


Telipogon choquequiraoense, a new orchid species from Choquequirao, an Inca archaeological site in Southern Peru

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Abstract

Choquequirao Regional Conservation Area is a natural protected area in southern Peru, where an Inca archaeological site with the same name is located. The area is rich in orchids, many of which remain undescribed. Here, we describe a new species of *Telipogon* (Orchidaceae) from Choquequirao, which we name *Telipogon choquequiraoense*. The species is similar to *T. huancavelicanus* but differs by the sub-rhombic to widely lanceolate petals, the oblong labellum, the setose dark purple callus, and the acicular setae on the column. We provide a detailed description, along with a line drawing and pictures of the new entity. We also graphically show the *Telipogon* richness and generate a taxonomic key including all *Telipogon* species that occur within the conservation area.

Keywords Conservation area · Endemic species · Oncidiinae · *Telipogon huancavelicanus*

Introduction

Peru is one of the most biodiverse countries in the world, in terms of both ecosystems and living organisms, which provide globally important ecosystem services (Rodríguez & Young, 2000; Móstiga et al., 2023; Martel et al., 2024). In terms of plants, Peru harbors around 19,150 plant species, 2,120 species being orchids (Ulloa Ulloa et al., 2017), 70% of which are endemic to the country (Roque & León,

2006). Unfortunately, many of the Peruvian orchid species are at risk of extinction due to the expansion of human activities (e.g. logging, mining, agriculture) (e.g., Roque & León, 2006; Householder et al., 2010; Martel, 2020). The establishment of natural protected areas (NPAs) has been the main strategy to conserve plants and animals in Peru. Effectively, NPAs cover around 18.14% (233,130 km²) of the Peruvian land (SERNANP, 2024) and are critical for orchid conservation since most of the 50% of the Peruvian orchid diversity is represented in NPAs (Olortegui Acosta, 2024).

The Choquequirao Regional Conservation Area, established in 2010, is a relatively new NPA located in Cusco Department, in southern Peru. It holds Inca archaeological monuments and a rich biodiversity, including at least 46 mammal species and 482 plant species (Ochoa, 2022). Among them, orchids are well represented and so far, 110 species have already been recorded in Choquequirao (Vilca Bustamante et al., 2023). The study of the orchid flora from Choquequirao has resulted in the discovery and later description of previously unknown species, such as *Epidendrum infundibuliforme* Hágsater & Villaf. (Hágsater & Villafuerte 2023). In Choquequirao, some well represented orchid genera are *Stelis* Sw., *Pleurothallis* R.Br., and *Telipogon* Kunth (Vilca Bustamante et al., 2023); however, some of the recorded orchids are undescribed species.

During a survey aiming to characterise the orchid diversity from Choquequirao, some of the authors (LLVB, JAYP and MVA) recorded and collected one specimen of an undetermined miniature *Telipogon* species (sensu Martel et al., 2017).

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After carefully examining the material, we determined that it belongs to an undescribed species. Therefore, we propose it here as a new entity and provide a detailed description, illustrations, and comparison with similar and co-occurring species. Additionally, we have prepared a checklist and species key for the so far known *Telipogon* species of Choquequirao.

Materials & Methods

One specimen of the new species was found during botanical expeditions in Choquequirao Regional Conservation Area, Cusco, Peru, in 2022. Plant material was collected and preserved in spirit (the inflorescence) and dried (vegetative organs). In situ photographs were taken with a DSLR Nikon D3500 equipped with a 40 mm lens. Flowers were collected and preserved in spirit in a solution of ethanol-glycerine-water (70:5:25); flowers in spirit were used to prepare the line drawing. The single collected specimen was later deposited at the herbarium of the Universidad Nacional de San Antonio Abad del Cusco (CUZ). An informal conservation assessment was prepared following the criteria of the IUCN (2024). The study was conducted under a collecting permit (RD N° D000115-2022-MIDAGRI-SERFOR-DGGSPFFS-DGSPFFS) issued by SERFOR, the National Forestry and Wildlife authority, an institution of Peru's Ministry of Agricultural Development and Irrigation (MIDAGRI).

Taxonomic Treatment

Telipogon Choquequiraoense C.Martel & Collantes, **sp. nov.**

TYPE: Peru: Cusco. Prov. La Convención, Dist. Santa Teresa, Yanatile-Tambopata, Área de Conservación Regional Choquequirao, 2864 m, 10 Apr 2022, *M. Villafuerte, J.A. Yuca, M.A. Hilares, N. Barriga, L. Vilca & D.A. Flores* 769 (holotype: CUZ [!]) Figures 1, 2 and 3.

Diagnosis. *Telipogon choquequiraoense* is most similar to *Telipogon huancavelicanus* but differs by the strongly incurved and sub-rhombic to widely lanceolate petals (vs. slightly incurved and oblanceolate petals), the 5-veined petals (vs. 3-veined petals), the oblong labellum (vs. a sub-pandurate labellum), the 5-veined labellum (vs. a 7-veined labellum), the conspicuous setose dark purple callus on the labellum (vs. an ecallose labellum), and the setae of columnar tufts are acicular and simple (vs. columnar tufts with sub-tubular, rugged-ornamented setae, which are branched at the apex into 2–5 cylindrical segments).

Description. Epiphytic herb, sympodial, acaulescent, ca. 35 mm including the inflorescence. Roots terete, 0.9 × 1.0 mm. Leaves 8–13 × 3.8–5 mm, 2–4, elliptic, entire, articulated, minutely papillate toward the apex, cuspidate apex. Inflorescence

apical; scape up to 29 mm long, terete, up to 4 flowers, opening in succession. Ovary 3.5–6.0 × 0.7–0.9 mm, subterete, pedicellate. Flowers non-resupinate, 23 mm in diameter. Floral bract 0.8–1.2 × 0.5–0.7 mm, triangular. Sepals greenish-yellow, semi-translucent; dorsal sepal 10–3.9 mm, sub-triangular, concave towards the base, entire, apiculate apex, 3–4-nerved; lateral sepals 8.1–9.0 × 3.6–4.1 mm, ovate, acute apex, concave towards the base, 3-nerved, entire, the distal half dorsally carinate. Petals 9.1–10.1 × 5.0–5.3 mm, greenish-yellow, sub-rhombic to widely lanceolate, apex acute to sub-acute, margins densely setulose; setulae white, retrorse towards the base; nerves 5, burgundy. Labellum 9.5 × 4.5 mm, greenish-yellow, oblong, sub-acute apex ending in a minute mamilla, basally divaricated into two short corniculate projections, entire, densely setulose on the margins, setulae greyish, retrorse towards the base; 5 burgundy nerves. Callus 4 × 3 mm, dark purple, sub-sagittate, laterally divaricated into sharp apices like those of a crescent moon, apex fleshy and raised 2.1 mm above the labellum, lateral and central surfaces covered by simple, long, dark purple setae. Column short, ca. 3.1 mm height, densely covered with tiny conical papillae, the section toward the labellum is broad and slightly V-shaped with a pointed apex; the apex protrudes into a short mamilla; the basal ends are raised and have two dense tufts of bristles; the clinandrium is formed by a concave, digitate projection with a third tuft of bristles at its apex; the setae are dark purple, simple, acicular, up to 3 mm long. Stigma sub-elliptic. Rostellum erect. Anther cap 2 × 1 mm, transversally cordiform, bilocular, reddish. Pollinarium 2.7 × 1.5 mm; pollinia 4 in 2 unequal pairs; outer pair obovoid, convex-flat; inner pair ellipsoid, laterally complanate; caudicle hyaline; viscidium uncinat. Capsules not seen.

Etymology. *Telipogon choquequiraoense* is named after the Choquequirao Regional Conservation Area, the only known location for this species to date.

Phenology. The only recorded individual of *Telipogon choquequiraoense* was observed flowering between April and May, which corresponds with the wet season in the southern hemisphere.

Distribution & Habitat. *Telipogon choquequiraoense* is only known from the cloud forests of the Choquequirao Regional Conservation Area, which has been categorized as a Montane Cloud Forest of Yunga [in Spanish Bosque Altimontano (Pluvial) de Yunga; Ministerio del Ambiente 2019].

Preliminary Conservation Status. *Telipogon choquequiraoense* is known from a single specimen at Choquequirao. Although other specimens were likely overlooked due to their small size, we do not have information about the population size. Nevertheless, since the new species has not been recorded previously in nearby areas that have been subject to intense explorations and that present a similar habitat (e.g. Machupicchu Historical Sanctuary, Manu National Park), the species is likely restricted to a single population which occurs in Choquequirao in an area of less than 10 km². Therefore, *T. choquequiraoense*

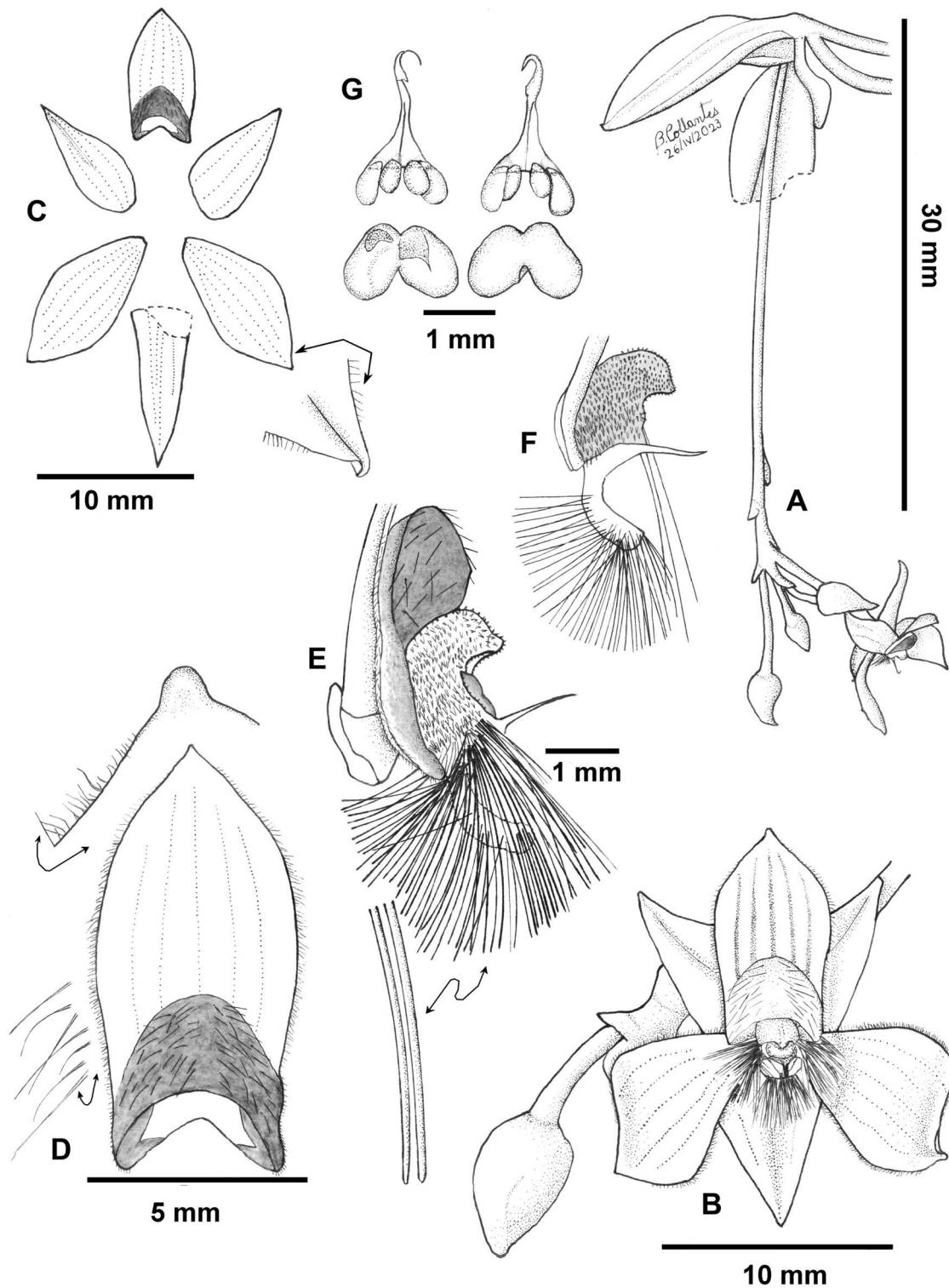


Fig. 1. *Telipogon choquequiraoense* C.Martel & Collantes. **A.** Habit. **B.** Flower, frontal view. **C.** Dissected flower with expanded perianth and details of the petal margins. **D.** Labellum, frontal view with details of the margins. **E.** Column and callus, lateral view with details of the setae. **F.** Column, longitudinal section view with details of the surface. **G.** Pollinarium and anther cap, frontal and ventral views. Note that (**A**) and (**B**) show the plant and flower in their natural position and not completely perpendicular in relation to the observer. Drawn from *M. Villafuerte et al. 769 (CUZ)* by B. Collantes.



Fig. 2. *Telipogon choquequiraoense* C.Martel & Collantes. **A.** Habit; note that the plant was found facing down. **B.** Flower, frontal view. **C.** Flower, $\frac{3}{4}$ view. Photos from M. Villafuerte et al. 769 (CUZ) by Jhon Yuca.

status must be classified as Critically Endangered (CE) under criterion B1 (extent of occurrence) and B2 (area of occupancy: a single known population) according to the IUCN (2024) criteria.

Notes. *Telipogon choquequiraoense* has been portrayed in Ochoa (2022) and Vilca Bustamante et al. (2023) as *Telipogon* sp. and *Telipogon* sp. 2, respectively, both of which showed the same individual here designated as the species holotype. The new species is morphologically most similar to *T. huancavelicanus* Collantes & C.Martel, which is distributed in the cloud forests of central and southern Andes of Peru. These two *Telipogon* species have a short plant size (< 10 cm including the inflorescence), a similar coloration in the perianth, an elongated labellum which is highly differentiated from the petals, and a column with three dense tufts of setae; moreover, *T. choquequiraoense* presents a subterete ovary, similar to that of *T. huancavelinus*, which was mistakenly described as being triquetrous and winged by Martel et al. (2017). However, *Telipogon choquequiraoense* can be easily discriminated from

T. huancavelicanus by its strongly incurved and sub-rhombic to widely lanceolate petals (instead of slightly incurved and oblanceolate petals), its oblong labellum (instead of a sub-pan-durate labellum), its setose dark purple callus on the labellum (instead of an ecallose labellum), and its column with three tufts of acicular and simple setae (instead of a column with three tufts of sub-tubular, rugged-ornamented setae, which are branched at the apex into 2–5 cylindrical segments). *Telipogon choquequiraoense* is also morphologically similar to *Telipogon deuterocuscoensis* J.M.H.Shaw, another miniature *Telipogon* from southern Peru but from a different locality in the Cusco Department, as they both have similar labellum shape, a conspicuous callus and similar columnar setae; however, these two species can be easily discriminated by the flower size (~ 23 mm long in *T. choquequiraoense* vs. ~ 12 mm long in *T. deuterocuscoensis*), the shape of the petals (oblanceolate petals in *T. choquequiraoense* vs. obovate petals in *T. deuterocuscoensis*), and the number of petals (5-veined vs. 3-veined in

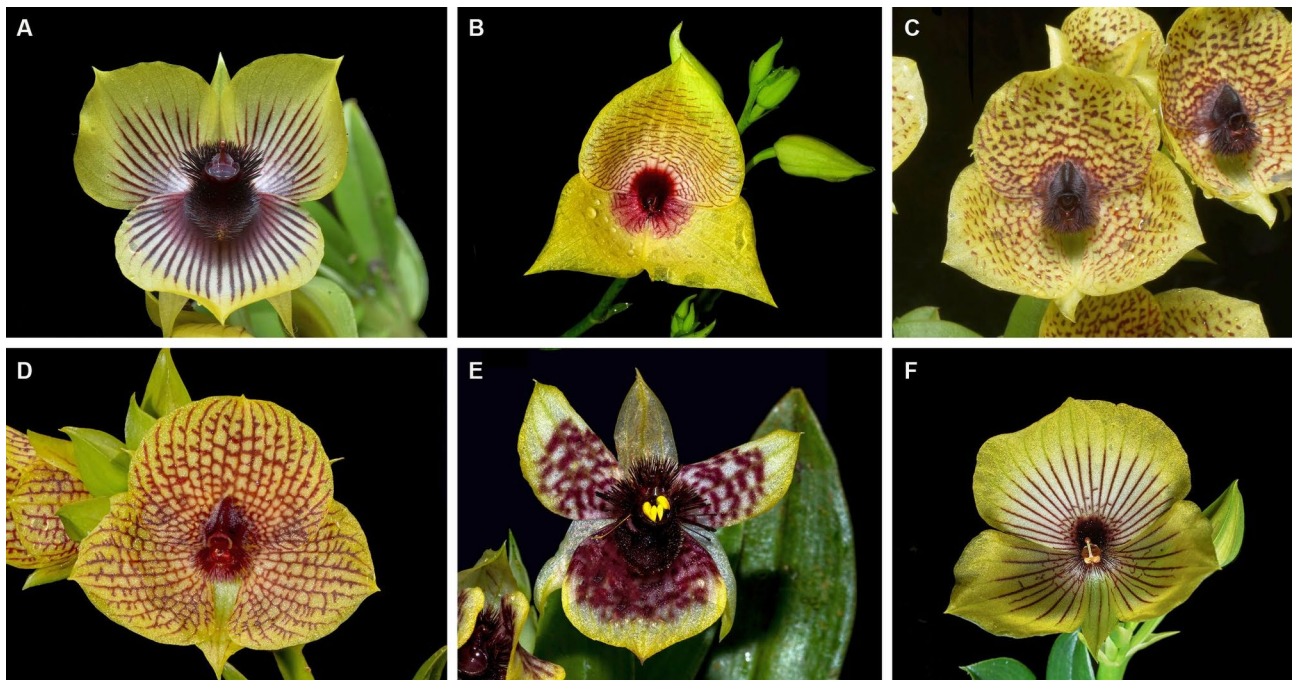


Fig. 3. Pictures of *Telipogon* from Choquequirao: **A.** *T. antisuyuensis*. **B.** *T. bowmanii*. **C.** *T. marleneae*. **D.** *T. santiagocastroviejoi*. **E.** *T. phalaenopsis*. **F.** *T. aff. peruvianus*. Photos by Jhon Yuca.

T. deuterocuscoensis). A summary of the differences between *T. choquequiraense* and morphologically similar species is presented in Table 1.

Telipogon richness in Choquequirao. Besides *T. choquequiraense*, another seven *Telipogon* species have been reported in Choquequirao Regional Conservation Area: *T. antisuyuensis* Nauray & A.Galán, *T. bowmanii* Rchb.f., *T. marleneae* Nauray & A.Galán, *T. phalaenopsis* Braas, *T. santiagocastroviejoi* Nauray, A.Galán & R.Farfán, and *Telipogon* aff. *peruvianus* (see Vilca Bustamante et al., 2023). Plants of the latter taxon have been identified as *T. papilio* Rchb.f. & Warsz. in Alfaro

Curitumay et al. (2022) and as *Telipogon* sp. 1 in Vilca Bustamante et al. (2023); however, this taxon seems to belong to a yet undescribed species. The description of this entity will be done in the future, since no plant material is currently available. Vilca Bustamante et al. (2023) also indicated *Telipogon farfanii* Nauray & A.Galán is present in Choquequirao; however, the picture shown by the authors seems to represent a *T. santiagocastroviejoi* with darker veins and callus. Therefore, we currently recognise eight *Telipogon* species within Choquequirao, but more species, especially from the miniature *Telipogon* group, are expected to be discovered in the future.

Table 1 Morphological features distinguishing *Telipogon choquequiraense* from two morphologically similar species based on floral and vegetative characteristics.

Characters	<i>T. choquequiraense</i>	<i>T. huancavelicanus</i>	<i>T. deuterocuscoensis</i>
Plant size (including inflorescence)	~3.5 cm	~7 cm	~10 cm
Flower diameter (when perianth extended)	~23 mm	~17 mm	~12 mm
Petals	Sub-rhombic to widely lanceolate, strongly incurved, 5-veined	Oblanceolate, slightly incurved, 3-nerved	Obovate, slightly to strongly incurved, 3-nerved
Labellum	Oblong, 5-veined, basally with two short, horn-like projections	Sub-pandurate, 7-veined, basally 2-auriculate	Oblong-ligulate, 3-veined
Labellar callus	Present, dark purple, setose, sub-sagittate	Absent	Present, V-shaped, brownish purple, densely retrorse-setulose
Columnar setae	Simple, acicular, unbranched	Sub-tubular, rugged, apically branched into 2–5 cylindrical segments	Simple, acicular, unbranched

Key to Species of *Telipogon* from Choquequirao

1. Plants caulescent.....*T. bowmanii*.....2
1. Plants acaulescent.....*T. aff. peruvianus*.....3
2. Labellum ecallose.....*T. aff. peruvianus*.....3
2. Labellum with a pubescent or setose callus.....3
3. Plants up to 5 cm long, including the inflorescence, and flowers of less than 23 mm in diameter. Lateral petals morphologically distinct from the labellum. Flowers zygomorphic.....*T. choquequiraoense*.....4
3. Plants more than 10 cm long, including the inflorescence, and flowers of more than 30 mm in diameter. Petals and labellum are alike in shape and colouration pattern. Flowers sub-actinomorphic.....4
4. Flowers with a large pubescent callus attached to the labellum.....5
4. Flowers with a carinate callus that is apically protruding from the labellum.....6
5. Petals and labellum with purple longitudinal veins in the basal half but without transversal reticulations. Column with 3 tufts of acicular setae.....*T. antisuyuensis*.....5
5. Petals and labellum with greenish veins and thick transversal purple reticulations in the basal half. Column with 3 tufts of setae, which are predominantly acicular, but some long clavate setae are also present on the lateral tufts.....*T. phalaenopsis*.....5
6. Labellum shortly acuminate at the apex. Petals and labellum with purple longitudinal veins with transversal purple reticulations. Stigma rounded.....*T. santiagocastroviejai*.....6
6. Labellum emarginate and a short apiculum at the apex. Petals and labellum with greenish longitudinal veins and thick transversal purple reticulations. Stigma trapezoidal.....*T. marleneae*.....6

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Authors' Contributions

LLV-B, JAYP and MVA collected the plant material. JAYP took photographs in situ. CM carried out the taxonomical study and identified the taxon as new. BC illustrated the plant. BC and CM prepared the description of the new taxon. CM wrote the manuscript. All the authors approved the final version.

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Data Availability

The authors confirm that the data supporting the findings of this study are available within the article.

Declarations

Competing interests

The authors have no competing interests to declare that are relevant to the content of this article.

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