

**A NEW RHEOPHYTIC SPECIES OF *PHILODENDRON*
SUBGENUS *PTEROMISCHUM* (ARACEAE)
FROM CENTRAL PERU**

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ABSTRACT

***Philodendron rocioae* Grayum sp. nov.** (Araceae), described from the Huánuco and Pasco Regions of central Peru, is the fourth species of *Philodendron* subg. *Pteromischum* known to be rheophytic.

RESUMEN

***Philodendron rocioae* Grayum sp. nov.** (Araceae), descrita de las regiones de Huánuco y Pasco en la parte central de Perú, es la cuarta especie de *Philodendron* subg. *Pteromischum* con hábito reofítico.

Philodendron Schott, restricted to the New World tropics, is the second largest genus of the family Araceae with an estimated total (extrapolating from Canal et al. 2018) of about 600 currently accepted species and many more awaiting description. These are apportioned among three subgenera, of which *Philodendron* subg. *Pteromischum* (Schott) Mayo, characterized by anisophyllous sympodial growth in adult vegetative shoots and leaves with extensively sheathed petioles, is the second largest. No comprehensive modern revision of subg. *Pteromischum* has yet been published, but 33 species were recognized in a revision covering Pacific and Caribbean tropical America (Grayum 1996), in which about 35 additional species were estimated to occur in Atlantic South America.

Most species of subg. *Pteromischum* are hemiepiphytic vines, but several are known to be at least facultatively terrestrial. Of the latter, just three species, all Brazilian and recently described, have been documented as exhibiting a rheophytic habit (indeed, these are apparently the only such examples in the entire genus): *Philodendron carajasense* E.G. Gonç. & A.J. Arruda (2014), of Pará State; *Philodendron flumineum* E.G. Gonç. (2000), of Goiás State and the Distrito Federal; and *Philodendron rheophyticum* Buturi & Temponi (Buturi et al. 2015), of Paraná State. Here, a fourth rheophytic species of subg. *Pteromischum* (and *Philodendron*) is described, from the Amazon basin of central Peru.

This study was conducted in the MO herbarium using dried material, including many specimens on loan from other institutions. The numbers appended to most specimen citations are herbarium accession numbers, not barcodes (which, if used at all, are often not visible on the specimens). An exclamation point (!) indicates that I have studied the actual specimen in hand, whereas the same symbol inverted (¡) means that I have seen only an image. The description that follows adheres generally to the format of Grayum (1996), where "P/L" specifies the ratio of petiole length to laminar length, "L/W" the ratio of laminar length to laminar width, "P/S" the ratio of peduncle length to spadix length, and "F/S" the ratio of the length of the female portion of the spadix to that of the entire spadix. "IQI" is an index of leaf asymmetry, calculated by dividing the width of the widest side of the lamina by the total laminar width, multiplying the quotient by 100, and subtracting 50 from the product (a perfectly symmetrical leaf would have an IQI of 0, with higher numbers indicating progressively greater asymmetry).

Grayum: *Philodendron rocioae* sp. nov., from Peru

PHILODENDRON ROCIOAE Grayum, sp. nov. TYPE: PERU. Pasco. Oxapampa, Dist. Palcazú, Comunidad Nativa Alto Lagarto - Reserva Comunal Yanesha, remanente de bosque primario, 10°08'04" S, 75°22'06" W, 500 m, 12 Sep 2009 (fl), R. Rojas & G. Ortiz 6937 (holotype: HOXA-048914; isotypes: MO-7012141!, USM-257067;). Figure 1.



Figure 1. *Philodendron rocioae*. Holotype (Rojas & Ortiz 6937, HOXA-048914), with inflorescence at or near anthesis.

Similar to *Philodendron guttiferum*, *P. inaequilaterum*, and other members of subg. *Pteromischum* in its leaf-epidermal micromorphology (prominulous reticulate venation enclosing granular areolae) but different from those in its rheophytic habit, relatively narrow leaf blades, and relatively long peduncles; among other rheophytic members of subg. *Pteromischum*, differs from *Philodendron carajasense* by its larger laminae, longer peduncles, and longer spadices; from *P. flumineum* by its more extensively sheathed petioles and laminae with more numerous primary lateral veins and a distinctive epidermal micromorphology; and from *P. rheophyticum* by its more extensively sheathed petioles, narrower laminae with clearly evident primary lateral veins, and shorter peduncles.

Terrestrial, epilithic or (less commonly) (hemi)epiphytic, creeping or scandent, ca. (0.1–)0.3–0.6(–1.5) m tall, along stream beds or banks, often forming dense colonies or clones. **Internodes** to ca. 2.5 cm long, 0.5–0.6 cm wide, drying light brown and sulcate, the epidermis becoming transversely fissured; roots absent at distal nodes. **Petiole** (5.1–)6.9–14.3 cm long, P/L=(0.32–)0.51(–0.57), extensively sheathed (93–100%), the sheath erect to involute, adnate or with the free portion prolonged apically to ca. 0.55 cm; unsheathed portion of petiole obsolete to ca. 0.55 cm long. **Lamina** (13.6–)18.0–25.5(–27.1) cm long, (3.2–)4.3–7.2(–8.8) cm wide, L/W=(2.58–)2.94–4.43(–5.31), IQI=1–9(–11), glossy, lanceolate to more or less narrowly elliptical or oblanceolate and generally somewhat falcate, cuneate basally, more or less broadly acuminate and cuspidate apically (the acumen to ca. 1.7 cm long); primary lateral veins 9–13 per side, 0.2–2.0 cm apart; abaxial surface drying with the tertiary and reticulate veins prominulous and enclosing moderately granular areolae; white stitching often evident (especially along resin canals); resin canals often visible (flanking lateral veins); adaxial surface similar, but the reticulate veins somewhat less prominulous; white stitching very occasional, or not evident; resin ducts not visible. **Inflorescences** solitary or (less commonly) paired; cataphylls seldom present, 2.0–4.3 cm long, 0.5–1.1 cm wide, narrowly ovate to lanceolate, sharply 2-keeled; peduncle (1.7–)2.7–3.6 cm, P/S=(0.19–)0.30–0.40; spathe at anthesis 10.3–14.3 cm long, 1.3–2.3 cm wide, pale yellow to pale green or greenish white externally; spathe drying moderately granular and more or less densely white-lineate externally, internally uniformly and densely granular, with longitudinal secretory striations in basal 54–63%; acumen of spathe 0.8–1.1(–1.9) cm long, sometimes reflexed. Stipe of spadix 0.3–0.9 cm long; spadix 7.8–10.7 cm long, the fertile male portion 0.45–0.75 cm wide; sterile male zone 0.5–0.9(–1.2) cm long; female portion of spadix (1.2–)1.6–2.2(–2.6) cm long, F/S=(0.15–)0.19–0.24, 0.7–1.0 cm wide (to 2.5 cm in fruit); fertile male flowers 1.0–1.3 mm long, 0.8–1.3 mm wide, irregularly polygonal, more or less cylindrical-claviform; sterile male flowers 1.2–1.8 mm long, 1.0–1.4(–1.9) mm wide, irregularly rounded-polygonal, claviform; female flowers 1.3–1.5 mm long, 1.0–1.1 mm wide, the styler canals 3(?). **Fruits** green or greenish to yellowish green (immature). **Seeds** 1.0–1.1 mm long, 0.2–0.3 mm wide, more or less fusiform, finely beaded-striate.

Additional specimens examined. PERU. **Huánuco.** Prov. Pachitea, Dtto. Puerto Inca, Bosque Nacional de Iparia, región de "bosque seco tropical (sensu Tosi 1960) a lo largo del Río Pachitea" cerca del pueblo de Puerto Inca (a unos 85 km. en distancia lineal de la confluencia con el Río Ucayali), 400–500 m, 17 Dec 1968 (fl, fr), *Schunke* V. 2889 (F-1722539!, G-7136/25!, G-7136/26!, MO-6813483!, MO-6813484!, NY [2 sheets!], US-2707867!). **Pasco.** Oxapampa, Pichis Valley, near Paujil, 10 km downriver from Puerto Bermúdez, E side of river across from big bend with large island, forest on low hills and small ravines, 10°15'S, 74°55'W, 300 m, 23 Sep 1982 (fl), *Foster* 8870 (F, MO-3004108!, USM-99773!); Oxapampa, Distrito Palcazú, Parque Nacional Yanachaga-Chemillén, cruzando el río Iscozacín, parcela Paujil 1 Ha., bosque primario muy húmedo tropical, 10°20'26"S, 75°15'11"W, 410 m, 14 Jul 2007 (fl), *Monteagudo et al.* 14285 (HOXA-034098j, MO-7012138!, USM); Oxapampa, Distrito Palcazú, Iscozacín, Parque Nacional Yanachaga-Chemillén, cruzando el río Paujil, bosque primario muy húmedo tropical, 10°19'55"S, 75°16'0"W, 400 m, 28 Jul 2007 (fl), *Monteagudo et al.* 14957 (HOXA-034101j, MO-7012139!, AMAZ, HUT, MOL, USM); Prov. Oxapampa, Puerto Laguna, 10°18'S, 75°10'W, 400–500 m, 13 Sep 1984 (fl), *Smith* 8456 (MO-3280126!, MO-3280127!); Oxapampa, Dist. Palcazú, Comunidad Nativa Alto Lagarto-Reserva

Comunal Yanasha, remanente de bosque primario, 10°8'4"S, 75°22'6"W, 500 m, 27 Sep 2008 (fl, fr), *Rojas & Ortiz 6153* (HOXA-055497j, MO-7012137!, USM); Oxapampa, Dist. Palcazú, Comunidad nativa Alto Lagarto - Reserva Comunal Yanasha, remanente de bosque primario, 10°9'7"S, 75°23'32"W, 584 m, 30 Jul 2010 (fl), *Rojas & Ortiz 7407* (HOXA-057471j, MO-7012142!, USM); Oxapampa, Distrito Oxapampa, Comunidad Nativa Alto Lagarto-Convento (Reserva Comunal Yanasha), remanente de bosque primario, 10°8'4"S, 75°22'6"W, 500 m, 30 Aug 2013 (fl), *Rojas & Ortiz 9389* (MO-7012146!); Oxapampa, Distrito Oxapampa, Comunidad Nativa Alto Lagarto-Convento (Reserva Comunal Yanasha), remanente de bosque primario, 10°8'4"S, 75°22'6"W, 500 m, 30 Oct 2013 (fr), *Rojas & Ortiz 9536* (MO-7012147!); Oxapampa, Distrito Palcazú, Comunidad Nativa Alto Lagarto, bosque primario, 10°6'15"S, 75°33'1"W, 800 m, 5 Oct 2007 (fr), *Rojas et al. 4734* (HOXA-035139j, MO-7012136!, USM); Oxapampa, Dist. Palcazú, Comunidad Nativa Alto Lagarto - Reserva Comunal Yanasha, remanente de bosque primario, 10°9'7"W, 75°23'32"W, 584 m, 10 Dec 2009 (fr), *Rojas et al. 7199* (HOXA-048167j, MO-7012143!, USM); Oxapampa, Dist. Palcazu, Comunidad Nativa Alto Lagarto - Reserva Comunal Yanasha, remanente de bosque primario, 10°8'4"S, 75°22'6"W, 500 m, 30 Sep 2013 (fl), *Rojas et al. 8632* (HOXA-058255j, HUT-55173j, MO-7012145!, USM); Oxapampa, Dist. Palcazu, Comunidad Nativa Alto Lagarto - Reserva Comunal Yanasha, remanente de bosque primario, 10°8'4"S, 75°22'6"W, 500 m, 20 Oct 2012 (fl), *Rojas et al. 8709* (HOXA-058435j, HUT, MO-7012144!, USM); Prov. Oxapampa, Rio Cacazú, 56 km from Villa Rica, 10°30'S, 75°10'W, 700 m, 26 Oct 1982 (fl, fr), *Smith & Foster 2661* (MO-3280677!, USM-71708!); Oxapampa, Dist. Palcazú, ataz camino al convento, bosque húmedo secundario sobre suelo arcillo-limoso, rojizo, 10°9'30"S, 75°19'34"W, 375–635 m, 9 Sep 2008 (fr), *Valenzuela et al. 12032* (HOXA-045431j, HUT, MO-7012134!, USM); Oxapampa, along road Chatarra–Cacazu, forest on steep, rocky slopes, 10°32'S, 75°4'W, 890 m, 10 Jul 2003 (fl), *van der Werff et al. 18231A* (MO-5879512!), *18263* (HOXA-00002564j, MO-7012135!); Oxapampa, Distrito Palcazú, Comunidad Nativa Yanasha Loma Linda, bosque primario sobre suelo rojizo, 10°20'17"S, 75°4'19"W, 411 m, 16 Jun 2010 (fl), *Vásquez et al. 36657* (HOXA-047839j, HUT, MO-7012140!, USM).

Distribution and phenology. *Philodendron rocioae* is endemic to the Amazon basin of central Peru, in the Huánuco (Prov. Puerto Inca) and Pasco (Prov. Oxapampa) regions, at 300–700(–900) m elevation. Populations have generally been found in stream beds or along stream banks in primary forest (or remnants thereof), where the plants often form dense colonies or clones. Although its overall geographic range is relatively small, the species occurs in at least three protected areas: Bosque Nacional de Iparia, Parque Nacional Yanachaga-Chemillén, and Reserva Comunal Yanasha. Flowering has been recorded from June through October and in December, and nearly ripe fruits in September, October, and December.

Etymology. The epithet honors Peruvian botanist Rocío del Pilar Rojas Gonzáles (HOXA), who has collected this species more often than anyone else.

Philodendron rocioae is an anomalous species of *Philodendron* subg. *Pteromischum* that is here assigned tentatively to sect. *Fruticosa* Grayum (1996), mainly on the basis of its lack of adventitious roots at the distal stem nodes, extensively sheathed petioles, and generally solitary inflorescences. Its peduncles, however, are unusually long (relative to the spadix length) by the standards of that section. The distinctive leaf-epidermal micromorphology (featuring prominulous reticulate veins enclosing granular areolae) and occasionally paired inflorescences appear to place the new species within the informal "*Philodendron guttiferum* group" of Grayum (1996: 14), which is also characterized by having orange ripe fruits (vs. whitish in most species of subg. *Pteromischum*); however, the coloration of fully ripe fruits has not been reported for *Philodendron rocioae*.

By virtue of its rheophytic habit and proportionately narrow leaves, *Philodendron rocioae* is quite distinct from the other species referred to the "*Philodendron guttiferum*" group, all of which are

hemiepiphytic vines with proportionately broader leaves. It seems highly unlikely, on biogeographic grounds alone, that *P. rocioae* might represent any of the aforementioned rheophytic *Pteromischum* species described from eastern Brazil (none of which was assigned to a section, let alone an informal group); nevertheless, comparisons are clearly in order. Because I have seen no original or verifiable herbarium material of either *Philodendron carajasense* or *P. rheophyticum*, my concepts of those species are based exclusively on their protologues. With that in mind: *Philodendron carajasense* differs from *P. rocioae* in having smaller laminae (7.2–17.3 cm long and 2–5 cm wide), shorter peduncles (1.0–1.3 cm), and shorter spadices (4.5–6.8 cm); *P. flumineum* (of which I have numerous specimens at hand) has petioles with the unsheathed portion significantly longer (to 4.7 cm) than in *P. rocioae* and laminae with fewer primary lateral veins (4–8 per side); *Philodendron rheophyticum* also has petioles with a longer unsheathed portion (to 3.1 cm), as well as wider (6.7–9.5 cm), obovate to (rarely) elliptical laminae with obscure primary lateral veins and longer peduncles (3.0–5.5 cm). Leaf-epidermal micromorphology has not been adequately described for *Philodendron carajasense* or *P. rheophyticum*, but that of *P. flumineum* does not concord with the pattern (i.e., prominulous reticulate venation delimiting granular areolae) characteristic of *P. rocioae* and the "*Philodendron guttiferum*" group.

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