**Vochysia tepuiandina** (Vochysiaceae), a new species from the sub Andean Cordillera forests

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**Abstract.** *Vochysia tepuiandina* is here described and illustrated. It occurs in southern Ecuador and northern Peru, and is associated with the disjunct “Andean Tepuis” forests found within the Andean piedmont and of the Amazonian forests. This species is placed in the *Vochysia* section *Ciliantha* subsection *Ferrugineae*. It is compared with the similar species *V. angustifolia* and *V. sprucei*.

**Keywords:** disjunt, diversity, *Vochysia* sect. Ferrugineae, Andean tepuis.

**INTRODUCTION**

The arboreal genus *Vochysia* Aubl. (Vochysiaceae) is widely distributed in Neotropical forests from Mexico to Paraguay, with more than 145 species, of which more than 60% is found in Amazon forests (Marcano-Berti 2013; Huamantupa-Chuquimaco 2017). Within *Vochysia* 4 sections are recognized: *Apopetala, Ciliantha, Pachyantha* and *Vochysiella* (Stafleu 1948; Marcano-Berti 2013), within the *Ciliantha* section, the *Ferrugineae* subsection is one of the most diverse with 29 species (Huamantupa-Chuquimaco 2017). The Amazon forests located at the Andean piedmont are recognized worldwide as diversity hotspots. They occur in several countries including Bolivia, Colombia, Ecuador and Peru (Myers et al. 2000). These areas integrate as well with sub-Andean mountain ranges where disjoint formations known as Andean Tepuis are found. These forests are associated mainly with white-sand soils, which has been hypothesized to be related to the Tepuis of the Guyana Shield (Neill et al. 2007). They are distributed mainly in Colombia, Ecuador and Peru. The ones located in Ecuador are part of the Cordillera del Kutuku whereas in Peru they distribute along the cordilleras del Cóndor, Escalera, Kamankis and Azul (Neill et al. 2012, 2014). These areas have been described as biologically rich and with high endemism (Neill et al.
Is in this region where the new species *Vochysia* described in this document occurs.

**MATERIALS AND METHODS**

The specimens examined were collected as a product of different collaborative projects. These projects include botanical and ecological collections on the Andean and Amazon forests in Ecuador and Peru, such as the permanent plots monitored by RAINFOR, the Missouri Botanical Garden-Perú (MBG) and others. The fertile specimens were analyzed in the HOXA, MO, NY and USM herbaria (acronyms according to Thiers 2019).

The morphological terminology follows the specialized literature of Stafleu (1948) and Marcano-Berti (2014), complemented with specific terminologies from Payne (1978), Font Quer (1989), Beentje et al. (2001), Schmid et al. (2002), and Ellis et al. (2009).

The species conservation status was assessed using GeoCat software (http://geocat.kew.org; Bachman et al. 2011), following IUCN (2017) criteria. Species distribution maps were prepared with ArcGIS 10.2 (ESRI 2013).

**TAXONOMIC TREATMENT**

*Vochysia tepuiandina* Huamantupa, **sp. nov.** (Figures 1, 2).

Type: Ecuador, Zamora-Chinchipe, Yantzaza, Región de la Cordillera del Cóndor, Cuenca del Río Machinaza, Campamento las Peñas, Parcela 5, 03°46'S, 078°29'W – 03°45'S, 078°30'W, 1400–1840 m, 24 Nov. 2008 (fl.), W. Quizhpe, F. Tello, B. Medina, W. Zeas & L. Andrade 3237 (holotype, QCNE!; isotype, MO!).

**Diagnosis**

This species has leaves with 11–15 secondary veins on each side of the midrib, leaf apex acuminate, cincinni 1–2 (generally 1), indumentum of sepal and petals tomentose, staminodes absent; it differs from *T. angustifolia*, which has 30–40 secondary veins on each side of midrib, obtuse or retuse leaf apex, 2–3 cincinni, and sepal and petals glabrous, and staminodes 0.5–1.0 cm long.

**Description**

Tree to 30 m tall. Stem sub terete, quadrangular, scabrous; young branches with distal internodes densely tomentulose, hairs dark brown. Stipule deltoid-triangular, 1.3–1.6 × 1.0–1.3 mm, tomentose. Leaves opposite; petioles 0.5–1.2 cm long, 1.5–2.3 mm diameter at base, subterete, slightly canaliculated, scabrous to densely villose in young leaves; blades lanceolate, oblong-elliptic, elliptic, 3.1–10.1 × 1.0–3.1 cm, acute at base; acuminate at apex; acumen 0.6–1.0 cm long; adaxial surface glabrous to sparsely scabrous, when present the sparsely hairs are more expressed on the veins; abaxial surface scabrous in old leaves, densely and minutely tomentose-villos in young leaves, hairs white-brown, ca. 0.15 mm long; coriaceous; venation pinnate; midvein impressed and conspicuous on the abaxial surface; secondary veins 8–15 on each side of midrib, impressed on adaxial surface and slightly prominent on the abaxial surface; tertiary veins slightly impressed on the adaxial surface and slightly prominent on the abaxial surface, brochidodromous. Inflorescence terminal, sometimes also axillary; thrysoid, 3–7 cm long, densiflorus, erect, main axis densely tomentulose, tomentose, with reddish brown hairs; a compound raceme with cincinni most frequently uniflorous, or 1–2-flowered; peduncles 4–7.1 mm, densely tomentulose. Pedicels 2.5–3 mm long, densely tomentose. Flower buds elongate, slightly recurved, navicular, 5–8 mm long, round at apex, densely pilose-tomentose; 1–2 bracteoles, subulate ca. 2.0–2.5 mm long, densely tomentose. Flowers orange-yellow, together with the spurred sepal 0.9–1.2 cm long, nearly straight to navicular; spur terete, straight not curved, apex rounded, 1–1.5 × 0.8–1.0 mm, forming an angle of 80–90˚ with the pedicel, densely tomentose; dorsal sepal 6–6.5 × 2.8–3.1 mm, outer surface densely tomentose, inner surface glabrous with the border ciliate; smaller sepal oblong-deltoid, 1.9–2.1 × 1.7–1.9 mm, outer surface densely tomentose, inner surface sparsely tomentulose; petals 3, unequal, oblong-lanceolate, oblong, the larger and central petal 2.5–3.5 × 1.7–1.7 mm, outer surface densely brown-reddish tomentose, more dense in the apex, hairs ca. 1.5 mm long; the 2 smaller petals with the same shape, 1.9–2.5 × 1.2–1.9 mm, outer surface scabrous, with some hairs in the base and middle vein, inner surface glabrous, border ciliate, hairs ca. 0.7–0.8 mm long. Stamens 6.5–7.1 mm long, straight to slightly curved; filaments 0.5–0.6 mm, sparsely ciliate-tomentulose in the base; anthers 5.5–6.5 mm long, conduplicate, slightly incurved to navicular, each side of the anther ± 0.8 mm long, ciliate-tomentulose, more dense in the borders, glabrous on the apex. Staminodes unknown. Ovary glabrous, 0.7–1.0 mm long; style 4.6–5.0 mm long; stigma terminal, slightly capitulate-sagitate. Fruit unknown.

**Etymology**

The epithet “tepuiandina” is named after the habitat in the “Andean Tepuis” from the sub Andean cordilleras...
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Figure 1. Vochysia tepuiandina. A. Habit with inflorescence. B. Leaf adaxial surface (close-up). C. Leaf abaxial surface (close-up). D. Stipule. E. Flower, front view, showing petals and sepals. F. Flower, lateral view. G, H. Dorsal sepal, internal and external surface. I. Smaller sepal. J, K. Large petal internal and external surface. L, M. Smaller petals. N. Ovary and style. O. Anther and P. Anther. Illustration by N. Sánchez, from W. Quizhpe & al. 3237.
preferred by this species. These habitats have quartzitic stone formations similar to the Tepuis of the Guiana Shield, distributed along mountain ranges between the north-central of Peru to southern Ecuador.

**Distribution and ecology**

*Vochysia tepuiandina* is known from the “Andean Tepuis” group of disjunct mountains associated to sandy outcrops related to Guiana Shield Tepuis ranging from Venezuela and Guyana, in Ecuador and Peru. This mountain region is distributed and interconnected from the southern of Ecuador to northern Peru, belonging to what is known as Cordillera del Condor, then continues to Cordillera Azul and Cerro Escalera in Loreto and San Martin region in the northern Peru. The altitudes range between 1240 and 1840 m above sea level.

**Phenology**

Flowering specimens were collected between October and December.

**Conservation status**

*Vochysia tepuiandina* is only known from the Cordillera del Cóndor, Cordillera Azul and Cordillera Escalera and in the surroundings of these areas, a region

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Figure 2. Geographic distribution of *Vochysia tepuiandina* (▲) in the sub Andean mountains (Andean tepuis) in Ecuador and Peru.
**Vochysia tepuiandina** (Vochysiaceae), a new species from the sub Andean Cordillera forests that is part of southern Ecuador and continuing to northern Peru. Based on the IUCN (2017) criteria and its geographic distribution, which was calculated using the Geocat Software (2017), the extent of occurrence (EOO) of **V. tepuiandina** is 7,966 km² and its area of occupancy is 16 km², therefore this species, according to IUCN (2017) standards is classified as Endangered (EN).

**Remarks**

**Vochysia tepuiandina** belongs to **Vochysia sect. Ciliantha** subsect. **ferrugineae**. All the species of this group are characterized principally by brown stems and bark, sometimes exfoliating, stipules always present, leaves in whorls or opposite, young branches and leaves ferruginous-pilose on the abaxial face, inflorescences terminal and sometimes axillary, flowers with 3 petals, rarely one, petals and stamen pilose-ciliate along the margins and base, style and glabrous ovary (Stafleu 1948). Therefore, **Vochysia tepuiandina** can be differentiated from **V. angustifolia** Ducke (1932). The latter species is a medium-sized tree, to 15 m tall, with lanceolate stipules, leaf blades with more of 30 secondary veins on each side of midrib, clearly glabrous on the abaxial surface, cincinni with 2-3 flows, and sepal and petals are glabrous; and is commonly restricted to seasonally inundated forests, river banks in the Rio Negro and Amazonas basin. On the other hand, **Vochysia tepuiandina** is markedly a large tree up to 30 m tall, with leaf blades with less than 15 secondary veins on each side of midrib, cincinni with 1-2 flowers, and sepals and petals densely tomentose. It is more commonly distributed in montane forests associated to poor sandy soils. Another similar specie is **Vochysia sprucei** Warming (1875), which is described from the Cerro Pelado mountains in Tarapoto province, relatively close to Cerro Escalera, Peru; it differs from **T. tepuiandina** by the leaves that are sparsely stiff-ferruginous and with brown-orange puberulence on the abaxial surface, with more of 16 secondary veins on each side of midrib, obtuse at apex, sepals and petals glabrous, and presence of staminodes. A comparison of morphological characters of these three species is presented in Table 1.

**Specimens Examined**

**ECUADOR**: Zamora-Chinchipe: Yantzaza. 03°46’S, 78°29’W, 1400–1840 m, 12 Oct. 2008, W. Quizhpe & al. 3142 (QCNE, MO); Nangaritza, Faldas de la Cordillera del Cóndor. 04°07’S 078°34’W, 1600–1680 m, 5 Dec. 1990, W. A. Palacios & D. A. Neill 6535 (QCNE, MO). **PERÚ**: Loreto: Ucayali, Pampa Hermosa. Parque Nacional Cordillera Azul, 06°55’41.80”S 75°57’56.20”W, 1497 m, 26 Mar. 2018, Y. Soto & al. 1159 (HOXA). San Martín: Tarapoto, Cordillera Escalera, Bosque de tierra firme, 06°27’7.54”S, 76°18’0.49”W, 1256 m, 6 Feb. 2017, H. Flores, & H. Vásquez 1352 (HH).

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| Character | V. tepuiandina | V. angustifolia | V. sprucei |
|-----------|----------------|----------------|------------|
| Number of secondary veins on each side of midrib | 11–15 | 30–40 | 16–24 |
| Indumentum on leaf abaxial surface | glabrous | glabrous | sparsely stiff-ferruginous, with brown-orange puberulence |
| Leaf apex | acuminate | obtuse, retuse | obtuse |
| Inflorescence length | 3–7 cm | 8–14 cm | 7–12 cm |
| Number flowers in cincinni | 1(–2) | 2–3 | 2–3 |
| Sepals indumentum | tomentose | glabrous | glabrous |
| Spur shape and dimensions | globose, 1.0–1.5 × 0.8–1 mm | elongated, 6.0–8.0 × 1.2 mm | elongated, 5.0–6.0 × 1.0–1.2 mm |
| Petal indumentum in the outer surface | tomentose | glabrous | glabrous |
| Staminodes | absent | 0.5–1.0 cm long | 1.0–1.5 cm long |
V. tepuiandina. Special thanks go to Roosevelt García by the review the manuscript and the English text.

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