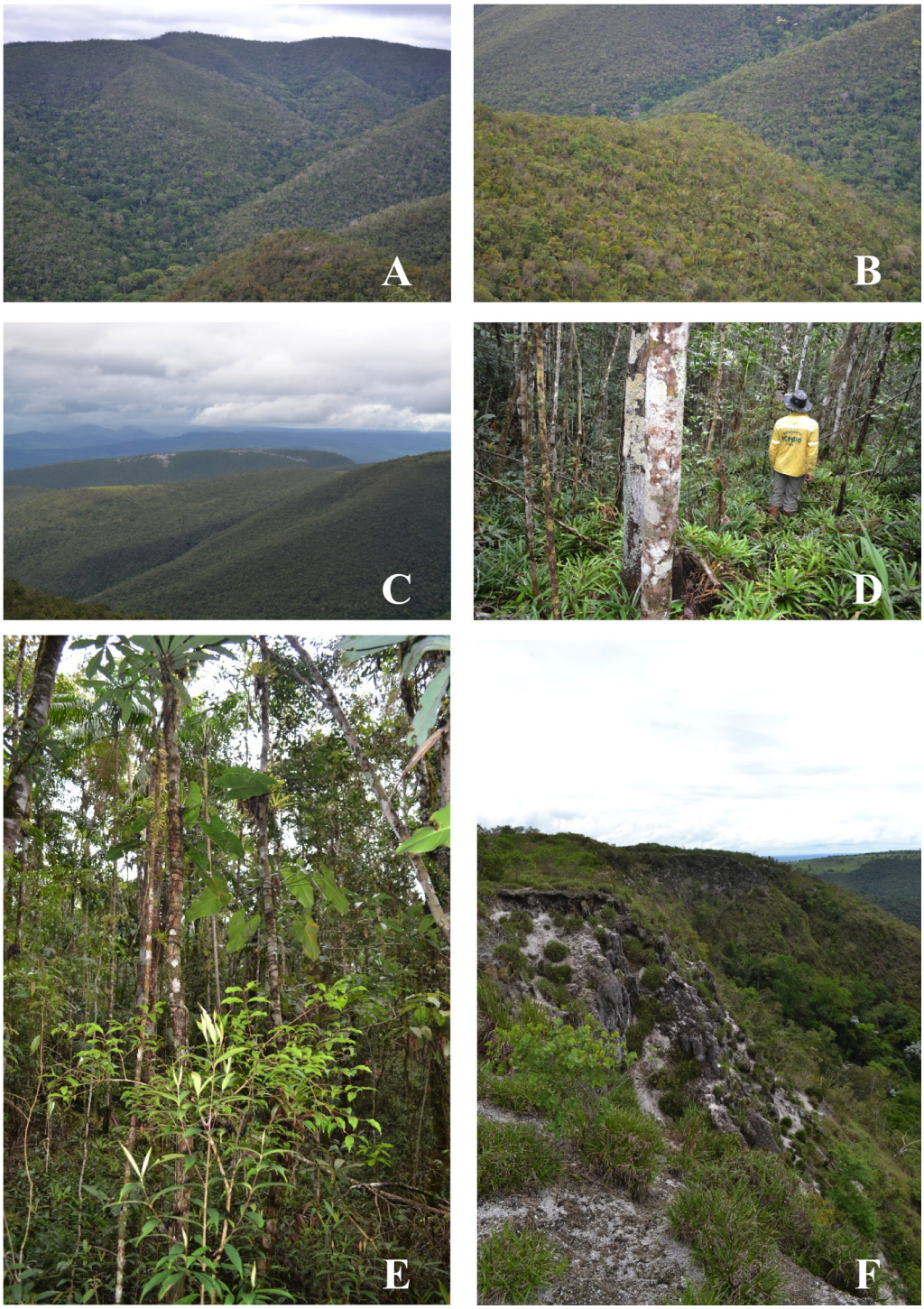

FIGURE 4. Vegetation of Reserva Biológica da Mata Escura. **A.** Valley background showing the riparian forest. **B–C.** General appearance of the high-altitude grassland ("refúgios ecológicos", sensu IBGE 2012). **D.** Interior of riparian forest inside Seasonal Semideciduous Forest. **E.** Interior of Ombrophilous Dense Forest. **F.** Scarp showing the sandy soil of the high-altitude grassland. Photos from R.T. Valadares.

Phenology:—Collected in flower in December.

Etymology:—The species was named in honor to Dr. Rodrigo Theófilo Valadares for his great contribution to the knowledge and conservation of Brazilian aroids.

Paratype:—BRAZIL. Minas Gerais: Jequitinhonha, Reserva Biológica da Mata Escura, estrada sentido oposto ao Mirante da Preguiça, 16º19'58.4"S, 41º00'40.8"W, 11 December 2018, *R.T. Valadares 1954* (R!, VIES!).

Features and affinities:—*Philodendron theofiloanum* is easily recognized in the field by its glossy green cordate-sagittate leaves and inflorescences grouped in 2 to 3 units per sympodium with spathes dark violet colored at the base

(see Figure 2C-E). This set of characteristics is not known to any other species occurring in the Atlantic Forest, but makes *P. theofiloanum* close to *P. megalophyllum* and *Philodendron myrmecophilum* Engler (1905: 127), two common species from the Amazonian Forest. The new species differs from them by its cordate-sagittate leaves (vs. sagittate to hastate leaves in both other species), ovary 7–8-locular and locules 3–4-ovulated (vs. 4–5-locular and locules 1-ovulated in both other species). Another interesting feature is the apparent strong relationship between *P. megalophyllum* and *P. myrmecophilum* and ant nests (Croat 1997, Sakuragui *et al.* 2005), not observed in the populations of *P. theofiloanum* at RBME. It is certainly premature to affirm that the species does not have the same relationship, but an indication can be pointed out.

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