

## A NEW SPECIES OF *EPERUA* (LEGUMINOSAE, DETARIOIDEAE) FROM AMAZONAS STATE, VENEZUELA

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**Abstract.** A new species of *Eperua* from the upper basin of the San Miguel River, Amazonas state, Venezuela, is described and illustrated. Its affinities within the genus are discussed and an updated key to identify the 20 currently recognized taxa is provided.

**Keywords:** Amazonas state, banas, Detarioideae *Eperua*, Fabaceae, San Miguel River, Venezuela

**Resumen.** Se describe y se ilustra una nueva especie de *Eperua* de la cuenca alta del Río San Miguel, en el estado Amazonas de Venezuela. Se discuten sus afinidades dentro del género y se incluye una clave actualizada para identificar los 20 taxones que hasta el momento se reconocen, los que incluyen cuatro subespecies y cuatro variedades.

**Palabras claves:** banas, Detarioideae, *Eperua*, estado Amazonas, Fabaceae, Río San Miguel, Venezuela

*Eperua* Aubl. (Leguminosae, Detarioideae) is a Neotropical genus that currently includes 19 taxa (including four varieties and four subspecies) of small to large trees. It is found in Brazil, Colombia, Venezuela, and the Guianas (Guyana, Surinam, and French Guiana). Species occur in humid forest formations on sandy and clay soils (lowland, montane slopes, gallery and flooded forests, and Amazonian caatinga), and on the edge of shrubby savannas from sea level to 1200 m of elevation. *Eperua* is characterized by a combination of characters, including leaves always evenly pinnate, epunctate leaflets in 2–6 pairs, flowers with 1 petal and 4 scale-like petaloida, (5–)10 fertile stamens, anthers dehiscing by longitudinal slits, and non-arillate seeds (Cowan, 1975; Cowan and Berry, 1998).

Until recently, *Eperua* was treated as a natural group in subfamily Caesalpinioideae, subtribe Detarieae (Cowan and Polhill, 1981; Mackinder, 2005). However, a new classification of Fabaceae, based on a comprehensive phylogenetic analysis of the family, placed *Eperua* in subfamily Detarioideae (LPWG, 2017). A revision of the genus was published by Cowan (1975), who documented 14 species, including four varieties and four subspecies; since then, only a single new species, *E. praesagata* R.S. Cowan, has been described (Cowan, 1985). In addition, a treatment of the genus for the Venezuelan Guayana was published by Cowan and Berry (1998), and more recently, Reis (2014) revised the genus for his Master's thesis.

The woods of several species of *Eperua* are of economic importance. *Eperua falcata* Aubl. is a valuable timber tree: its wood, "Wallaba," is used for telephone poles, fence posts, house frames, fuel, and charcoal, and especially for heavy construction and, more recently, for roof shingles, which by far outperform cedar shingles (the latter manufactured from

the wood of *Thuja plicata* Donn ex D. Don, Cupressaceae; see a comparison at <https://www.turadashingles.com/wallaba-vs-cedar-shingles/>). The wood of *E. purpurea* Benth, a species found in the Río Negro basin in Brazil, Colombia, and Venezuela (see common names in Cowan and Berry, 1998), is locally used for bridges and general construction, but like the wood of *E. falcata*, it exudes resin after it is cut and cannot be used for fine cabinetry work. *Eperua falcata* is planted in Cameroon, Trinidad, and West Java, and *E. jenmanii* Oliv. in Cameroon, Jamaica, Mexico, Singapore, and Trinidad (Cowan, 1975).

Here we describe and illustrate a new species of *Eperua* from a "bana" (see discussion under Etymology below) in the basin of the San Miguel River, Amazonas state, Venezuela (see Romero-González et al., 2019, for a description of this basin).

***Eperua banaensis*** G.A. Romero & Aymard, *sp. nov.*

TYPE: VENEZUELA. Amazonas: Municipio Autónomo Maroa, cuenca del río San Miguel, alto caño Mee, bana sobre arena blanca al sur de la serranía de Cariche, 2°44'14"N 66°20'7"W, 106 m, 18 septiembre 2011, G. A. Romero, C. Gómez y J. Fernández 4079 (Holotype: VEN; Isotypes: GH, TFAV). Fig. 1–3.

*Eperua banaensis* is vegetatively similar to *E. obtusata* R.S. Cowan, from which it differs by having 2 adaxial, lanose structures near the margins of the petal (vs. absent), 10 fertile stamens (vs. 7), and the ovary longer than the gynophore (vs. shorter).

Glabrous *treelet* 3–5 m tall; *stipules* intrapetiolar, minute, caducous; *petiole* terete, 2–4 cm long, the *rachis* slender, terete, 2.5–4.5 cm long; *leaflets* 2-jugate, the *petiolules* 7–9 mm long, the *blades* flat, glabrous, slightly oblique, obovate, ovate to narrowly elliptic, 9–14 cm long, 3.7–6.5 cm wide,

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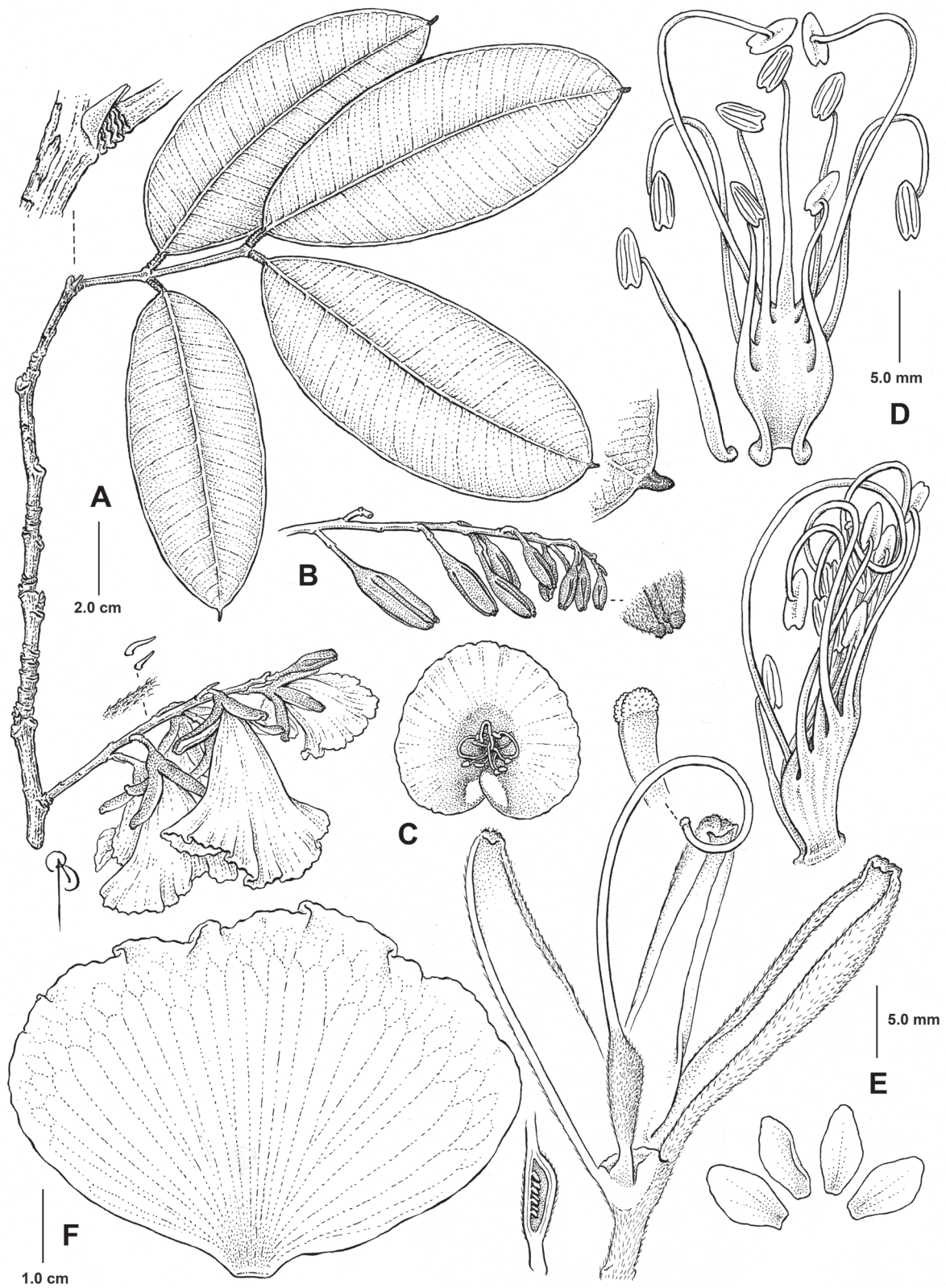


FIGURE 1. *Eperua banaensis* G.A. Romero & Aymard. **A**, a fertile branch; **B**, the inflorescence bearing flower buds, showing the single large, raised nectar gland near the apex of the outer sepals; **C**, view of the flower, showing the two lanose structures along the margins of the petal; **D**, two views of the androecium, showing the 10 fertile stamens, including the free, dorsal one; **E**, partial cutout view of the hypanthium, three sepals, and the gynoecium, showing a sagittal section of the ovary and the bilobed stigma; **F**, abaxial view of the petal, expanded. Drawing by Bobbi Angell based on the type collection.



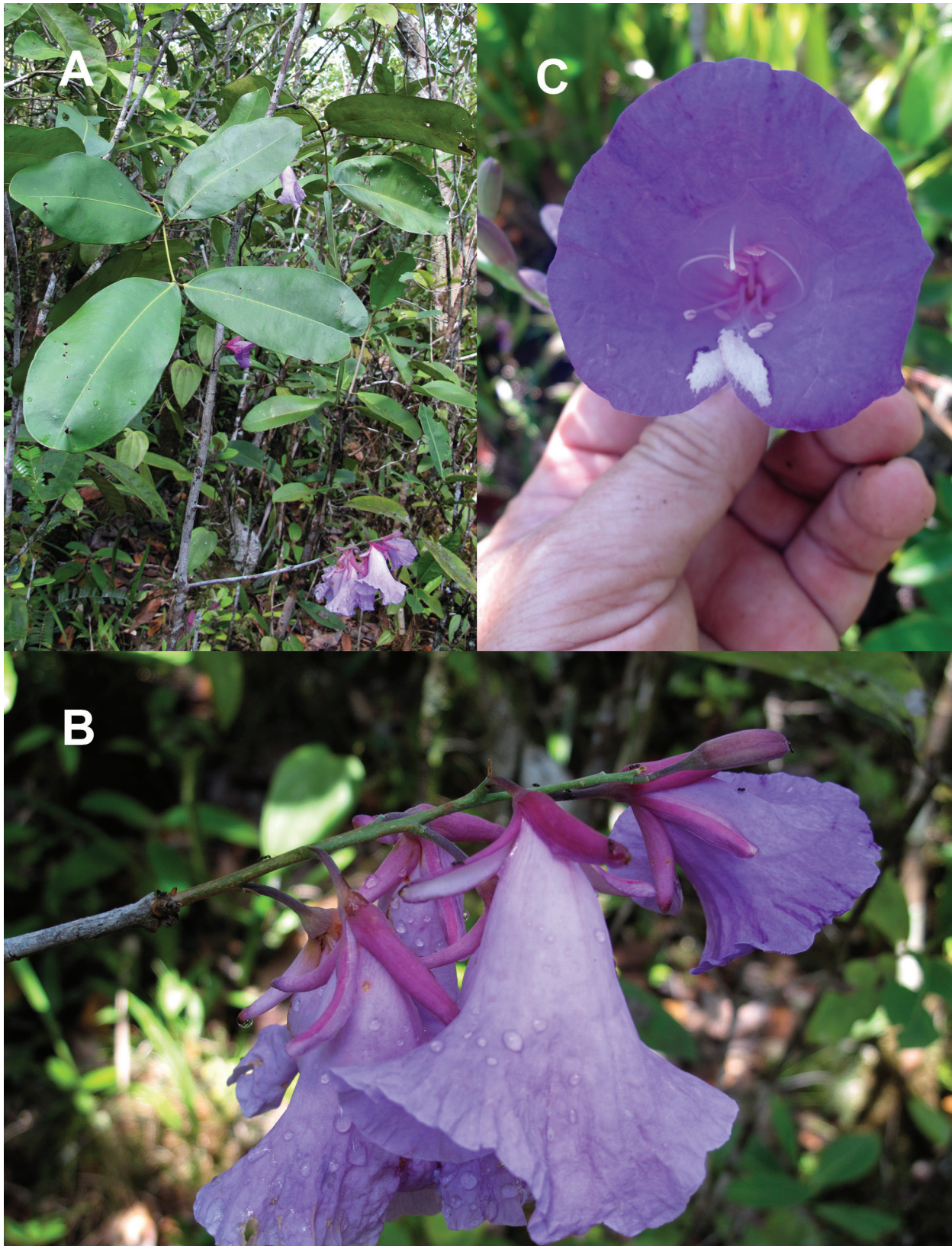


FIGURE 2. *Eperua banaensis* G.A. Romero & Aymard. **A**, habit (notice the emarginate leaflet); **B**, close-up of the raceme (notice the ants on the inflorescence axis and particularly on the tip of the terminal flower bud); **C**, view of the flower, showing in particular the petal with the two lanose structures along the margins. Photographs by G. A. Romero-González based on the type collection.



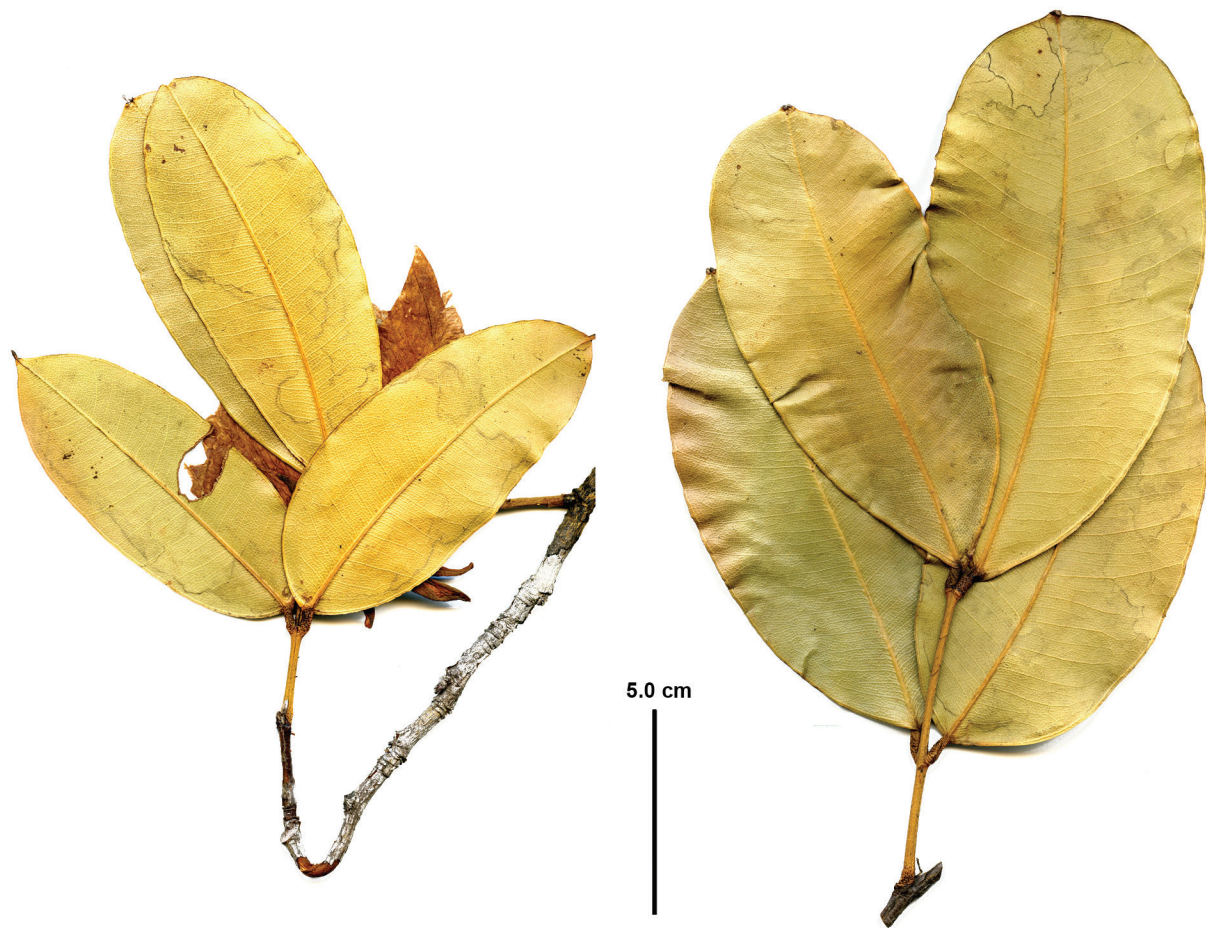


FIGURE 3. *Eperua banaensis* G.A. Romero & Aymard. A–B, leaf size and shape variation in type collection. Photographs by G. A. Romero-González.

rigidly coriaceous, nitid, slightly discoloured, the upper surface darker, the base usually cuneate, the apex apiculate (the apiculum brittle, most often deciduous), acute, obtuse, rounded to emarginate; *inflorescences* either individual, cauliflorous flowers or erect short racemes 1.5–11.0 cm long; the *axis* minutely strigulose, the *bracts* cupulate, the bracteoles caducous, broadly triangular, 7–8 mm long and wide, arising near the base of the pedicels; flowers generally pendent, the *pedicels* ca. 10 mm long, compressed below the bracteoles but cylindric above; *hypanthium* cylindric or cupulate, ca. 5 mm long and wide; *sepals* 4, abaxially pink, adaxially light purple, pubescent, unequal in size and shape, oval or oblong, obtuse, the 2 outer ones 25–27 mm long, 8–9 mm wide, with a single large, raised nectar gland near the apex on the outer surface, the inner ones ca. 23 mm long, marginally scarious; petal 1 (*petalodia* 4), purple, flabelliform, sessile, ca. 50 mm long and 70 mm wide, abaxially glabrous, adaxially with 2 white, lanose structures near the margins, the *petalodia* oval or elliptic-oblong, 6–7 mm long, 2.6–3.5 mm wide; *stamens* 10, glabrous, connate basally 9–10 mm, strongly inequilateral, the *filaments* light lilac, the free portion 13–30 mm long, the dorsal one 16 mm long, the anthers adaxially pink, abaxially white, narrowly oblong, 6.5–7.5 mm long, 2–3 mm wide; the *stigma* bilobate, papillate, the style ca. 36

mm long, slender, the *ovary* sericeous, oblong-obovate, 7–8 mm long and 2.5 mm wide, the *gynophore* glabrous, 2–3 mm long; *fruits* not seen (description of the flower based on samples preserved in 50% ethanol).

**Etymology:** from “bana,” or “low Amazon caatinga... an evergreen sclerophyllous woodland ...[that] occupies relatively small ‘islands’ amidst tall Amazon caatinga” (Bongers et al., 1985; see also Huber and Riina, 1997: 36). This type of vegetation occurs mainly in the drainage of black-water tributaries of the Río Negro in Brazil (Amazonas, Pará, and Roraima states), Colombia (Amazonas, Guainía, Vaupés, and Vichada departments), and Venezuela (Amazonas state; Aymard et al., 2014).

**Ecology:** no pollinator activity was observed during the collecting period, but many ants were observed on the inflorescences and flowers (especially on the tip of flower buds; Fig. 2B).

**Distribution:** known only from a small population at the type locality, in the sources of the San Miguel River (the upper basin of this river locally known as the Mee or Mé River), a tributary of the Guainía River, in the basin of the Río Negro, one of the largest tributaries of the Amazon.

*Eperua banaensis* is apparently related to *E. obtusata* (Fig. 4), with which it shares vegetative characters. Although





FIGURE 4. Holotype of *Eperua obtusata* R.S. Cowan. Image courtesy of the Smithsonian Institution.

the protologue of the latter describes a tall tree (*Arbor alta*; Cowan, 1975: 33), an additional collection from the vicinity of the type locality, *M. Colella et al. 1864* (VEN 328381), referred here to *E. obtusata*, is described as a small tree of 2–3 m (“Arbolito de 2–3 m”), and habit alone is insufficient to separate these two species. Nonetheless, they can be distinguished easily using the floral characters presented in the diagnosis given above. We call particular attention to the two lanose structures in the margins of the petal (Fig. 1C, Fig. 2C), first reported in the genus herein, which either are found only in *E. banaensis* or have not been detected yet in live or herbarium material of other taxa.

The remote type locality of *Eperua banaensis* also

yielded a new, diminutive species of *Cleistes* Rich. ex Lindl. (Orchidaceae), which remains undescribed, and *Gleasonia uaupensis* Ducke (Rubiaceae), a new report for the flora of Venezuela.

In the following key (modified from Cowan, 1975) we found it most convenient to initially separate two group of species on the basis of number of leaflet pairs (always 2 vs. 3–6). Trees of *Eperua purpurea*, however, can often bear 2-jugate leaves, but this species is distinguished easily from others bearing 2-jugate leaves by the leaflets, the surfaces of which are strongly discolorous and have “the undersurface...obscured by a microscopic layer of tangled wax filaments” (Cowan, 1975).

#### KEY TO THE TAXA OF *EPERUA*

- 1a. Leaflets always 2-jugate ..... 2  
 1b. Leaflets mostly 3- to 6-jugate (sometimes 2-jugate in *E. purpurea*)..... 6  
 2a. Inflorescences pendent, terminal racemes of racemes (85–)145–188 cm long; petal 2.5–3.4 cm long, abaxially sericeous at the base ..... *E. venosa* (Guiana Shield, Bolívar state, Venezuela, endemic)  
 2b. Inflorescences individual cauliflorous flowers or erect short racemes 1.5–11.0 cm long; petal 4–8 cm long, abaxially glabrous to strigulose at the base ..... 3  
 3a. Rachis 2.5–5.5 cm; petioles 2.0–4.5 cm long; ovary sericeous ..... 4  
 3b. Rachis 7–85 cm long; petioles 8–30 cm long; ovary glabrous ..... 5  
 4a. Inflorescences axillary racemes, 7.0–9.5 cm long; petal adaxially without 2 basal lanose structures near the margins; stamens fertile 7; ovary ca. as long as gynophore (5 vs. 4 mm), stigma obtuse to capitate ..... *E. obtusata* (macrothermic forest, basin of Casiquiare canal, Amazonas state, Venezuela, endemic)  
 4b. Inflorescences cauliflorous flowers or axillary racemes 1.5–11.0 cm long; petal adaxially with 2 basal lanose structures near the margin; fertile stamens 10; ovary longer than the gynophore (7–8 vs. 2–3 mm), stigma bilobed ..... *E. banaensis* (macrothermic shrubby white sand vegetation, Amazonas state, Venezuela, endemic)  
 5a. Leaflets narrowly revolute marginally; inflorescence axes glabrous; bracteoles 9–10 mm long, oval-ovate; pedicels and sepals glabrous, unequal in size and form; “terra firme” forest ..... *E. glabriflora* (macrothermic forests, Amazonas and Pará states, Brazil, endemic)  
 5b. Leaflets flat; inflorescence axes puberulous; bracteoles ca. 5 mm long, oblate; pedicels and sepals puberulous, equal in size and form; flooded forest ..... *E. bijuga* (macrothermic forest, Amapá, Amazonas and Pará states, Brazil; French Guiana)  
 6a. Inflorescence long-pendent, 48–300 cm long ..... 7  
 6b. Inflorescences erect or at least not pendent, only a few cm long ..... 13  
 7a. The base of the leaflets cuneate; inflorescence not longer than 50 cm; ovary shorter than gynophore ..... *E. praesagata* (macrothermic forest, Pará state, Brazil, endemic)  
 7b. The base of the leaflets rounded-obtuse, obtuse, or cordulate; inflorescence 60–300 cm long; ovary longer than the gynophore ..... 8  
 8a. Leaflets falcate; stipules intrapetiolar or rarely more-or-less fused into one intrapetiolar body ..... 9  
 8b. Leaflets not falcate (elliptic, obovate, oval, ovate, lanceolate, or combinations of them); stipules free from each other, lateral at the base of the petiole ..... 11  
 9a. Leaflet surfaces strongly discolorous, densely papillate-ceriferous on the undersurfaces (at least x 30), the “wax bodies” contiguous, obscuring epidermis; bracteoles scarious marginally, triangular-ovate ..... *E. purpurea* (Río Negro and upper Orinoco basins forest, Brazil, Colombia, and Venezuela)  
 9b. Leaflet surfaces not discolorous, never ceriferous; bracteoles membranaceous marginally, broadly ovate or oval ..... 10  
 10a. Petal white, 2.5–3.0 × 4–5 cm; buds with a gray bloom (minutely puberulous); inflorescences 60–90 cm long, the axis of the lateral branches mostly 10–15 mm long at anthesis; staminal tube strigose-sericeous; fruits minutely strigulose ..... *E. leucantha* (Amazon caatinga forest, sometimes near edges of shrubby savannas, Amazonas state, Brazil; Guianá and Vaupés departments, Colombia; Amazonas state, Venezuela)  
 10b. Petal pink to scarlet, 1.3–1.8 cm × 1.9–2.5 cm; buds brownish-strigulose; inflorescences 10–14 cm long, the axis of the lateral branches about 30–50 mm long or even longer at anthesis; staminal tube villose; fruits more or less minutely puberulous ..... *E. falcata* (macrothermic forest, Amapá state, Brazil; Vaupés department, Colombia; Guianas; Amazonas and Bolivar states, Venezuela)  
 11a. Plant glabrous in all its parts; base of the leaflets cordulate; petal cream-colored, 2.8–3.0 × 3.5–5.0 cm; filaments ca 7.8 cm long, the anthers ca. 9 mm long ..... *E. glabra* (macrothermic forest, Guyana, endemic)  
 11b. Plant with many parts minutely tomentulose, the hairs multicellular, irregularly branching, rusty-colored (at least x 60); base of the leaflets rounded-obtuse; petal dark pink to red or purple-red, 1.3–2.0 × 2.2–3.5 cm; filaments 3.5–5.5 cm long, anthers 5.5–7.0 mm long ..... 12

KEY TO THE TAXA OF *EPERUA* CONT.

- 12a. Leaf rachis usually 12.5 cm long or shorter, the leaflets 3-jugate;  
sepals 13–20 × 4–9 mm. . . . . *E. rubiginosa* var. *rubiginosa* (macrothermic forests, Amapá, and Pará states, Brazil; Guianas)
- 12b. Leaf rachis usually more than 15 cm long, the leaflets 4- or 5-jugate;  
sepals 21–35 × 7–15 mm. . . . . *E. rubiginosa* var. *grandiflora* (macrothermic forests, Suriname, endemic)
- 13a. Petal white; bracteoles caducous; fruits more or less oblong, more than twice as long as wide . . . . . 14
- 13b. Petal pink, lilac, rose-purple, or purple; bracteoles persistent; fruits more or less quadrate, less than twice as long as wide . . . . . 15
- 14a. Leaflets mostly 5- or 6-jugate; sepals 2.2–3.0 cm long; petal 2.5–3.5 × 3.5–6.0 cm; ovary rarely  
with a few hairlets on the dorsal margin near the base, gynophore glabrous; staminal tube equilateral,  
1.0–1.5 cm long. . . . . *E. schomburgkiana* (macrothermic forests, Amazonas and Pará states, Brazil; Guianas)
- 14b. Leaflets mostly 4-jugate; sepals 1.2–1.8 cm long; petal 1.4–2.5 × 2.2–3.5 cm; ovary and gynophore densely tomentulose; staminal tube  
somewhat zygomorphic, 3.5–9.0 mm long . . . . . *E. duckeana* (macrothermic forests, Amazonas and Pará states, Brazil, endemic)
- 15a. Petal dark lavender to purple with darker purple and white markings, mottled, basally white, 5–10 × 4.0–8.5 cm . . . . . 16
- 15b. Petal pink to purple, 2.5–4.0 × 2.5–5.0 cm . . . . . 17
- 16a. Bracts, bracteoles, inflorescence axes, pedicels, and hypanthium minutely puberulous; bracts 4–5 mm long  
. . . . . *E. jenmanii* ssp. *jenmanii* (macrothermic to mesothermic forests, Roraima state, Brazil; Guianas; Bolívar state, Venezuela)
- 16b. Bracts and bracteoles glabrous except somewhat ciliolate; inflorescence axes, pedicels, and hypanthium glabrous; bracts 2–3 mm long  
. . . . . *E. jenmanii* ssp. *sandwithii* (macrothermic to mesothermic forests, Roraima state, Brazil; Guianas; Bolívar state, Venezuela)
- 17a. Petal lilac to purple; branchlets, petioles and rachis pubescent sparingly; hypanthium equilateral; staminal tube villose . . . . . 18
- 17b. Petal pink; branchlets, petioles, and rachis glabrous; hypanthium inequilateral; staminal tube puberulous to glabrescent. . . . . 19
- 18a. Large trees; leaflets oval to elliptic, the base rounded-obtuse; petal pale  
lilac . . . . . *E. oleifera* var. *oleifera* (macrothermic forests, Amazonas state, Brazil, endemic)
- 18b. Treelets to small tree ca. 8 m; leaflets ovate, base cordate, petal rose-purple or  
purple. . . . . *E. oleifera* var. *campestris* (white sand Campina, Amazonas state, Brazil, endemic)
- 19a. Leaflets margins revolute, minutely venulose; anthers minutely puberulous; ovary and gynophore densely  
pilosulose. . . . . *E. grandiflora* ssp. *guyanensis* (macrothermic to mesothermic forests, Guyana; Bolívar state, Venezuela)
- 19b. Leaflets flat, the venation subobscure; anthers and gynoeceium glabrous  
. . . . . *E. grandiflora* ssp. *grandiflora* (macrothermic forests, Amazonas and Amapá states, Brazil; Guianas; Bolívar state, Venezuela)

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