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## A new species of *Myoxanthus* (Pleurothallidinae: Orchidaceae) from Peru with a horn-shaped labellar callus

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### Abstract

The genus *Myoxanthus* comprises 54 species distributed from Mexico to southeastern Brazil and belongs to the subtribe Pleurothallidinae, the most diverse lineage within Orchidaceae. Since the last revision of the genus, several additional species have been described, mainly from South America, where new taxa continue to be discovered, particularly in the forest of the Andean Mountain Range that harbor remarkable diversity. Here we describe a new species, *Myoxanthus triceratops*, from the cloud forest of Oxapampa department, Peru. This new species is similar to *M. hirsuticaulis*, from which it differs by having an ovate acute synsepal; petals filiform above the basal third; a labellum with a horn-like callus at the apex; and a pair of lamellae forming a hourglass-shaped pattern. The new species can be readily distinguished from all other members of the genus by the presence of a horn-shaped callus at the apex of the labellum, a character not previously reported in any species of *Myoxanthus*. For the new species, we provide a Lankester Digital Composite Plate (LCDP), a detailed illustration, a taxonomic discussion, and photographs of the most closely related species. The discovery of *Myoxanthus triceratops* highlights the still underestimated diversity of *Myoxanthus* in Andean forests and emphasizes the importance of continued fieldwork and taxonomic study in these highly biodiverse ecosystems.

**Key words:** Andes orchid, Pleurothallids, Peruvian flora, *Restrepia* affinity

### Resumen

El género *Myoxanthus* comprende 54 especies distribuidas desde México hasta el sureste de Brasil y pertenece a la subtribu Pleurothallidinae, la más diversa dentro de la familia Orchidaceae. Desde la última revisión del género, se han descrito varias especies nuevas, principalmente de Sudamérica, donde continúan descubriéndose nuevos taxones, particularmente en los bosques montaños andinos que albergan una gran diversidad. Aquí describimos una nueva especie, *Myoxanthus triceratops*, procedente de los bosques nubosos de Oxapampa, Perú. Esta nueva especie es similar a *M. hirsuticaulis*, de la cual se diferencia por tener un sinsépalo ovado y agudo; pétalos filiformes por encima del tercio basal; un labelo con un callo en forma de cuerno en el ápice y las lamelas formando un patron en forma de reloj de arena. La nueva especie se puede distinguir fácilmente de todos los demás miembros del género por la presencia de un callo en forma de cuerno en el ápice del labelo, una característica no reportada previamente en ninguna otra especie de *Myoxanthus*. Para la nueva especie, proporcionamos una Lámina Compuesta Digital Lankester (LCDP), una ilustración detallada, una discusión taxonómica y fotografías de las especies más cercanas. El descubrimiento de *Myoxanthus triceratops* resalta la diversidad todavía subestimada de *Myoxanthus* en los bosques andinos y enfatiza la importancia de continuar con trabajos de campo y estudios taxonómicos en estos ecosistemas de alta biodiversidad.

## Introduction

Within the megadiverse subtribe Pleurothallidinae, *Myoxanthus* Poeppig & Endlicher (1835: 50) comprises 54 species distributed from southern Mexico to Bolivia and southern Brazil (Luer 1992, Luer 1995, Rojas-Alvarado *et al.* 2021). The genus was established almost two centuries ago from a specimen collected in Peru described as *Myoxanthus monophyllus* Poepp. & Endl. Shortly after its publication the genus was transferred to *Pleurothallis* R.Br. in Aiton (1813: 211) by Schlechter (1921). Subsequently, other species belonging to this group were described under multiple genera, including *Duboisia* Karsten (1847: 394) and *Chaetocephala* Barbosa (1882: 37), which were also later transferred to *Pleurothallis* (Reichenbach 1852, Schlechter 1921, Cogniaux 1896). In 1982, Luer reclassified all these grouped species (Luer 1982, 1992, 1995), resurrecting *Myoxanthus*, which is now a well-recognized genus both morphologically and genetically. Molecular DNA analyses placed *Myoxanthus* within the *Restrepia* affinity (Pridgeon *et al.* 2001, Karremans 2016, Pérez-Escobar *et al.* 2017, Chumová *et al.* 2021), a clade shared with *Echinosepala* Pridgeon & Chase (2002: 100), *Barbosella* Schlechter (1918: 259), *Dresslerella* Luer (1976: 1), *Restrepia* Kunth (1816: 366), *Restrepiella* Garay & Dunsterville in (Dunsterville & Garay 1966: 266) and *Pleurothallopsis* Porto & Brade (1937: 133). *Myoxanthus* is easily distinguished from all other genera of the subtribe by the presence of discontinuous lines of trichomes perpendicular or oblique to the axis of the ramicaul (Rojas-Alvarado *et al.* 2021).

The training of new botanists and the increasing exploration of previously under-studied areas in Peru have resulted in a growing number of floristic and taxonomic studies in Orchidaceae, contributing substantially to the knowledge of one of the largest plant families in the world and to a better understanding of the flora of Peru, a country recognized as one of the most biodiverse regions globally. Luer (1992), in his monograph of the genus, reported 12 species for Peru, and Brako & Zarucchi (1993) listed 13 species for the country. Subsequently, with the publication of new species and additional records (Kolanowska & Szlachetko 2019, Rojas-Alvarado *et al.* 2021, Cuadros-Rojas 2023), the total number of *Myoxanthus* species reported for Peru is documented at 24. For the province of Oxapampa, two species and an unidentified taxon have been reported (Luer 1992, Valenzuela *et al.* 2022): *M. affinis* (Lindley 1836: 354) Luer (1982: 35), *M. monophyllus* and *Myoxanthus* sp.

Here, we describe a new species of *Myoxanthus* from the Oxapampa region, based on living material and compared with its most morphologically similar species. The new species is readily distinguished by the presence of a horn-shaped callus near the apex of the labellum, a morphological feature not known from any other described species. This taxon increases the number of *Myoxanthus* species in Peru to 25, placing the country among the most species-rich regions for the genus, alongside with Colombia and Ecuador (Rojas-Alvarado *et al.* 2021).

## Materials and methods

During a field expedition to the Centro de Capacitación en Conservación y Desarrollo Sostenible (CDS), Oxapampa, Peru, an unusual species of *Myoxanthus* was photographed. Because the specimens exhibited morphological characteristics that did not match those of any known species, they were subjected to detailed examination. To analyze and compare the putative new species, we consulted the monograph of the genus (Luer 1992), the subsequent taxonomic additions by Rojas-Alvarado *et al.* (2021), and all literature describing new species published thereafter (Kolanowska & Szlachetko 2019, Rojas-Alvarado *et al.* 2021, Uribe-Vélez *et al.* 2022, Cuadros-Rojas 2023, Kolanowska & Szlachetko 2025). This approach allowed us to identify the most closely related taxa and to examine their original descriptions and type material, and determine whether the studied specimens represented a previously undescribed species. Since the specimen comparisons did not correspond to any species currently recognized within the genus, it is herein described as new. The research was conducted under de permission N° AUT-IFL-2020-032 of the Servicio Nacional Forestal y de Fauna Silvestre (SERFOR). Living plants and floral structures were photographed with a Nikon D90 camera with a 35–70 mm Nikkor lens equipped with a 48 mm generic Nikon extension tube (Nikon Corporation, Japan). The resulting images were used to prepare a Lankester Composite Digital Plate (LCDP) with Adobe Photoshop®. Measurements were taken from the fresh plants under a stereoscope (model JTL-02-V7). The botanical illustration was done in an iPad Pro using Procreate v. 5X. Following documentation, both dried and liquid-preserved specimens were prepared and deposited in the HOXA and HUPCH herbaria. Inflorescence terminology follows Rojas-Alvarado & Karremans (2024). The map was created with QGIS Desktop 3.44.6 and subsequently edited in Adobe Photoshop.

## Taxonomy

*Myoxanthus triceratops* Rojas-Alv., Rizo-Patron & Ocupa, *sp. nov.* (Figures 1–2).

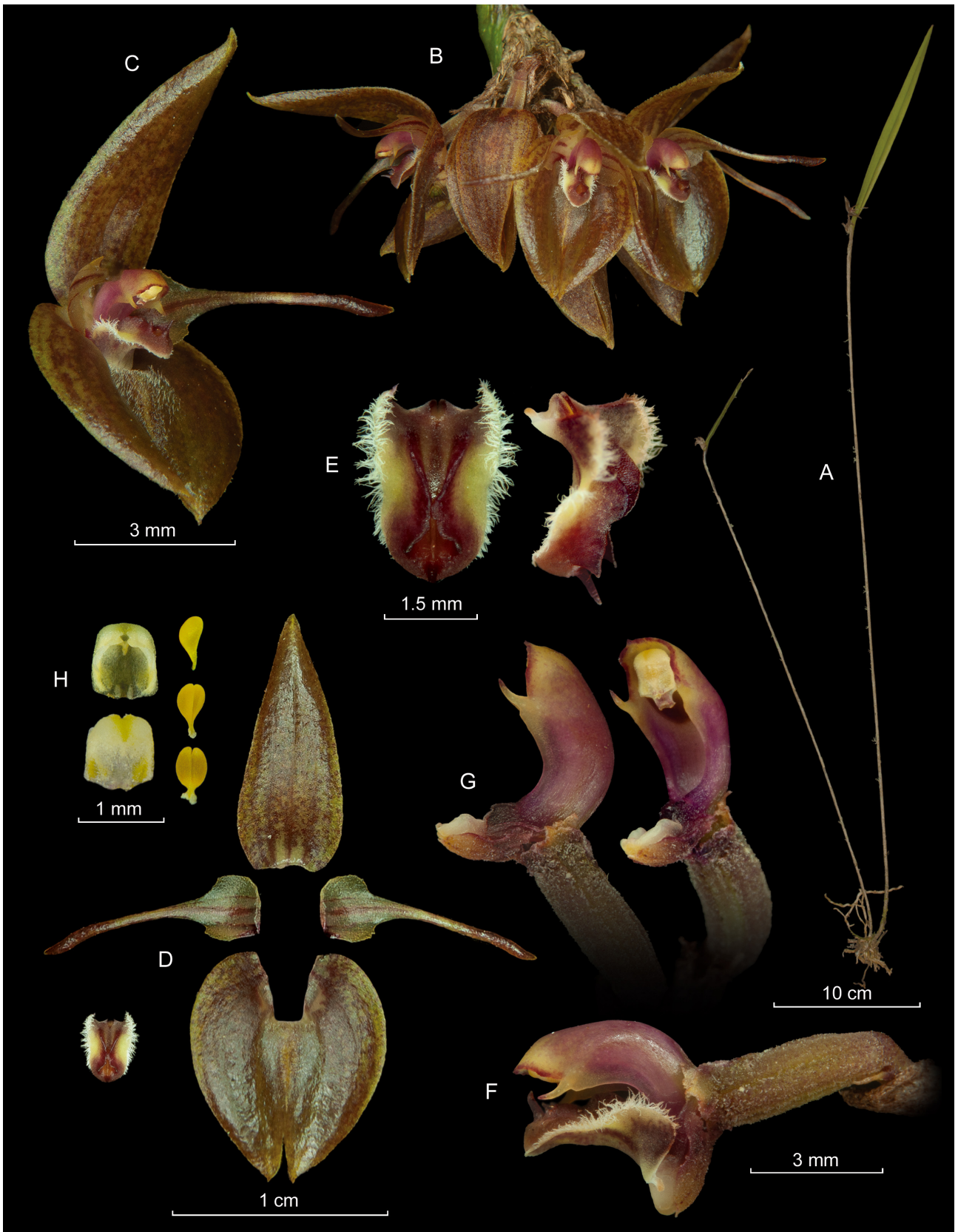
**Type:**—PERU. Pasco: Oxapampa, San Alberto, cloud forest, 2200 masl, coordinates omitted for conservation reasons, 6 May 2021, *F. Rizo-Patrón 118* (holotype: HUPCH-6260!; isotype: HOXA!).

*Myoxanthus triceratops* differs from *M. hirsuticaulis* (Ames & Schweinfurt 1930: 29) Luer (1982: 43) by its ovate synsepal, frequently with revolute margins (*vs.* subcircular and concave, without revolute margins); petals contracted toward the apex forming a filiform apex (*vs.* petals contracted toward the apex forming a terete apex); the labellum bearing a horn-like apical callus in the adaxial surface (*vs.* apex smooth, lacking an apical horn-like callus); and the distal part of the lamellae of the lip large and triangular shaped (*vs.* distal part of the lamellae inconspicuous fading on the middle lobe).

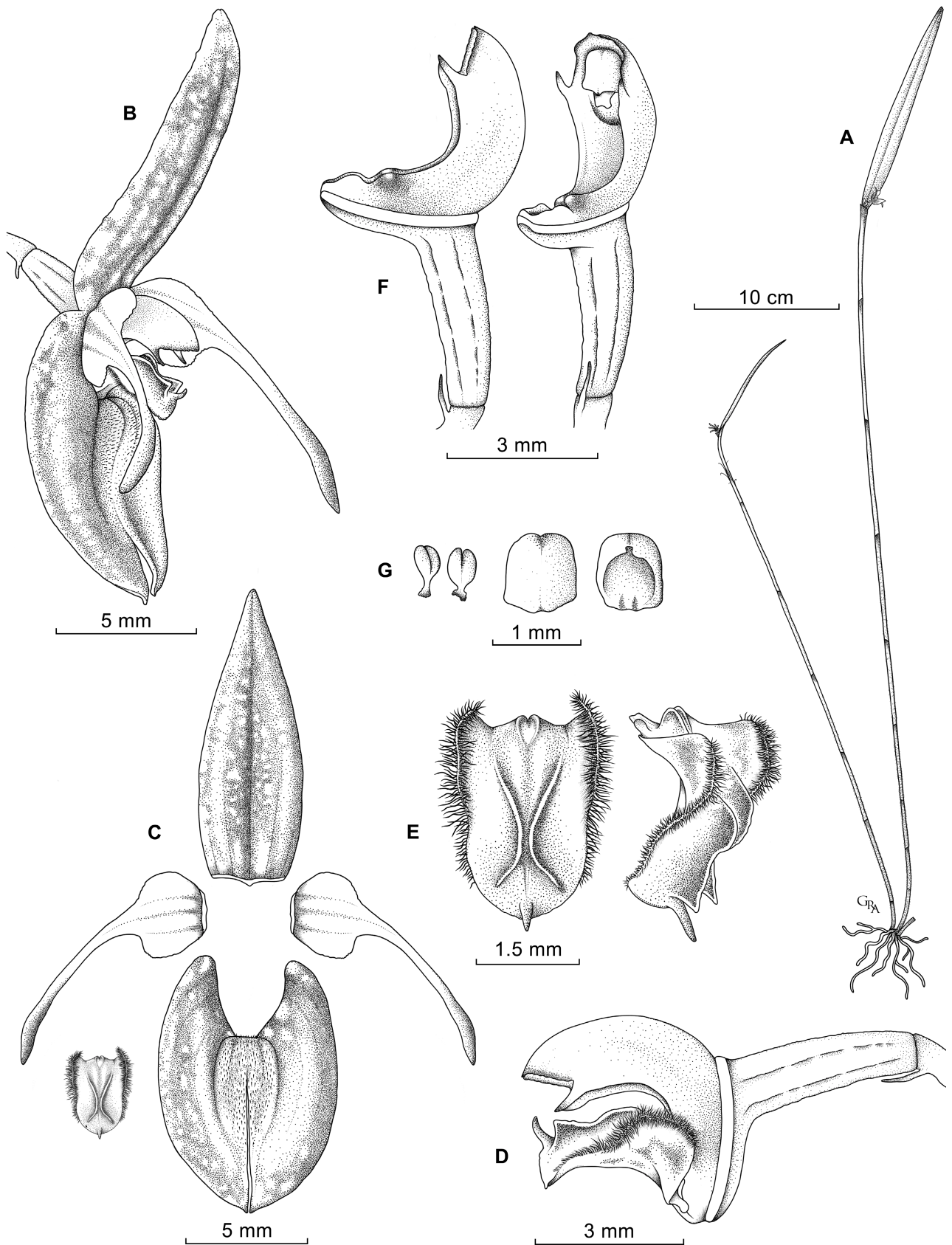
**Description:**—*Plant* epiphytic, caespitose, erect up to 70 cm tall. *Rhizome* abbreviated. *Roots* fibrous, flexuous, 0.8–3.0 mm in diameter, branching. *Ramicauls* slender, cylindrical, erect, up to 52 cm long, 1.5–3.6 mm in diameter, 8–11 internodes, with the basal ones shorter, enclosed by hispidulous sheaths. *Sheaths* of ramicaul tubular, papyraceous, light brown, overlapping from 3 to 10 mm the next internode, covered by brown (dark purple in young shoots) trichomes generally deciduous in the apical sheaths and arranged in discontinuous lines perpendicular or oblique to the ramicaul axis, the apical sheath covering up to 3 cm of leaf base, often breaking longitudinally into fibers and eventually disintegrating with age. *Leaves* erect, coriaceous, conduplicate, lanceolate, narrowly ovate, acute, base cuneate, apex minutely tridentate, 8.0–19.0 × 1.1–1.8 cm. *Inflorescence* at the apex of the ramicaul enclosed during early development by a 8.0 × 2.5 mm papyraceous, acute, spathe that disintegrates when old, covered by light brown trichomes; compound, with the peduncle and branch system highly abbreviated, producing single-flowered successive cymes, up to 7 flowers opened at a time; pseudopeduncle up to 4.5 mm long, with few purple trichomes to the apex, subtended by a brown, acute, papery, 5.5–7.5 mm long bract covered by minute purple trichomes to the apex; pedicel purplish, up 5.5 mm long, with a 1 mm long filament emerging near the apex. *Floral bract* papyraceous, 5 mm long, with few purple minute trichomes to the apex. *Ovary* subclavate, cellular granular, glabrous, 2 mm long, greenish to brownish. *Dorsal sepal* greenish mottled with brownish, lanceolate to ovate, margins slightly revolute, 5-veined, acute, 12 × 5 mm. *Lateral sepals* greenish mottled with brownish, oblique, 5–6-veined, connate at the base forming an ovate, acute, synsepal, the base with a small mentum, then concave with minute white trichomes in the center, the external margins revolute, 11 × 5 mm. *Petals* basally greenish translucent with purple stripes, ovate at the basal 1/3, then abruptly contracted, becoming filiform, 3-veined, 10 mm long, 3 mm wide at the base with denticulate to serrulate margins. *Labellum* greenish with brownish to dark red, white fimbriate margins, ovate-oblong, scarcely trilobed, slightly recurved, 3.5 × 3.0 mm, base subtruncate with a small auricle at each side, lateral margins erect below the middle, base with two small, rounded, backwardly directed, hump-shaped calli at center; the disc with a pair or longitudinal lamellae emerging below the middle, extending to near the apex and converging in the middle without fusion, then diverge again towards the apex forming a hourglass-shaped pattern, the proximal part rounded and the distal part triangular shaped; middle lobe oblong rounded, with a horn-like callus below the apex, adaxially, in front of the lamellae; 3-veined, hinged to the column foot by an hyaline membrane. *Column* greenish with dark red, semiterete, arched almost forming a right angle, 3.5 mm long; the 2 mm long column foot ventrally concave accommodating the basal callus of the labellum, and above with a pair of rounded dark red calli that extend to the apex of the column forming the wings, with narrowly acute tooth on each side of the stigma, the clinandrium long hooded, the anther incumbent, and the stigma ventral. *Anther cap* white, obovoid, 0.75 mm wide. *Pollinia* two, yellowish, obovoid, laterally flattened, 0.5 mm wide, with a pair of small, flat, white caudicles.

**Distribution and ecology:**—Currently known only from Oxapampa, Pasco department, Peru (Figure 3). Besides the type locality in the eastern Oxapampa, a digital record on the platform iNaturalist in the southern Oxapampa was found (observation by R. Ripley, digital image: <https://www.inaturalist.org/observations/13310485>). This species was found growing as an epiphyte over a *Alchornea glandulosa* Poepp. (1841: 18) (Euphorbiaceae) at 2200 masl in a cloud forest of the buffer zone of the Yanachaga Chemillén National Park, Oxapampa. It blooms from October to December.

**Etymology:**—Specific epithet comes from the Greek *triceratops*, “three-horned-faced” (*tri-*, “three-,” *ceras*, “horn,” and *ops*, “eye, face”), in allusion to the resemblance of the apex of the labellum to the celebrated dinosaur.



**FIGURE 1.** Lankester Composite Dissection Plate of *Myoxanthus triceratops*. **A.** Plant habit. **B.** Synflorescence with 7 single-flowered cymes. **C.** Flower  $\frac{3}{4}$  view. **D.** Dissected perianth. **E.** Labellum adaxial and  $\frac{3}{4}$  view. **F.** Ovary column and labellum lateral view. **G.** Ovary and column lateral and ventral view. **H.** Anther cap ventral and dorsal view, pollinia side, ventral and dorsal view. Prepared by F. Rizo Patrón and G. Rojas-Alvarado based on the holotype.



**FIGURE 2.** Illustration of *Myoxanthus triceratops*. **A.** Habit. **B.** Flower  $\frac{3}{4}$  view. **C.** Perianth dissected. **D.** Ovary, column and labellum lateral view. **E.** Labellum adaxial and  $\frac{3}{4}$  view. **F.** Ovary and column lateral and ventral view. **G.** Pollinia ventral and dorsal view, anther cap dorsal and ventral view. Prepared by G. Rojas-Alvarado based on the holotype.

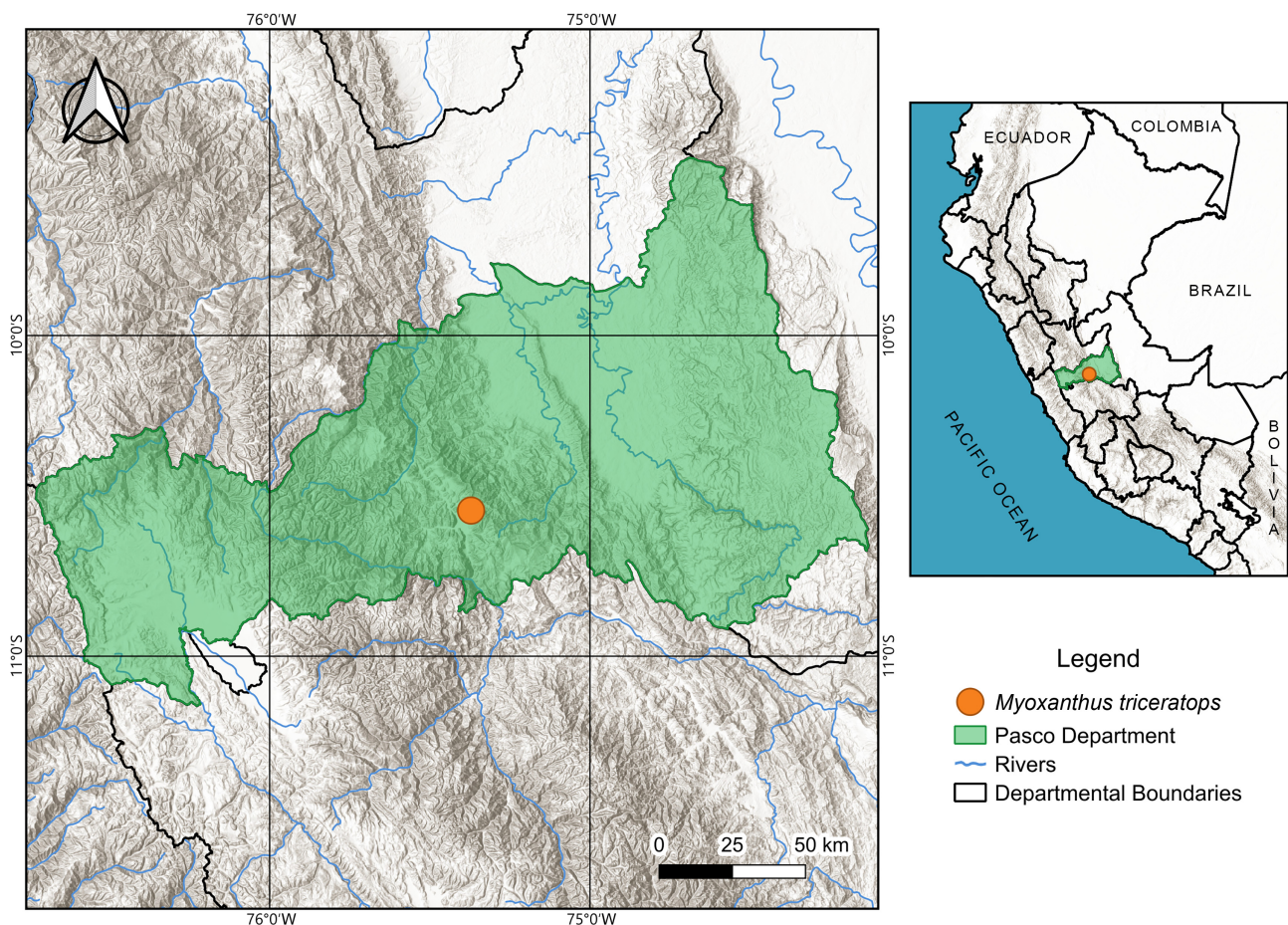
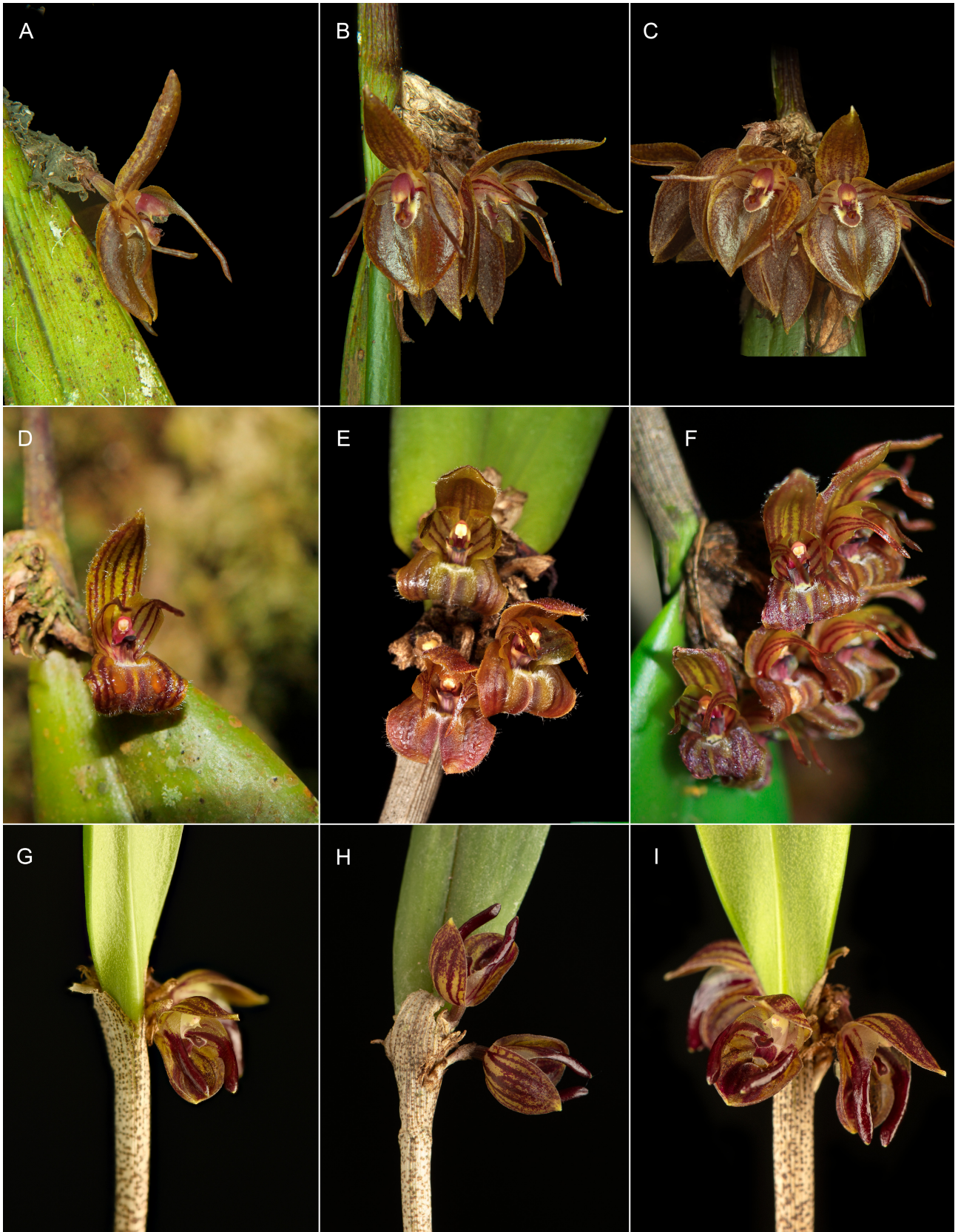


FIGURE 3. Distribution map of *Myoxanthus triceratops*, located in Oxapampa, Pasco department, Peru. Prepared by L. Ocupa-Horna.

**Taxonomic discussion:**—In *Myoxanthus*, there are several species such as *M. ceratohallii* (Reichenbach 1854: 25) Luer (1982: 36), *M. hirsuticaulis* (Figure 4), *M. fimbriatus* Luer & Hirtz (1992: 38–39), *M. antennifer* Luer & Hirtz (1992: 18–19) and *M. gyas* (Luer & R. Vásquez in Luer 1981: 207) Luer (1982: 43), that at first glance appear similar to this new species, especially for the striped sepal or the narrow contracted petals. However, with closer examination, the most similar species to *M. triceratops* is *M. hirsuticaulis*, but the former differs by having a ovate synsepal with revolute margins (*vs.* synsepal subcircular, concave, without revolute margins); petals contracted to the apex forming a filiform distal apex (*vs.* petals contracted to the apex forming a terete distal apex); a labellum with a horn-like callus near the apex in the adaxial surface (*vs.* labellum with the apical adaxial surface smooth without a horn-like callus), the distal part of the labellum lamellae large and triangular shaped (*vs.* the distal part of the lamellae inconspicuous, fading on the middle lobe); apex of the column with a narrow acute tooth on each side of the stigma, followed by the regular margin of the clinandrium, which covers the anther in lateral view (*vs.* apex of the column with a narrow acute tooth on each side of the stigma, followed by clinandrium with two small teeth and then dorsally elongate, exposing part of the anther cap in lateral view); column wings regular, with a small angle below the apical teeth (*vs.* column wings with round or obtuse angle to the apex) (Figure 5).

Some groups within *Myoxanthus*, such as the species allied to *M. affinis*, are taxonomically very challenging due to the lack of clear diagnostic characters across the distribution range of the species (Luer 1992, Rojas-Alvarado *et al.* 2021). Therefore, thorough sampling and careful documentation of living material are extremely important for addressing such cases. However, this new species presents a morphological feature that has never been recorded in any described species of the genus: a horn-shaped callus in the adaxial surface near the apex of the labellum (Figures 1E, 5C). In *Myoxanthus*, projections such as calli or lamellae are common, mainly at the base of the labellum or on the disc. Projections arising from the disc generally extend over the midlobe but do not reach the apex (Luer 1982, 1992, Rojas-Alvarado *et al.* 2021). Beyond these projections, wart-like structures may occur adaxially at the apex of the labellum; however, since a projection such as the one present in the new species has never been documented, it allows for clear distinction from any other taxon within the genus.



**FIGURE 4.** Comparison of: **A–C** *Myoxanthus triceratops*, **D–F** *M. ceratohallis* and **G–I** *M. hirsuticaulis*. Photographs by: F. Rizo Patrón (A–C), N. Gutierrez-Morales (D, Colombia), R. Parsons (E, Colombia), J. Rojas (F, Colombia), G. Rojas-Alvarado (G–I, Costa Rica).



**FIGURE 5.** Comparison of the ovary, labellum and column of: **A–C** *Myoxanthus triceratops* and **D–F** *M. hirsuticaulis*. **A, D:** Ovary, column and labellum lateral view. **B, E:** Ovary and column lateral view. **C, F:** Labellum, adaxial and side views. Photographs by F. Rizo Patrón (A–C), G. Rojas-Alvarado (D–F). Scale bar = 3 mm.

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