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## *Vanilla yanesha* (Orchidaceae), a new species of the membranaceous-leaved group from the central rainforest of Peru

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**Abstract:** *Vanilla yanesha* Damián, a new orchid species from Pasco, Peru is proposed. It is similar in overall morphology to *V. mexicana* Mill. However, *V. yanesha* is distinguished from the latter by its larger leaves, shorter inflorescence and labellum with a rounded middle lobe with 5–7 low, brownish keels. A line drawing and habitat information are provided as well as a comparison with morphologically similar species including a key to the Peruvian membranaceous-leaved species.

**Key words:** new species, *Orchidaceae*, Oxapampa, Pasco, Peru, *Vanilla*, Yanesha

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## Introduction

*Vanilla* Plum. ex Mill. is easily differentiated among the *Orchidaceae* by its hemi-epiphytic growth habit, succulent stem, absence of pseudobulbs, labellum partially adnate to the column, usually with a penicillate callus, versatile anther, crustose seeds, and fruits that are sometimes strongly aromatic (in the American fragrant species) (Nicoletti de Fraga & al. 2017; Soto Arenas & Cribb 2007). The genus encompasses c. 126 species mainly distributed in the Neotropics with Brazil as the centre of diversity of the genus with 36 species (Barros & al. 2015), followed by Colombia with 19 species (Flanagan & Mosquera-Espinosa 2016) and Mexico and Venezuela, both with 15 species (Soto & Cribb 2010; Carnevali, pers. comm.).

In Peru, the diversity of the genus has been poorly explored. The first documentation of any *Vanilla* species occurring on the country comes from Ruiz & Pavon, who recorded three species of *Vanilla*, later identified as *V. hamata* Klotzsch, *V. pompona* subsp. *grandiflora* (Lindl.) Soto Arenas and *V. ruiziana* Klotzsch (Pupulin 2012). Almost a century after the Ruiz and Pavon expedition, Kraenzlin (1906) published *V. weberbaueriana* Kraenzl. based on a specimen collected in Peru by A. Weberbauer. On his treatment of the family *Orchidaceae* for the Flora of Peru, Schweinfurth (1958) recognized five species of *Vanilla*, adding *V. odorata* C. Presl. to the previous list. Most recently, Soto & Cribb (2010), in their treatment of the entire genus, included three new *Vanilla* species for Peru: *V. appendiculata* Rolfe., *V. methonica* Rchb. f. & Warsz. and *V. palmarum* (Salzm. ex Lindl.) Lindl.,

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while recognizing *V. weberbaueriana* as a synonym of *V. ruiziana*. Finally, Janovec and colleagues (Householder & al. 2010; Janovec & al. 2013) increased our knowledge of the distribution of *Vanilla* and the ecology in the wetlands, locally known as “aguajales”, of the southeastern part of the country, where they registered six species, including four species not previously reported.

In a concerted attempt to increase our limited knowledge of *Vanilla*, a project was performed with the main objective to explore the species diversity of these plants along the eastern slope of the Peruvian Andes and to characterize their evolutionary relationships with DNA markers (Damián & Janovec 2018). As a result of this project, 19 species of *Vanilla* are now reported to occur on Peru, including six species not previously reported. Taxonomic notes are also being prepared on previously poorly documented taxa (Damián & al., in preparation). Moreover, a major effort was made to register all the herbarium specimens both within and outside of Peru. While conducting this work, a distinct specimen belonging to the group of *Vanilla* with membranaceous leaves (the *V. mexicana* group) was studied. In the present manuscript, it is formally proposed, described, discussed and illustrated as a new species.

## Material and methods

The morphological characters were obtained through the study of herbarium specimens held in HOXA, MO and USM (herbarium codes according to Thiers 2019+). Terminology is based on Soto Arenas & Cribb (2010). Photographs were taken using a Nikon D810 camera with Micro Nikkor 60 mm lens. Description and measurements were carried out under a stereomicroscope. The line illustration of the new species was prepared from high-definition digital photographs and processed with Adobe Photoshop CC v. 14.0. The conservation status was assessed using the IUCN (2012) categories and criteria.

## Results and Discussion

***Vanilla yanesha*** Damian, **sp. nov.** – Fig. 1.

Holotype: Peru, region Pasco, province Oxapampa, district Palcazu, San Francisco de Pichanaz, 10°30'23"S, 75°04'19"W, 550 m a.s.l., bosque secundario, 28 Feb 2006, R. Rojas, J. Mateo & C. Rojas 3947 (USM 240875!; isotypes: HOXA 126525!, MO accession no. 6049740 barcode MO-2028721 [photo! <http://www.tropicos.org/Image/100551655>]).

**Diagnosis** — Similar to *Vanilla mexicana* Mill., but differing in the larger leaves, 27.4–30 × 10.5–12.4 cm (vs 21–22 × 7.5–9 cm in *V. mexicana*), shorter inflorescence, to 5.7 cm long (vs 7–17 cm long), shorter labellum, 3.1–3.3 × 2.2–3.1 cm (vs c. 4.5 × 3–4.5 cm) with

a rounded middle lobe with 5–7 low, brownish keels (vs middle lobe subacute to ovate, with 3 prominent, thickened, yellow keels).

**Description** — Hemiepiphyte vine. *Aerial roots* whitish, 0.3–0.5 cm wide, glabrous. *Aerial stem* green, c. 0.6 cm in diam.; internodes c. 8 cm long. *Leaves* distichous, green (turning black or brownish on herbarium specimens), broadly elliptic, 27.4–30 × 10.5–12.4 cm, venation strongly reticulate, margin entire, apex acute. *Inflorescence* lateral, erect, 5.1–5.7 cm long, with 3 or 4 flowers opening simultaneously; *floral bracts* persistent, green, ovate, 1.8–3 cm long, apex reflexed. *Flowers* resupinate, predominantly greenish; ovary and pedicel green, 3–5.5 cm long. *Sepals* pale green, elliptic to lanceolate, inrolled, thickened, margin undulate, apex acute; dorsal sepal elliptic to lanceolate, 4–5.6 × 1.7–1.8 cm; lateral sepals asymmetric elliptic, 3–4 × 1.2–2 cm. *Petals* pale green, elliptic, 4.5–5.3 × 1–1.5 cm, margin undulate, apex acute. *Labellum* white, 3-lobed, 3.1–3.3 × 2.2–3.1 cm, attached to column on dorsal side for c. 5 mm of length, rugose above junction with column, base truncate; *lateral lobes* arching over column, overlapping, rounded, margin entire; *middle lobe* orbicular, c. 1.5 × 1.5 cm, margin undulate, callus of 2 prominent keels emerging from base to near 1/3 length of labellum and progressively becoming obscure near middle and then divided into 5–7 sinuous, low, brownish, rugose keels reaching apex of labellum smoothly. *Column* white, arched, 2.5–2.7 cm long; *stigma* transversely broadly oblong, c. 0.7 cm wide; *anther*, c. 0.4 × 0.6 cm. *Fruit* unknown.

**Phenology** — Recorded as flowering in February.

**Distribution and ecology** — So far, *Vanilla yanesha* is known only from the district of Palcazu in the province of Oxapampa in the region of Pasco, close to the river Cacazu. It has been reported to grow in a secondary forest at 550 m a.s.l.

**Conservation status** — IUCN (2012) status: Data Deficient (DD). Known from a single collection made on the limit of two protected natural areas, the Yanachaga Chemillen National Park and the San Matias San Carlos Protected Forest. A major effort is needed to find populations of this species in either of these two protected areas.

**Etymology** — The epithet honours the Yanesha people, an ethnic group from the central rainforest of Peru which forms part of the Oxapampa-Ashaninka-Yanesha Biosphere Reserve. This reserve has an exceedingly rich cultural legacy that is in need of protection.

**Remarks** — *Vanilla yanesha*, along with *V. oroana* Dodson, has perhaps the largest leaves in the genus, at

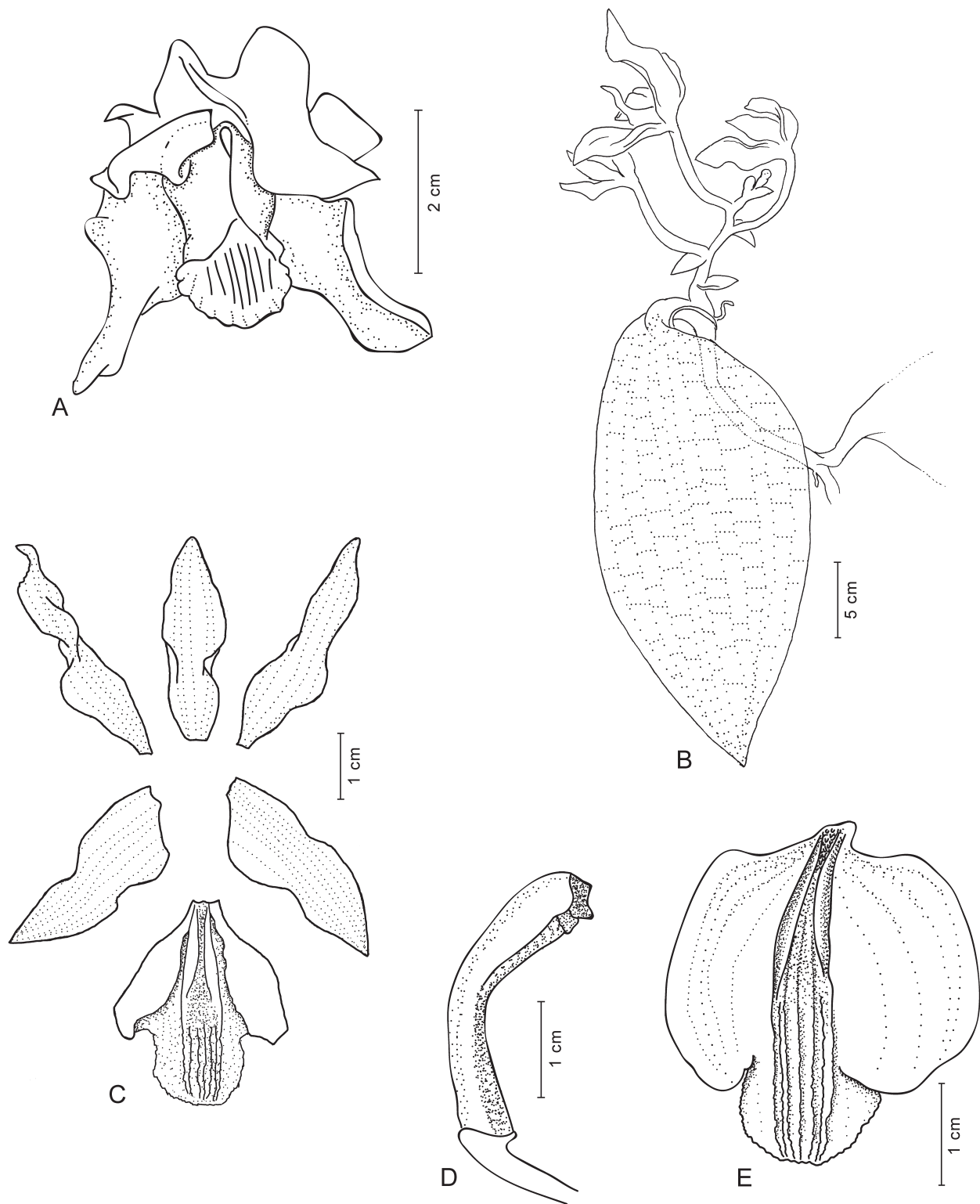


Fig. 1. *Vanilla yanesha* – A: flower; B: portion of stem with leaf and inflorescence; C: dissected perianth; D: column in lateral view; E: labellum. – Drawing from R. Rojas, J. Mateo & C. Rojas 3947 (USM) by N. Soto and A. Damián.

27–35 × 10–15 cm. However, its non-foliaceous bracts (vs foliaceous in *V. oroana*), and its labellum bearing a rounded apex with 5–7 low, brownish keels (vs an obtuse apex with 3 thickened keels in *V. oroana*) easily separate the two species. In Peru, *V. yanesha* is sympatric with

*V. mexicana* (Fig. 2B), collected in the same locality (R. Rojas & G. Ortiz 5146). The latter species differs mainly in having different labellum morphology, with a prominent, subacute to ovate middle lobe bearing three congested, yellow keels in the middle. Another similar spe-

cies is *V. guianensis* Splitg. (Fig. 2A) (= *V. latisegmenta* Ames & C. Schweinf.), which differs from *V. yanesha* in its broader labellum, c. 5 cm wide (vs 2.2–3.1 cm wide in *V. yanesha*) and its broadly ovate to obscurely defined middle lobe (vs conspicuous, rounded middle lobe in *V. yanesha*). *Vanilla martinezii* Soto Arenas (= *V. guatemalensis* Archila) has a similar labellum middle lobe, with up to 11 low, rugose keels, but in *V. yanesha* these keels are only 5–7 and do not have a fleshy plate, a feature that distinguishes *V. martinezii*.

**Additional specimen examined** — VANILLA MEXICANA: PERU: region Pasco, province Oxapampa, district Pozuzo, Alto Lagarto a Puente Victoria, 10°06'00"S, 75°26'00"W, 700 m a.s.l., bosque primario, 28 Dec 2007, R. Rojas & G. Ortiz 5146 (HOXA 040769!, MO accession no. 6852664 barcode MO-2991620 [photo! <http://www.tropicos.org/Image/100551710>], USM 241512!).

#### Key to the Peruvian membranaceous-leaved species of *Vanilla* (the *V. mexicana* group)

1. Leaves c. 17 × 4.5 cm; floral bracts <10 mm long; labellum strongly emarginate at apex . . . *V. methonica*  
– Leaves 20–30 × 7–12.4 cm; floral bracts > 10 mm long; labellum broadly obtuse to rounded at apex . . . 2
2. Labellum 45–50 mm wide, weakly trilobed or hexagonal, lateral lobes strongly overlapping, apex broadly ovate with 3 yellow keels . . . . . *V. guianensis*  
– Labellum 22–35 mm wide, strongly trilobed, lateral lobes slightly overlapping, apex rounded to suboblong with 3–7 yellow to brownish keels . . . . . 3
3. Labellum with rounded middle lobe and 5–7 low, brownish keels . . . . . *V. yanesha*  
– Labellum with subacute to ovate middle lobe and 3 prominent, thickened, yellow keels . . . *V. mexicana*

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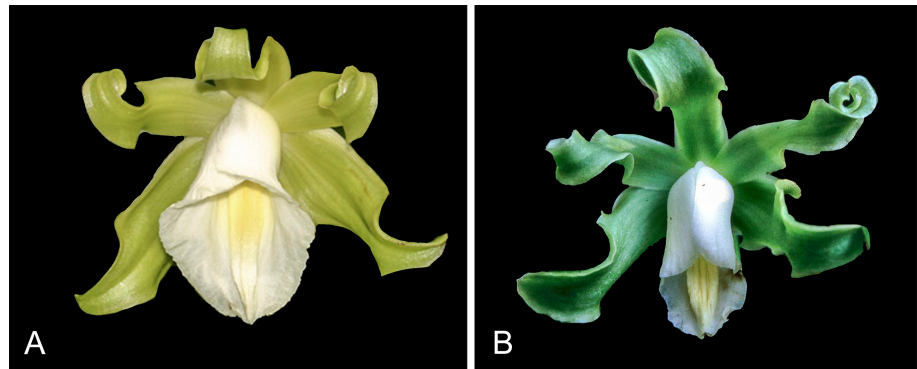


Fig. 2. Flowers of *Vanilla guianensis* (A) and *V. mexicana* (B). – Photographs by Guy Chiron.

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