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Two new species of *Plutarchia* (Ericaceae) from the southern Andes of Colombia

Dos especies nuevas de *Plutarchia* (Ericaceae) del sur de los Andes de Colombia

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Abstract:

Background and Aims: *Plutarchia* is a Neotropical genus belonging to the tribe Vaccinieae (Ericaceae), with 11 recognized species, 10 of which occur in Colombia. During field expeditions conducted in the departments Huila and Cauca, and following the examination of the collected specimens, two species were identified that do not correspond to any currently described taxa. The objective of this study was to describe and illustrate two new species of *Plutarchia* and to evaluate their morphological affinities, conservation status, and geographic distribution.

Methods: Field trips to the municipality Garzón (Huila) in 2018 and 2024, and the review of specimens in the herbaria K and UDBC from the department Cauca of the genus *Plutarchia* within the framework of a synopsis of the genus, resulted in the discovery of specimens that did not correspond to currently described species. The new species were described based on specimens deposited in the herbaria SURCO and UDBC, using the bibliography associated with the genus and the family. In addition, the conservation status is suggested according to the IUCN Red List criteria. Furthermore, they were compared with morphologically similar species.

Key results: *Plutarchia hildae* and *P. puraceense* are described and illustrated as two species that differ morphologically from previously described taxa. They occur in southern Colombia, in the departments Cauca and Huila. *Plutarchia hildae* is proposed as Critically Endangered (CR), whereas *P. puraceense* is proposed as Data Deficient (DD).

Conclusions: The two newly proposed species of *Plutarchia* increase the number of species in South America to 13 and reaffirm Colombia as the hotspot of this genus, representing a significant contribution to the knowledge of the family Ericaceae.

Key words: Cauca, Ericales, Huila, páramo, Vaccinieae.

Resumen:

Antecedentes y Objetivos: *Plutarchia* es un género neotropical perteneciente a la tribu Vaccinieae (Ericaceae), con 11 especies reconocidas, de las cuales 10 se encuentran en Colombia. Durante salidas de campo realizadas en los departamentos Huila y Cauca, y tras la revisión de los ejemplares colectados, se identificaron dos especies que no corresponden a las actualmente descritas. El objetivo de este estudio fue describir e ilustrar dos nuevas especies de *Plutarchia*, y evaluar sus afinidades morfológicas, su estado de conservación y distribución geográfica.

Métodos: Salidas de campo al municipio Garzón (Huila) en el 2018 y 2024, y la revisión de especímenes del departamento Cauca del género *Plutarchia* en los herbarios K y UDBC en el marco de una sinopsis del género resultaron en especímenes que no correspondían a las actualmente descritas. Se describieron las nuevas especies con base en especímenes depositados en los herbarios SURCO y UDBC, usando la bibliografía asociada al género y la familia. Además, se sugiere el estado de conservación de acuerdo con los criterios de la Lista Roja de la UICN para ambas especies. Además, fueron comparadas con especies morfológicamente similares.

Resultados clave: Se describen e ilustran *P. hildae* y *P. puraceense*, dos especies que se diferencian morfológicamente de otras descritas. Estas crecen en el sur de Colombia en los departamentos Cauca y Huila. Se propone a *P. hildae* en Peligro Crítico (CR) y *P. puraceense* en la categoría de Datos Insuficientes (DD).

Conclusiones: Las dos especies nuevas de *Plutarchia* propuestas incrementan el número a 13 especies para Suramérica y reafirman a Colombia como el hotspot de este género, representando un aporte significativo al conocimiento de la familia Ericaceae.

Palabras clave: Cauca, Ericales, Huila, páramo, Vaccinieae.

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Introduction

Ericaceae is one of the most conspicuous, common, and ecologically important elements of montane ecosystems (Luteyn and Pedraza-Peñalosa, 2013). In Tropical America, the family comprises 45 genera and more than 800 species, mainly concentrated in the northern Andes (Luteyn and Sylva S., 1999), with approximately 94% of the species of northwestern South America endemic (Luteyn, 2004). Colombia is one of the most diverse countries for Ericaceae, with approximately 278 species (55% endemic), of which about 150 belong to the tribe Vaccinieae. The tribe is characterized by an inferior ovary, tubular anthers, and many-seeded berries (Stevens et al., 2004).

The genus *Plutarchia* A.C.Sm. belongs to the tribe Vaccinieae (Stevens et al., 2004), and has traditionally been circumscribed by leaves alternate or opposite in few species, conspicuous floral bracts, 4-5-merous flowers with valvate aestivation, calyx articulate with the pedicel, terete to winged hypanthium, equal length stamens and without spurs, filaments distinct and shorter than the anthers, slightly papillate thecae, and 5-locular ovary (Smith, 1936; Luteyn, 1992; Stevens et al., 2004).

The genus is morphologically similar to *Ceratostema* Juss., *Demosthenesia* A.C.Sm., *Pellegrinia* Sleumer, and *Thibaudia* Ruiz & Pav. (Salinas et al., 2019). However, its phylogenetic position remains unclear, and its relationships with other Ericaceae genera are uncertain (Salinas et al., 2019; Becker et al., 2024). It is distributed in the high Andes of Colombia and Ecuador, with its greatest diversity occurring in Colombia (Smith, 1936; Salinas et al., 2019). Luteyn (1992) recognized 10 species in the genus; subsequent studies increased the number to 11, with one endemic to Ecuador and 10 to Colombia (Salinas et al., 2019). Species of the genus are rarely encountered, mostly being restricted to the central and eastern páramos of the Colombian Andes.

Recent explorations in poorly collected páramo areas in the Colombian departments Huila and Cauca allow us to document two new *Plutarchia* species. The first one was collected in the “Parque Natural Regional Cerro Páramo de Miraflores” (municipality Garzón, department Huila) in the southern Cordillera Oriental. This natural park harbors high richness and diversity of species (López-Ordoñez et al., 2024). Unfortunately, it requires additional conservation actions to mitigate agricultural expansion, illegal extraction of species, and inappropriate land use factors that put this protected area at risk (Chaverra Perea and Varón Quimbayo, 2022).

The second species was initially detected by author J. Luteyn in specimens collected in the “Parque Nacional Natural de Puracé” and its surroundings. This Park is located between the departments Cauca and Huila in the Cordillera Central, which is an area of great importance for the conservation of biodiversity and páramo in Andean ecosystems (PNNC, 2026).

Here, we provide formal descriptions for both species, including detailed morphological data, comparative analyses with related species, geographical distributions, and preliminary conservation status assessments. The discovery of these two new species of *Plutarchia*, endemic to southern Colombia, is the result of conservation work carried out in the departments Huila and Cauca through community-based processes in natural areas, led by various environmental entities.

Materials and Methods

Floristic surveys were conducted in the municipality Garzón in the “Parque Natural Regional Cerro Páramo de Miraflores”, initially in 2017 and again in 2024, and the surrounding areas of “Parque Nacional Natural de Puracé” in 2025. For each collection, elevation, coordinates, and

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habitat information were recorded. Botanical specimens were deposited in the Herbario Universidad Surcolombiana (SURCO) and Herbario Forestal Gilberto Emilio Mahecha Vega (UDBC). Additionally, herbarium specimens were personally consulted in the herbaria COL, K, NY, SURCO, and UDBC (Thiers, 2024-2025, continuously updated). Digital images of type specimens were also consulted from JSTOR Global Plants (JSTOR, 2025).

Protologues of all names accepted for *Plutarchia* were reviewed. Descriptions and vegetative measurements were made from dry material, whereas reproductive measurements were made from both live flowers preserved in ethanol (75%) and rehydrated flowers. Terminology for morphology descriptions and color palette follows Beentje (2016) and Ellis et al. (2009); specific terminology for *Plutarchia* follows Luteyn (1992) and Salinas et al. (2019), while venation terminology follows Pedraza-Peñalosa et al. (2013).

Conservation status was assessed using Criterion B of the IUCN Red List criteria (IUCN, 2024). Furthermore, the Area of Occupancy (AOO) and the Extent of Occupancy (EOO) were calculated using the GeoCAT tool (Bachman et al., 2011). The AOO was calculated using a default cell width of 2 × 2 km.

Results

Taxonomy

Plutarchia hildae Rosero-Toro, Paz-López & Darío García, **sp. nov.** Fig. 1.

TYPE: COLOMBIA. Huila, municipio Garzón, Parque Natural Regional Cerro Páramo de Miraflores, 3376 m, 02°14'24.94"N, 75°25'46.51"W, 2.III.2024, fl, J. Rosero 909 (holotype: SURCO-15557!).

Plutarchia hildae differs from all species of the genus by the combination of leaf blades with serrate margins and pinnate venation, racemes axillary, hypanthium angled, and corolla densely short-hairy.

Terrestrial shrub, to ca. 1.5 m tall; mature stems terete, erect, bark reddish-brown, glabrous; twigs angled,

1.3-4.1 mm diameter, glabrous; bark yellowish, cracking longitudinally; buds lanceolate, scales imbricate, lanceolate, margin glandular-fimbriate; leaves alternate, simple, helicoid; petiole canaliculate, cross-striated, 2.9-4.1 mm long, glabrous; leaf blade 1.1-2.8 × 0.5-1.3 cm, symmetrical, coriaceous, elliptic-lanceolate, basally obtuse or rounded, apically obtuse, mucronate, mucro 0.5-0.7 mm long; leaf blade margin serrulate, slightly revolute, glandular-fimbriate, fimbriae oblong-falcate, 0.2-0.6 mm long; blade beneath with glandular fimbriae, sparse, oblong; adaxially and abaxially glabrous; venation pinnate, mid- and lateral veins adaxially impressed, abaxially raised, lateral veins 2-4 per side, subopposite, ascending, brochidodromous; inflorescence axillary, racemose or solitary, racemes 4-7-flowered; rachis angled, 8.4-11.4 mm long, hairs eglandular and unicellular; floral bract 1 per pedicel, persistent, oblong or lanceolate, concave, 2.1-8.4 mm long, marginally entire, ciliolate, hairs eglandular and unicellular; flowers 4-5-merous, aestivation valvate; pedicels terete, articulate with the calyx, red *in vivo*, reflexed to pendant, striate, slightly swollen apically, 0.6-1.5 mm long, densely short-pilose with white unicellular hairs, apical glands present; bracteoles 2, near base, oblong or lanceolate, concave, 1.1-4.2 × 0.9-1.5 mm, marginally entire, ciliolate, hairs eglandular and unicellular; calyx 5.9-6.9 mm long, glabrous, hypanthium 10.6-11.1 mm long, 5-7-winged, limb 6-8 mm long, lobes deltate, acuminate, 3.1-4.4 mm long, glabrous, sinuses acute, red *in vivo*; corolla cylindric-urceolate, slightly angular, white *in vivo*, 10.5-12.3 mm long, pubescent with white unicellular hairs on outer surface, glabrous inside, lobes deltate, shortly attenuate, reflexed, 0.6-1.4 mm long; stamens 10 equaling 2/3 of the corolla; filaments 1.8-2.4 mm long, unicellular hairs at the apex; anthers 6.1-6.9 mm long, thecae 2.8-4.3 mm long, slightly striate, mucous at the base, tubules 2, 2.7-3.7 mm long, dehiscing by apical clefts ca. 1.4 mm long; ovary 5-locular, placentation axile; nectary disk flat, glabrous; style 5 mm long, exerted 1-2 mm beyond corolla, stigma truncated; fruit not seen.

Distribution and habitat: *Plutarchia hildae* seems to be restricted to páramo ecosystem in the municipality Garzón (Huila, Colombia) in the "Parque Natural Regional



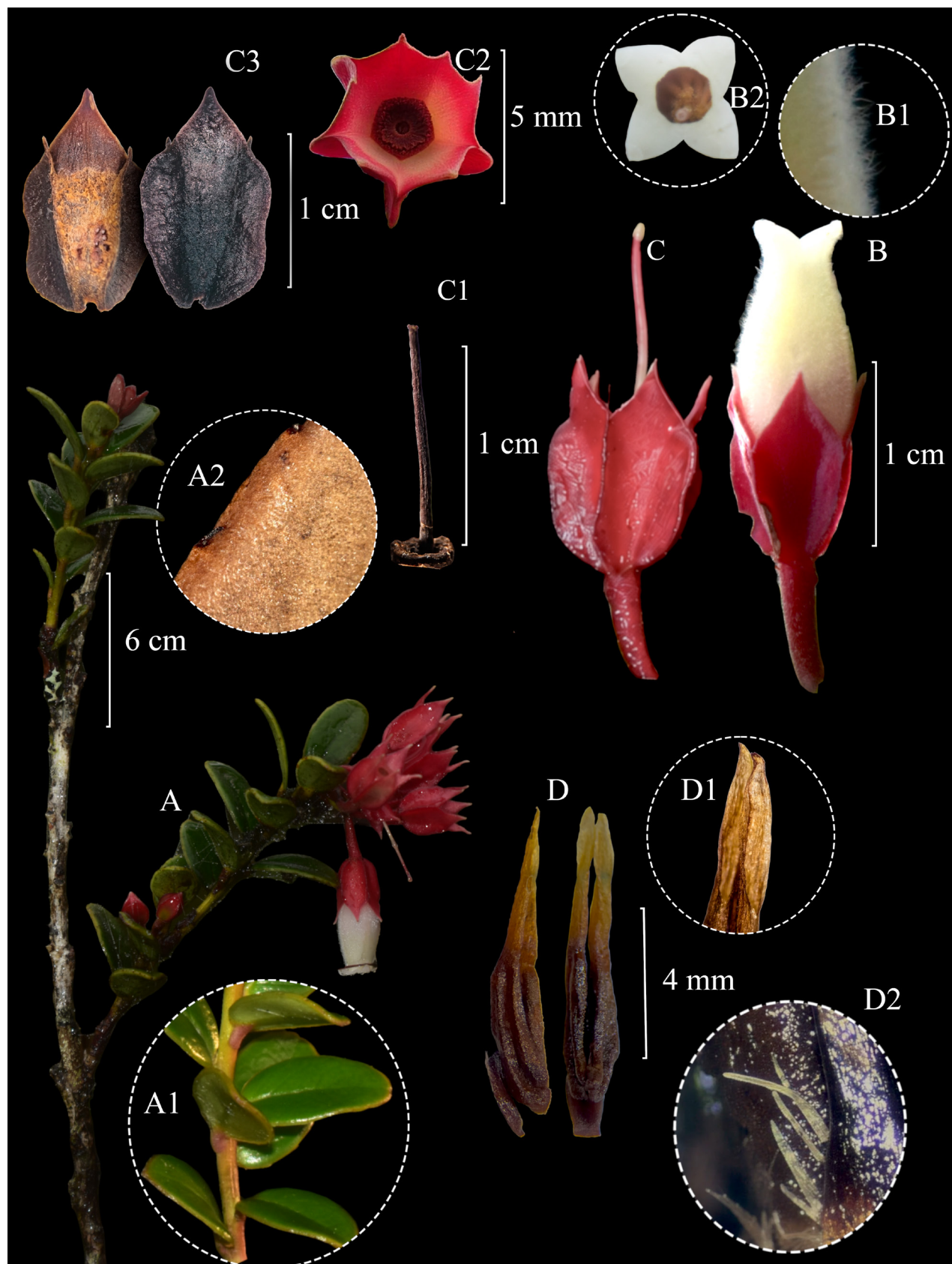


Figure 1: *Plutarchia hildae* Rosero-Toro, Paz-López & Darío García. A. habit; A1. detail of blade; A2. detail of leaf blade margin; B. flower; B1. pubescence of corolla; B2. lobes of corolla; C. calyx with style and stigma; C1. style; C2. wings of hypanthium; C3. detail of hypanthium; D. stamens; D1. detail of tubules of the anthers and slits; D2. detail of hairs filaments. Elaborated by Carlos Paz-López. Photos: A2, B, C, C1, C2 by Carlos Paz-López; A, A1, C3, D, D1, D2 by Jeison Rosero-Toro.

Cerro Páramo de Miraflores”, on the eastern slopes of the eastern cordillera between 3000 and 4000 m elevation (Fig. 2). The species grows in páramo scrub-grassland with species such as *Desfontainia splendens* Bonpl., *Epidendrum bogotense* Schltr., *Espeletia hartwegiana* Sch. Bip. ex Cuatrec. (frailejones), *Weinmannia elliptica* Kunth, *W. mariquitae* Szyszyl. (encenillos) and species of genera *Vaccinium* L., *Disterigma* (Klotzsch) Nied., *Hesperomeles* Lindl., among others.

Phenology: collected with flowers between February and March.

Etymology: the epithet honors botanist Hilda del Carmen Dueñas Gómez, who served as a professor at the Universidad Surcolombiana, head of the herbarium SURCO, and coordinator of the Research and Pedagogy Group in Biodiversity (GIPB, for its acronym in Spanish). Her research has contributed significantly to floristic and ethnobotanical

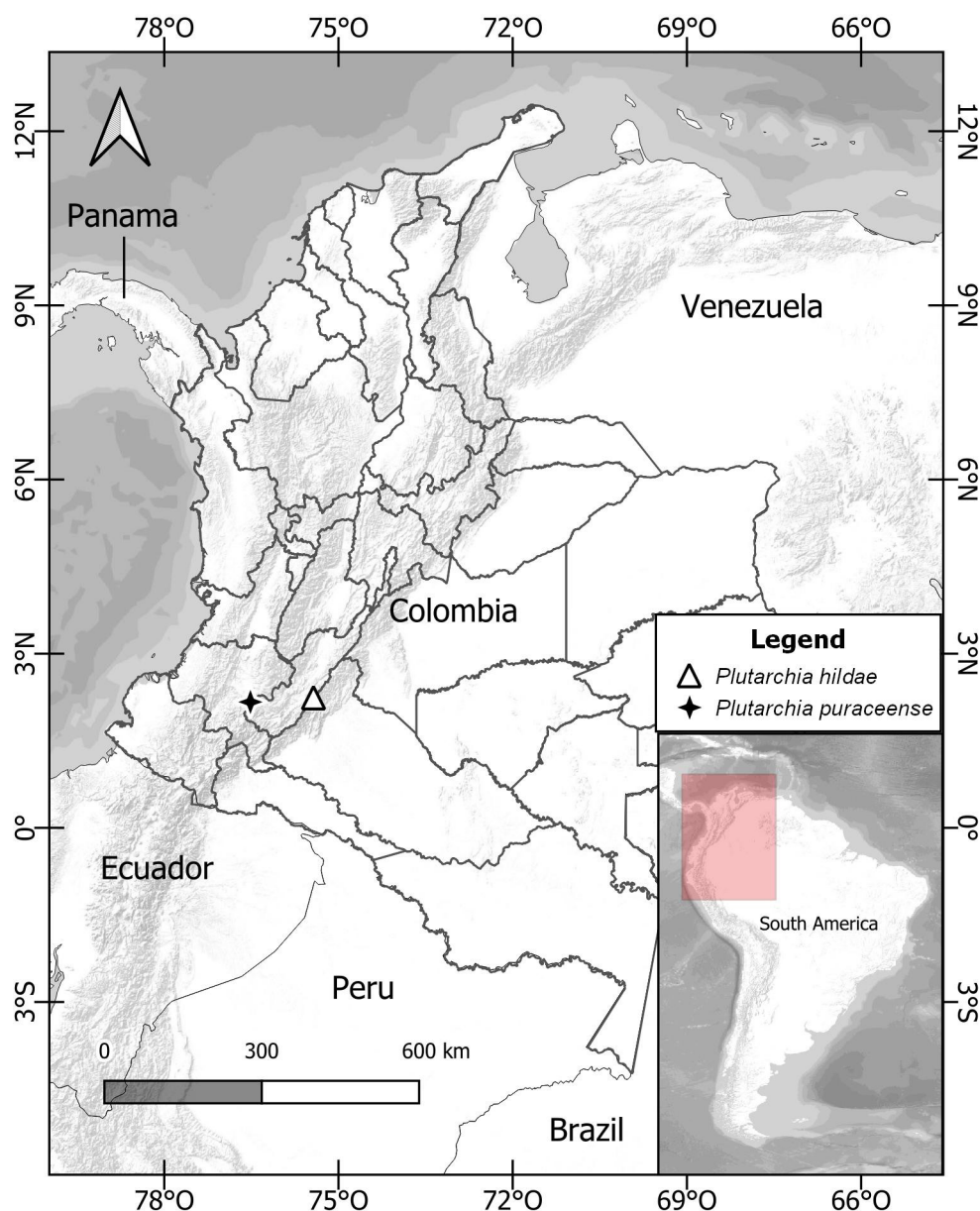


Figure 2: Distribution map of *Plutarchia hildae* Rosero-Toro, Paz-López & Darío García and *Plutarchia puraceense* Luteyn & Paz-López in Colombia. Elaborated by Diego Alejandro Tello Ochoa.



surveys in the department of Huila, as well as to the training of botanists and educators who now practice throughout the country.

Additional material examined: COLOMBIA. Huila, municipio Garzón, Vereda El Vergel, 3367 m, 02°13'15.8"N, 75°26'21.7"W, 23.II.2017, fl, *C. Paz et al.* 130 (UDBC-038648); Parque Natural Regional Cerro Páramo de Miraflores, 3247 m, 2°14'19.42"N, 75°25'49.09"W, 27.II. 2024, fl, *J. Rosero et al.* 943 (SURCO-15557).

Preliminary conservation status: *Plutarchia hildae* has been preliminarily assessed as Critically Endangered (CR), based on IUCN (2024) criteria B1ab(i,iii) + 2ab(i,iii). The species is known to inhabit páramo areas where only a single population with ten individuals was documented in 2024. The natural park where it is found faces several threats, primarily due to illegal activities such as logging, expansion of agricultural boundaries, and unregulated access to the area. These activities have a negative impact on biodiversity (Chaverra Perea and Varón Quimbayo, 2022).

Plutarchia puraceense Luteyn & Paz-López, sp. nov. Fig. 3.

TYPE: COLOMBIA. Cauca, municipio Puracé, Volcán Puracé, 2000–3800 m, VII.1971, fl, *Mahecha s.n.* (holotype: UDBC-005277!).

Plutarchia puraceense is similar to *P. angulata* A.C.Sm. and *P. miranda* A.C.Sm. because of its opposite, broadly ovate leaf blades with cordate base, but differs in its leaves with strongly bullate surface (vs. flat in *P. angulata* and *P. miranda*), venation prominent on both surfaces (vs. flat to slightly raised but not conspicuously prominent venation); inflorescence 4–7-flowered (vs. 2–5 in *P. angulata*, 1–2 in *P. miranda*); pedicels 30–40 mm long (vs. 8–28 mm in *P. angulata*, 22–30 mm long in *P. miranda*), floral bract 7–10 mm long (vs. 2–4 mm long in *P. angulata*, 1–1.5 mm long in *P. miranda*).

Hemiepiphytic or terrestrial shrub to ca. 4 m tall; mature stems terete, bark reddish-brown, exfoliating

in longitudinal strips; immature twigs reddish-brown, terete, striate, glabrous; buds not seen; leaves opposite, bullate with nerves prominent on both surfaces, essentially sessile; petiole, 1–2 mm long, rugose, moderately short, white-pilose when young, glabrate; leaf blade 3–7 × 3–5.6 cm, thick-coriaceous, broadly ovate, basally cordate, semi-amplexicaul, apically obtuse, slightly retuse; leaf blade margin entire blade beneath with glandular fimbriae, sparse, oblong; adaxially and abaxially glabrous; venation 5–7(9)-plinerved from base, white-pilose beneath when young but soon glabrate, deeply impressed above and prominently raised beneath, lateral nerves glabrous, strongly impressed above, arching upwards, anastomosing near margins, conspicuously raised beneath, reticulate veinlets glabrous, impressed above and prominently raised beneath; inflorescence axillary, racemose, racemes 4–7-flowered, flowers opposite; rachis subterete 2.5–5 cm long, striate, persistently short-white to canescent pilose; floral bracts narrowly lanceolate, long-attenuate, conduplicate, appearing aristate when dry, 7–10 mm long, moderately short-pilose marginally; flowers 4-merous, aestivation valvate; pedicels subterete, articulate with the calyx, red in vivo, striate, thin, 30–40 mm long, persistently short-white pilose; bracteoles 2, near base, similar to floral bracts but 5–6 mm long, dorsally and marginally short-pilose; calyx ca. 20 mm long, glabrous, hypanthium 5–7 mm long, winged to strongly angular, limb 13–15 mm long, ca. 3 times longer than hypanthium, lobes ovate, long-attenuate, conspicuously longitudinally striate to veined, 10–12 mm long, glabrous, sinuses obscure but acute, red in vivo; corolla long-tubular, faintly angled, red in vivo, 20–23 mm long, only the distal 1/3 exposed beyond the calyx lobes, pubescent with densely white to canescent-short-pilose on outer surface, glabrous inside, lobes deltate, shortly attenuate, reflexed, 0.7–1.8 mm long, the portion hidden within calyx more pinkish and hairless; stamens 8, equaling 2/3 of corolla; filaments 5–7 mm long, glabrous; anthers ca. 17 mm long, base apparently incurved and prognathous, thecae 4–5 mm long, smooth, muticous at the base, tubules 2, 12–13 mm long, dehiscing by apical clefts ca. 5 mm long; ovary 5-locular, placentation axile; nectary disk flat, glabrous; style ca. 18 mm long, inserted, stigma truncated



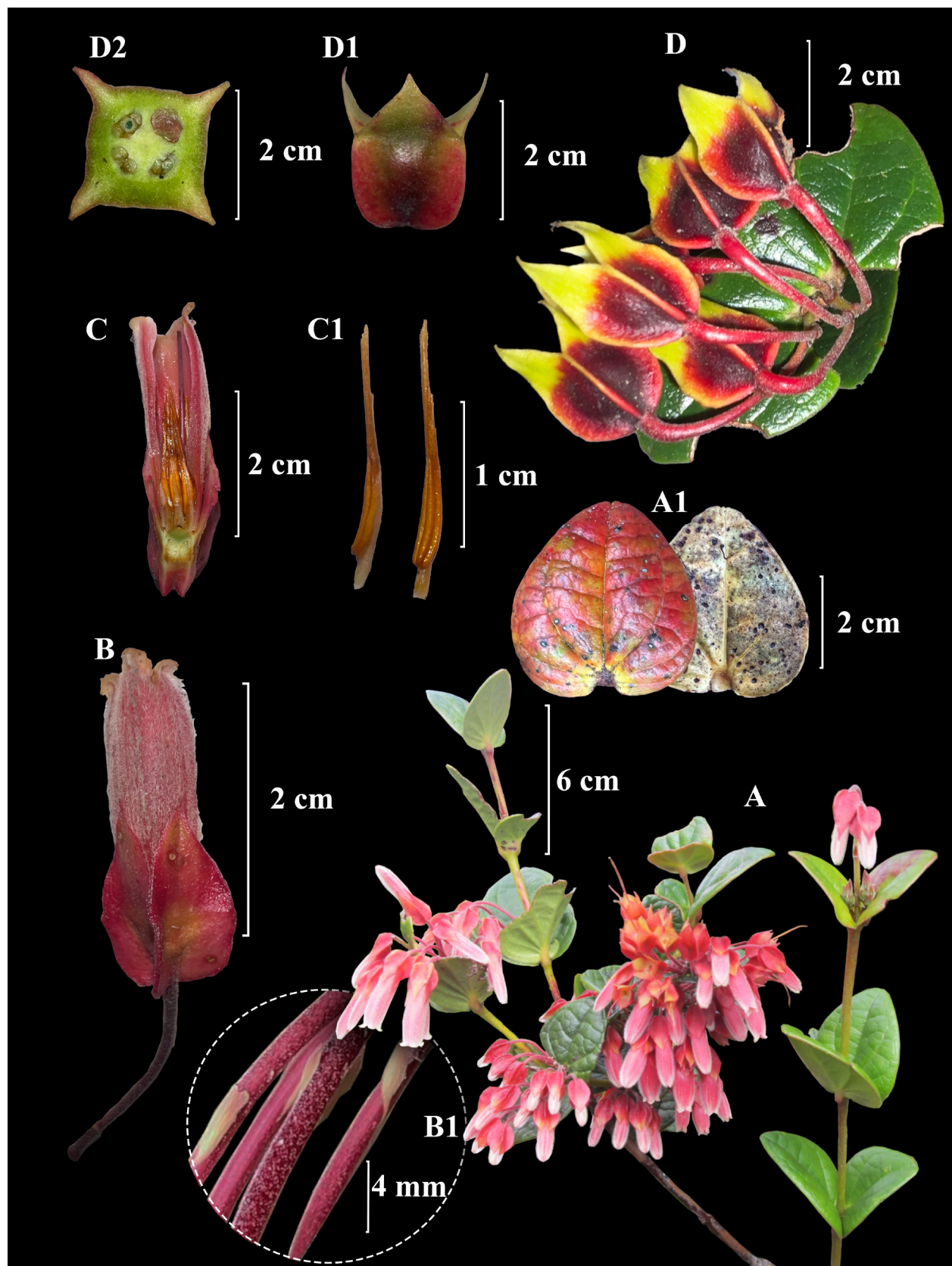


Figure 3: *Plutarchia puraceense* Luteyn & Paz-López. A. habit and inflorescence; A1. leaf blade; B. flower; B1. detail of bracteoles; C. flower, in longitudinal section showing hypanthium and stamens; C1. stamens; D. infructescence; D1. fruit; D2. fruit detail, cross-section showing seeds. Elaborated by Carlos Paz-López. Photos A1-D2 by Carlos Paz-López; A by Diego Rivera.

fruit a berry, 4-winged, reddish (immature), 18.6-18.9 × 13.3-15.1 mm; seeds trigonous, embryos green, ca. 50 per fruit.

Distribution and habitat: *Plutarchia puraceense* is known only from the type and a few collections herein mentioned and is said to be uncommon in the high plain of páramo at 4000 m elevation (Fig. 2).

Phenology: collected with flowers in February and with fruits in November.

Etymology: the specific epithet “*puraceense*” honors the Parque Nacional Natural de Puracé. This area is known for being an important area for biodiversity conservation in southern Colombia. This volcanic area was declared a Biosphere Reserve in 1979 by UNESCO and its name in Quechua (an indigenous Andean language) means “mountain of fire”; therefore, this area is positioned as an area of great cultural and biological importance due to its high diversity.

Additional material examined: COLOMBIA. Departamentos Cauca - Huila, Central Cordillera, Parque

Puracé, 6 km after Paletará on San Agustín rd., 4000 m, 20.II.1990, fl, *Heath 56* (K-000323716). Departamento Cauca, municipio Puracé, corregimiento Paletará, alrededores del resguardo indígena Paletará a borde de carretera, 2992 m, 2°11'31.36"N, 76°28'58.53"W, 4.XI.2025, fl, fr, *C. Paz et al. 2031* (UDBC, CAUP, COL); corregimiento Paletará, alrededores del resguardo indígena Paletará a borde de carretera, 2992 m, 2°11'31.36"N, 76°28'58.53"W, 4.XI.2025, fr, *C. Paz et al. 2032* (UDBC), corregimiento Paletará, alrededores del resguardo indígena Paletará a borde de carretera, 2992 m, 2°11'31.36"N, 76°28'58.53"W, 4.XI.2025, fr, *C. Paz et al. 2033* (UDBC).

Preliminary conservation status: *Plutarchia puraceense* is known from the surrounding areas at one locality with relatively restricted access. However, due to the low number of collections, the species is preliminarily assessed as Data Deficient (DD).

Discussion

Plutarchia hildae has several characteristics of the traditional circumscription of the genus, but differs from other species by the combination of characters mentioned in the diagnosis and Table 1. Additionally, *Plutarchia hildae* shares

Table 1: Comparative morphology and geographic distribution of *Plutarchia hildae* Rosero-Toro, Paz-López & Darío García, *Plutarchia puraceense* Luteyn & Paz-López, and morphologically related species.

	<i>Plutarchia hildae</i> Rosero-Toro, Paz-López & Darío García	<i>Plutarchia angulata</i> A.C.Sm.	<i>Plutarchia miranda</i> A.C.Sm.	<i>Plutarchia puraceense</i> Luteyn & Paz-López	<i>Plutarchia rigida</i> (Benth.) A.C.Sm.
Leaf length (cm)	1.1-2.8	2.5-3.5	2.5-3.5	3-7	2.5-6
Leaf shape	Elliptic-lanceolate	Broadly ovate	Suborbicular-ovate	Broadly ovate	Ovate or ovate-oblong
Leaf margin	Serrulate	Entire	Entire	Entire	Serrulate
Inflorescences	Racemes or solitary	Racemes	Solitary or paired	Racemes	Racemes
Number of flowers	4-7	2-5	1-2	4-7	3-6
Calyx	Winged	Winged	Winged	Winged	Obprismatic
Corolla length (mm)	10.5-12.3	17-21	17-20	20-23	35
Distribution	Huila, Colombia	Cauca, Huila, Nariño, Putumayo, Colombia; Sucumbíos, Ecuador	Huila, Cauca, Colombia	Cauca, Colombia	Cauca, Huila, Valle del Cauca, Colombia



with *P. angulata* and *P. miranda* the red, angulate calyx tube and angulate, densely short-hairy corolla, but differs from those species by its alternate leaves (vs. opposite in *P. angulata* and *P. miranda*), leaves 1.1-2.8 cm long, with serrate margins and (vs. 2.5-3.5 cm long and entire margins), inflorescences in axillary racemes with 4-7 flowers (vs. axillary racemes with 2-5 flowers in *P. angulata*, solitary or paired axillary flowers in *P. miranda*), and corolla 10.5-12.3 mm long (vs. 17-20 mm long). Through the revision of specimens of *Plutarchia* from Colombia, it has been found that some specimens of *P. rigida* (Benth.) A.C.Sm. can present leaf blades with serrate margins; however, *P. hildae* has leaves with an obtuse or rounded base, a winged calyx, and a white corolla measuring 10.5-12.3 mm (vs. cordate base, obprismatic calyx, red corolla up to 35 mm). *Plutarchia puraceense* differs from the other species with opposite leaves (*P. angulata*, *P. miranda*) by the characteristics mentioned in the diagnosis and Table 1.

Author contributions

Conceptualization: CAP, JL; Data collection: CAP, JL, JR; Funding acquisition: ATM, CAP, DG, JL, JR; Metodology: ATM, CAP, JL; Project administration: ATM, CAP, DG, JL, JR; Visualization: HMC, AR; Writing – original draft: ATM, CAP, JL; Writing – review & editing: ATM, CAP, JL.

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Declaration of Artificial Intelligence Use

No AI has been used in any aspect of the research and manuscript.

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