



A new species of Araceae Juss. from Central Amazonia, Brazil: *Philodendron rio-pretense*

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Summary. *Philodendron rio-pretense* C.A.S.Bat. & M.L.Soaes belongs to the subgenus *Philodendron*. This newly described species is similar to *P. carinatum* and *P. wurdackii* but differs from these species primarily due to a combination of the following characteristics: persistence of the prophyll (twisted); stipe short, locules 4 – 7, ovules 1 – 2 and funiculus with trichomes. Notes on the habitat, geographic distribution and conservation status are also provided.

Key Words. Epiphyte, Monocotyledons, Rio Preto da Eva, tropical rain forest.

Introduction

Araceae Juss. is part of the monocotyledons, currently organised into 144 genera and 3,645 species, the genus *Philodendron* Schott (1829: 780) is the second most diverse in the family, with 487 described species, and an estimated c. 1,000 species (Boyce & Croat 2020). The natural occurrence of the genus is predominantly in tropical and subtropical forests of Latin America (Canal *et al.* 2019).

In Brazil, there are 152 species currently recorded, of which 70 species are considered endemic (Flora e Funga do Brasil 2022). In the Amazon Biome, 97 species are recorded, in which the state of Amazonas stands out with 75 records (Flora e Funga do Brasil 2022). This genus forms the largest taxonomic component of the epiphytes in quantitative community studies in Central Amazonia (Irumé *et al.* 2013; Boelter *et al.* 2014), which demonstrates the importance of systematic studies for this genus in the Amazon region. Knowledge of this diverse genus in the Brazilian Amazon is of paramount importance for the conservation of native species. In the present study, we report a new and rare species, *Philodendron rio-pretense* sp. nov. Notes on the habitat, geographic distribution, phenology, conservation status, and a table of the morphological characters are also provided.

Material and Methods

In December 2018, during phenological monitoring of trees in a mature forest parcel in Cabo Frio Reserve (2°23'30"S, 59°55'0"W), part of the continuous forests control areas of the Biological Dynamics of Forest Fragments Project, in the Area of Relevant Ecological Interest, a Conservation Unit category (ARIE PDBFF in Portuguese) located in the municipality of Rio Preto da Eva–AM, 80 km North of Manaus, a *Philodendron* species caught our attention. At the time, a sterile sample of the plant was collected and morphotyped. As the area was being periodically monitored, in February 2019, we observed that the plant was fertile, therefore, appropriate to be recollected for optimal observation and description. After extensive analysis of the sample, we concluded that it was a new species, *Philodendron rio-pretense* sp. nov., for Brazil.

The taxonomic analysis of *Philodendron rio-pretense* was based on material collected in the field and cultivated material, and later by comparison of two similar species deposited in the herbaria INPA and UNB. The material was available online at the Global Biodiversity Information Facility (www.gbif.org) and Species Link (www.splink.cria.org.br). A Leica® magnifier (model S8APO) attached to a digital camera Canon® (model eos rebel t5) was used to study the material collected in Amazonas state. The descriptions

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follow the terminology of Soares (1996), Croat (1997), and Beentje (2012). A new map of occurrence using R software was drawn (R Core Team 2020). Conservation status category, the area of occupation (AOO), and the extent of occurrence (EOO) were calculated according to the IUCN Red List criteria (IUCN 2019), using the ConR package (Dauby *et al.* 2017).

Taxonomic Treatment

Philodendron rio-pretense C.A.S.Bat. & M.L.Soaes **sp. nov.** Type: Brazil, Amazonas: Rio Preto da Eva, BR-174, Parcelas do PDBFF, acampamento do Cabo Frio; 2°23'30"S, 59°55'0"W, 15 Feb. 2018 (fl.), C. A. S. Batista 16 (holotype INPA!).

<http://www.ipni.org/urn:lsid:ipni.org:names:77307489-1>

Plant scandent. *Stem*: Short, flattened internodes 1 – 1.5 × 1.5 – 2.5 cm, tightly attached to the phorophytes, flagelliform branch, elongated, rounded, opaque light green, with roots at the nodes. *Root*: 1 – 6 grampiform, aerial roots, 0.4 – 1.5 cm in diam. per node. *Prophyll*: 5.5 – 10.3 × 0.6 – 2.5 cm, persistent, twisted, striated, firm, green, with yellowish margin, transparent resin with an astringent fragrance, brown to dark green, very evident. *Leaves*: numerous 7 – 14, discreet sheath; petiole length 6 – 8 cm conspicuous, green, with purple horizontal line at the apex, flat adaxially, rounded abaxially, with many resin ducts in horizontal section, translucent resin, when oxidised brown with unpleasant smell. *Leaf blade* 25 – 36 × 8.5 – 15 cm, oblong, obovate to oblanceolate, blade slightly wavy; acuminate apex, base truncate to cordate; abaxial face light green opaque, adaxial face bright green. *Inflorescence*: 1 – 4 per floral sympodium; cataphyll 5.0 – 7.5 × 2.0 – 3.8 cm, dark brown, striated, with two keels; short peduncle 5.2 – 8 × 0.5 – 1.2 cm, cylindrical, clear green–white, stained with vertical white stripes, near the insertion of the spathe, resin transparent with sweet fragrance; spathe 7 – 9 cm long, slightly constricted, tube 3.6 – 4.5 cm long, 2.0 – 2.3 cm in diam., light green outside, white inside with orange vertical stripes, producing resinous droplets at anthesis; lamina 3.4 – 4.5 × 3 – 3.5 cm at anthesis, light green outside, white inside, acuminate apex, decurrent for 2 cm. Spadix 6.5 – 7.5 cm long, rounded apex; short stipe 0.5 – 0.7 × 0.5 – 0.6 cm, female zone 2.5 – 2.8 × 0.7 – 1.0 cm, c. 2 cm adnate to spathe, intermediate sterile male zone 0.5 – 1.0 × 1.0 cm, fertile male zone 3.0 – 4.0 × 0.5 – 1.0 cm, producing occasional orange resin with a sweet fragrance. *Flowers*: androecium 3 – 4 stamens, 8.3 – 8.8 × 3.5 – 4.4 mm; staminode c. 1 mm; gynoecium 2.2 – 2.7 × 1.8 – 2.0 mm, prismatic; ovary sub-cylindrical; locules 4 – 7, ovoid c. 2 mm width; ovules 1 – 2 per locule, 4 – 5 mm long, anatropous, funicle smaller than the ovules,

often with trichomes at base; axile placentation, with ovules inserted near the base; stigma discoid to capitate. Figs 1 & 2.

RECOGNITION. *Philodendron rio-pretense* belongs to subgenus *Philodendron*. This species is similar to *P. carinatum* E.G.Gonç. and *P. wurdackii* G.S.Bunting, both species have flat stems, oblanceolate to obovate leaf shape and inflorescences in a sympodium ranging from 1 – 4. However they differ from *P. rio-pretense* mainly by the combination of the following characteristics: persistence of the prophyll (vs deciduous); prophyll shape twisted (vs elongated); short stipe 0.5 – 0.7 cm long (vs sessile in *P. carinatum* and 1.3 cm long in *P. wurdackii*); axile placentation (vs sub basal in *P. carinatum* and basal in *P. wurdackii*); locules 4 – 7 (vs 6 – 8 in *P. carinatum* and 6 in *P. wurdackii*), ovules 1 – 2 (vs 2 – 4 in *P. carinatum* and 1 in *P. wurdackii*), funiculus smaller than the ovules and with trichomes (vs as long as the ovules in *P. carinatum*).

DISTRIBUTION. *Philodendron rio-pretense* is only known from the municipality of Rio Preto da Eva, state of Amazonas, Brazil (Map 1).

ADDITIONAL SPECIMENS EXAMINED. BRAZIL: Amazonas: Rio Preto da Eva, BR-174, Parcelas do PDBFF, acampamento do Cabo Frio, 2°23'58"S, 59°54'04"W, 18 Feb. 2019 (fl.), C. A. S. Batista 19 (INPA!); Rio Preto da Eva, BR-174, PDBFF, Cabo Frio Reserve, 2°23'30"S, 59°55'0"W, 20 Feb. 2019 (fl.), C. A. S. Batista 21 (INPA!); Rio Preto da Eva, BR-174, Parcelas do PDBFF, acampamento do Cabo Frio, 2°24'30.9"S, 59°50'01.1"W, 13 May 2020 (fl.), C. A. S. Batista 20 (INPA!).

HABITAT. The species was recorded from “terra firme” (upland) humid tropical rainforests, at elevations between 50 – 125 m, with clay soils where tree species such as *Eschweilera* spp., *Minuartia guianensis* Aubl., and *Naucleopsis* spp. are common. The individuals occur on the trunk of the trees between 2 and 3 metres high.

CONSERVATION STATUS. This species has an EOO of 8 km² and an AOO of 8 km², representing two subpopulations (radius 5 km). Therefore, *P. rio-pretense* is assigned a preliminary status as Endangered (EN): B1a+2a according to IUCN Categories and Criteria. Anthropogenic disturbance as a result of deforestation is the greatest threat to this species in its habitat.

PHENOLOGY. The inflorescences can be observed from December to February, when cultivated it can flower up to May. Infructescence unknown.

ETYMOLOGY. As the species appears to be rare, the specific epithet refers to the location where the species was collected.

NOTES. *Philodendron rio-pretense* can be recognised by the oblanceolate leaf blade, persistent and twisted prophyll, petiole with a purple horizontal line on the



Fig. 1. Holotype of *Philodendron rio-pretense* (C. A. S. Batista 16, INPA!, Barcode: INPA 284466) from the state of Amazonas.

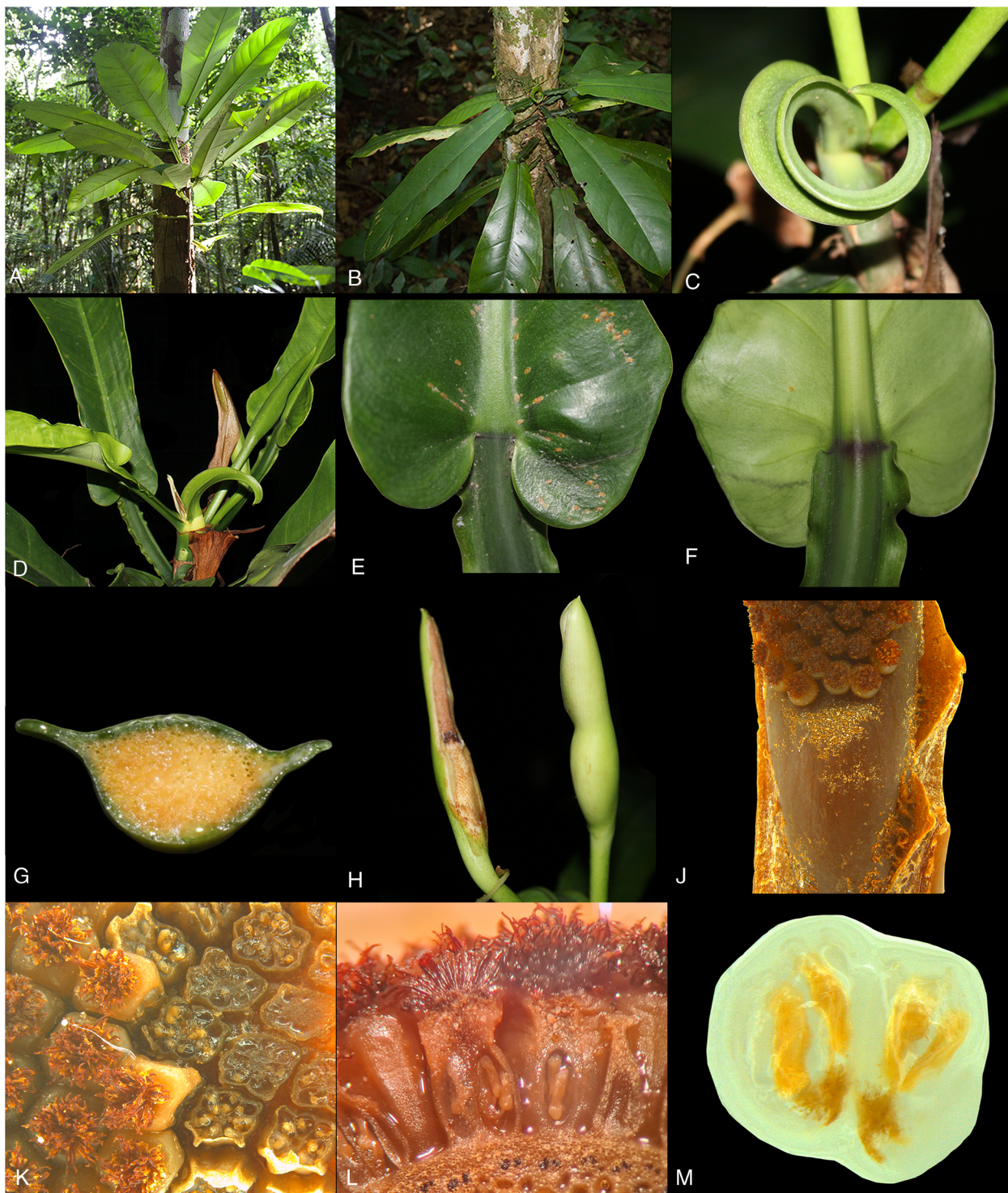
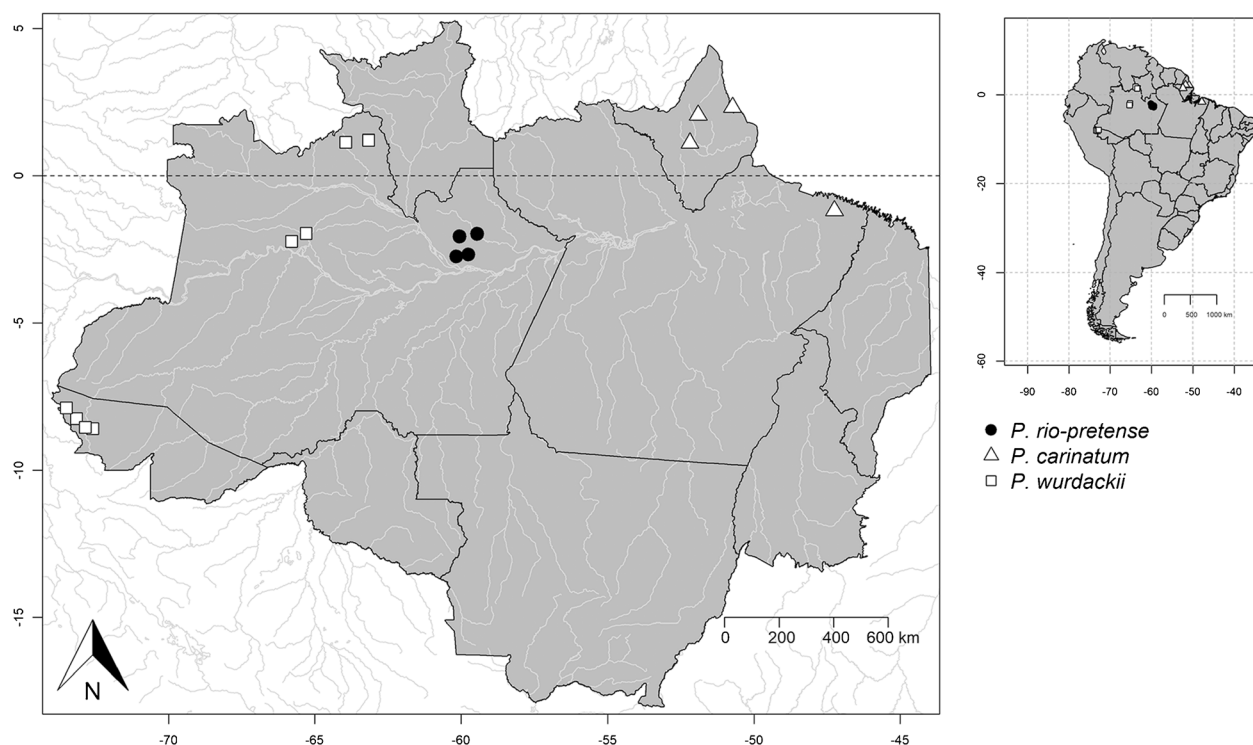


Fig. 2. *Philodendron rio-pretense*. A habit, adult plant; B juvenile plant; C prophyll; D cataphyll; E leaf blade adaxial surface; F leaf blade abaxial surface; G cross section of the petiole; H inflorescence at anthesis; J stipe; K female zone, cut showing the locules, L longitudinal section of the female zone, gynoecium in a lateral view showing ovules; M placenta, showing the ovules and trichomes.



Map 1. Map showing the known distribution of *Philodendron rio-pretense* and the two morphologically related species of *Philodendron* in North Brazil.

adaxial face, short stipe, axile placentation, funiculus with trichomes and smaller than the ovules. The main morphological characteristics that differentiate *P. rio-pretense* from the two closely related species are presented in Table 1. It is also observed that the distribution of the three species strongly indicates that they are different populations, separated by long distances, rivers and altitude, with collections carried

out near tributaries such as Lake Maraã (Western Amazonas state) for *P. wurdackii* and Rio Calçone (Eastern amazon states) for *P. carinatum*, while for *P. rio-pretense*, it is found in upland forest, with altitude ranging from 50 – 125 m. Finally, the comparative phenology between the species, evaluated by the flowering periods added to the herbarium material did not indicate any difference between the three

Table 1. Comparison of vegetative and reproductive characters showing morphological differences among *Philodendron rio-pretense* C.A.S.Bat. & M.L.Soaes, *Philodendron carinatum* E.G.Gonç. and *Philodendron wurdackii* G.S.Bunting.

Characteristics	<i>P. rio-pretense</i>	<i>P. carinatum</i>	<i>P. wurdackii</i>
Prophyll length (cm)	5.5 – 10.3	10.5 – 14	undescribed
Prophyll persistence	persistent	deciduous	deciduous
Prophyll shape	twisted	elongate	elongate
Petiole length (cm)	6 – 8	6 – 9	8 – 24
Petiole feature	purple horizontal line	red ring	spongy
Leaf blade shape	oblancoolate	obovate	oblancoolate
Inflorescences number	1 – 4	2 – 3	1 – 3
Cataphyll length (cm)	5.0 – 7.5	undescribed	undescribed
Spathe length (cm)	7 – 9	8 – 9	7 – 13
Spadix length (cm)	6.5 – 7.5	7.5 – 8.5	8 – 16
Stipe length (cm)	0.5 – 0.7	sessile	1.3
Placentation	axile	sub-basal	basal
Locules number	4 – 7	6 – 8	6
Ovules per locule	1 – 2	2 – 4	1
Funicle	with trichomes	undescribed	undescribed
Funicle length	smaller than the ovules	as long as ovules	undescribed

species, most species start flowering in December and end in February, however, when cultivated the species present an extension of the period of flowering up to May, while *P. carinatum* starts flowering earlier, in October.

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Declarations

Conflict of interest. The authors declare that they have no conflict of interest.

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