



Epidendrum manusalinasiae (Orchidaceae: Laeliinae), new species from the high Andean forests of Manu National Park, Cusco, Perú

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Abstract

We describe and illustrate a new species of *Epidendrum* from the high Andean forests of Manu National Park, Cusco. *Epidendrum manusalinasiae* belongs the Saxicola group. Information on its distribution, habitat, phenology, and conservation status is provided. The new species is compared with *E. churubambense*, *E. herreranum* and *E. tetartociclum* from which it is distinguished by having leaves elliptic to widely elliptic, flowers pale yellow to green, sepals sometimes tinged red-brown, column and calli creamy yellow, lip disc with large, fleshy thickened, forming wide cordiform platform, wider than mid-lobe and reaching its base and mid-lobe whit distal portion plicated forward, whit a sub-lobed appearance in natural position.

Key words: *Epidendrum* diversity, Kosñipata, Saxicola group, taxonomy

Introduction

Montane forests extend throughout the eastern slope of the Peruvian Andes, they are the highest in the world and extend on the peaks and inter-Andean valleys of many departments of Peru, ranging between 800 to 3,700 meters above sea level, and occupy an approximate of 14% of the national territory (Tovar *et al.* 2010, Cuesta *et al.* 2009), present a peculiar diversity of flora, with the presence of endemism, rarities, and a high occurrence of epiphytes, moss and bryophytes (Terborgh 1971). Plants of the Orchidaceae find their preferred habitat in these ecosystems, although they are not free from suffering anthropogenic impacts. Thanks to the protected natural areas, a significant number of species can be conserved, many of them not yet discovered.

The Manu National Park, located in Cusco, Peru, one of the largest Protected Natural Areas in the country, with 1,708,133.58 ha, of which 320,307.73 ha are covered by cloud and high Andean Forest. The Park is located between 800 to 3,700 meters above sea level, preserves around 275 to 280 species of orchids, distributed in 73 genera, with *Epidendrum* L., *Pleurothallis* R.Br. and *Maxillaria* Ruiz & Pav., being the most diverse genera (Schenk *et al.* 2017, SERFOR 2020).

The genus *Epidendrum* Linnaeus (1763: 1347) is one of the most diverse and representative orchid genera. In Peru is represented by 494 species up to 2022 (Quispe-Melgar *et al.* 2022, Hágsater & Santiago 2022). In the years 2022 and 2023, a total of 11 new species were discovered and described for country (Ocupa-Horna *et al.* 2022, Valenzuela & Santiago 2022, Damián *et al.* 2022, Navarro & Hágsater 2023, Arista *et al.* 2023, Quispe-Melgar *et al.* 2023 and Chamaya *et al.* 2023), and the one here proposed increases the number to 510 species of *Epidendrum* for Peru.

The genus is now informally divided into species groups and subgroups (Hágsater & Soto 2005). One of these, the Saxicola group, is characterized by the pseudobulbous stems, the caespitose or scandent habit, the prominent

spathaceous bract apically rounded, the few-flowered, erect inflorescence, the flowers purple or yellow, and the surface of the vegetative structures often rugose. Hágsater *et al.* (2020) clarified the group, and, after that, included 13 new species (Hágsater & Santiago 2020a, b). In total, 22 species are endemic to Peru and one is found in Bolivia, between 1500 to 4150 m in elevation.

Material and methods

The live material was collected in the Department of Cusco, Province of Paucartambo, District of Kosñipata, in Manu National Park, as part of the research work on the floristic diversity of a conserved cloud montane forest and another influenced by cattle-grazing, at an elevation of 3200 m. Live floral and vegetative structures were photographed in the field and lab. The preparation of a Lankester Composite Digital Plate (LCDP) using Adobe Photoshop CC 2019®. A distribution map of the specimens of the new species found in Peru was prepared using QGIS Desktop 3.22.11 (Figure 1). The AMO-DATA database (Hágsater & Sánchez-Saldaña 2016, Quispe-Melgar *et al.* 2023) was consulted to obtain information on the records of *Epidendrum* present in the Manu National Park. The specimens from the AMES, AMO, BRIT, CUZ, HOXA, MO, and USM herbaria were reviewed. Additionally, we reviewed bibliographic sources and taxonomic literature on *Epidendrum* species described or reported (Hágsater & Santiago 2019, 2020a, 2020b, 2021, 2022, 2023). iNaturalist and GBIF were also consulted, especially for images of live material. The morphological characteristics of the collected specimen allowed the specimen to be placed within the *Saxicola* group, easily distinguished from all the species in this group.

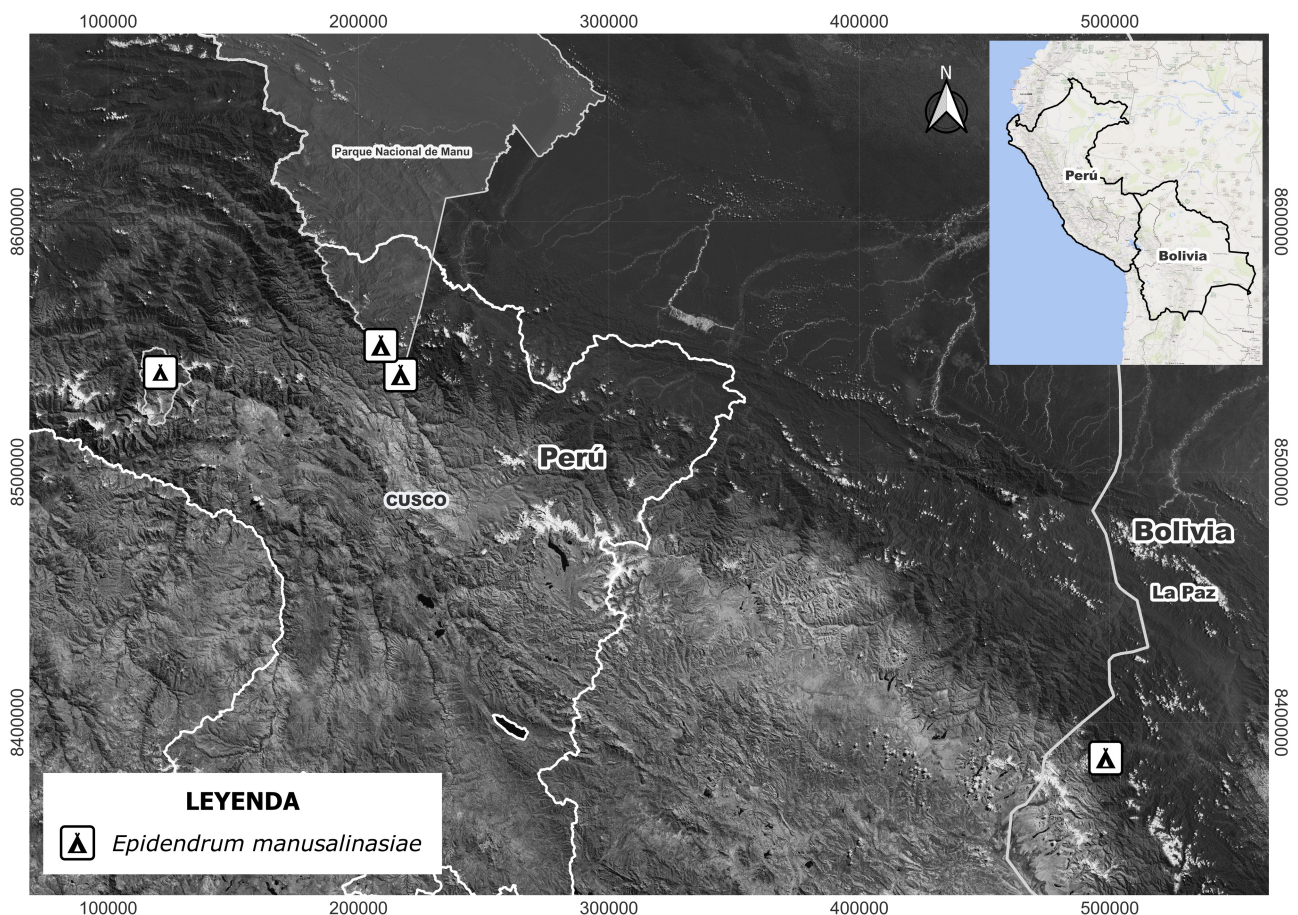


FIGURE 1. Distribution map of *Epidendrum manusalinasiae*.

Taxonomy

Epidendrum manusalinasiae L.E.Alfaro, J.Duarte *et* Hágsater, *sp. nov.* (Figures 2–3).

Type:—PERU. Cusco: Prov. Paucartambo, Distr. Kosñipata, Sur Oeste del Parque Nacional de Manu, 3200 m, línea de Bosque Pluvial Montano con pajonal de puna, epífita sobre *Clethra cuneata* y terrestre en hojarasca y musgo, 4 August 2023, L. E. C. Alfaro, M. Pedraza & A. Nina 22 (holotype: 343441 USM!).

Similar to *Epidendrum churubambense* Ocuja, J.Duarte, E.Santiago & Hágsater (2022: 271) but *E. manusalinasiae* has leaves 7.5–12.8 × 1.7–2.2 cm, elliptic to widely elliptic (*vs.* leaves 6.4–8.4 × 0.9–1.2 cm, narrowly lanceolate), pale yellow to green flowers, sepals sometimes tinged red-brown, column and calli creamy yellow (*vs.* flowers green-yellow, column green at the base and white at the apex), the sepals 19–23 × 8–10.5 mm, (*vs.* sepals 19.8 × 6–6.6 mm), the petals 18–19.4 × 5.0–7.0 mm (*vs.* petals 16.9 × 3.5 mm), the lip 13–14 × 18.5–27.4 mm, disc with a large, fleshy thickened, forming wide cordiform platform, matte (*vs.* disc 3-ribbed, the ribs thickened, two in front of the calli and mid-rib slightly longer and widened at the apex, fleshy, forming a short mucron at the apex of the lip) lateral lobes 10 × 15 mm, obliquely dolabriform, wider at apex (*vs.* lateral lobes 9–10 × 6.9–7 mm, sub-orbicular,) mid-lobe 12 × 7.0 mm, sub-rectangular, apex deeply bilobed, forming pair of semi-orbicular lobes (*vs.* mid-lobe 3 × 5.8 mm, sub-quadrate, short, bilobed generating a pair of sub-quadrate lobes).

Description:—Epiphytic or terrestrial, sympodial, scandent *herb*, to 22 cm tall including inflorescence. *Roots* 1.5–2.0 mm in diameter, distributed along rhizome of primary pseudobulb, fibrous, thin, wine-red and white. *Stems* 2.6–4.2 × 0.75–0.95 cm, thickened forming fusiform pseudobulb, striated and rugose, pale green and wine-red when exposed to sunlight; covered by one sheath 1.7–1.9 × 2.9–3.5 cm, membranaceous, acute, becoming scarious and fibrous with time, lacking in old stems. *Leaves* 7.5–12.8 × 1.4–2.2 cm, apical, one per stem, articulate, conduplicate, coriaceous, crass, centrally rugose; green in shade, tinged brown in full sun; elliptic to widely elliptic, obtuse, margins entire, spreading. *Spathe* 1, 4.7 × 2.1 cm, at apex of pseudobulb, tubular, oblong, conduplicate, apex acute, color transparent brown. *Inflorescence* ca. 6.1 cm long including flowers, apical from developing pseudobulb, erect, racemose, shorter than apical leaf; peduncle 3.5 cm long, terete, thin, erect, straight; rachis 0.3 cm long. *Floral bracts* 1.7–2.0 mm long, much smaller than ovary, ovate-triangular, acuminate, embracing, cream colored. *Flowers* 2-3, simultaneous, resupinate, pale yellow to green, sepals sometimes tinged red-brown, column and calli creamy yellow; disc of lip matte, fragrance none. *Ovary* 17–20 mm long, terete, thin, arching, furrowed, slightly inflated ventrally along apical 1/3. *Sepals* 19–23 × 8–10.5 mm, spreading, free, ovate-elliptic, acuminate, 7-veined, margins entire; spreading, lateral sepals slightly oblique, apex with low dorsal keel. *Petals* 18–19.4 × 5.0–7.0 mm, strongly reflexed or becoming pendent, hidden behind lateral sepals, free, elliptic-lanceolate, acute, 3-veined, margins entire, spreading. *Lip* 12.5–14 × 18.0–27.4 mm, 3-lobed, widely revolute, lateral lobes 9.2–10 × 10–15 mm, reniforms, margin erose, mid-lobe 10–12 × 5.0–7.0 mm, revolute, distal portion plicated forward, whit a sub-lobed appearance in natural position, margin erose; bicallose, calli digitiform, large, fleshy, laterally flattened, divaricate: disc, a wide, fleshy, cordiform platform, with the apex projected toward the base of the mid-lobe. *Column* 10–12.5 mm long, short, thin at base, widened towards apex, slightly arching, with pair of lateral wings, truncate. *Clinandrium-hood* reduced, margin entire. *Anther* reniform, apex concave in middle, 4-celled, pale yellow tinged brown on sides. *Pollinia* 4, obovoid, laterally compressed, caudicles yellow, soft and granulose. *Rostellum* apical, slit; viscarium semi-liquid. *Lateral lobes of stigma*, *Cuniculus* and *Capsule* not seen.

Distribution and ecology:—*Epidendrum manusalinasiae* is currently known from the Department of Cusco, from the upper edge of the Manu National Park and La Paz, Bolivia. The plant illustrated and described was collected in the high part of Manu National Park, inside cloud forest, between 3180–3250 m elevation. It was found growing in high Andean Rain Forest dominated by *Weinmannia reticulata* Ruiz & Pavon (1830: t. 332), *W. cochensis* Hieronymus (1895: 310), *Clusia alata* Planchon. & Triana (1860: 361), *Clethra cuneata* Rusby (1907: 314), and *Myrsine coriacea* (Swartz) Robert Brown (Roemer & Schultes 1819: 511). The climate is that of the montane rain forest, bordering on the transition towards *pajonal* (wet grassland ecosystem) with the presence of bushes of the Ericaceae and Asteraceae families and abundant *Gaiadendron punctatum* G.Don. (1834: 432) of the Loranthaceae family. Flowering was registered in February and August.

Etymology:—The epithet *manusalinasiae*, is composed of the area where it was collected, Manu, of the Parque Nacional Manu, followed by -Salinas-, the surname of Dra. Norma Salinas Revilla, researcher of the INTE-PUCP (Institute for Nature, Earth and Energy, Pontificia Universidad Católica del Perú).

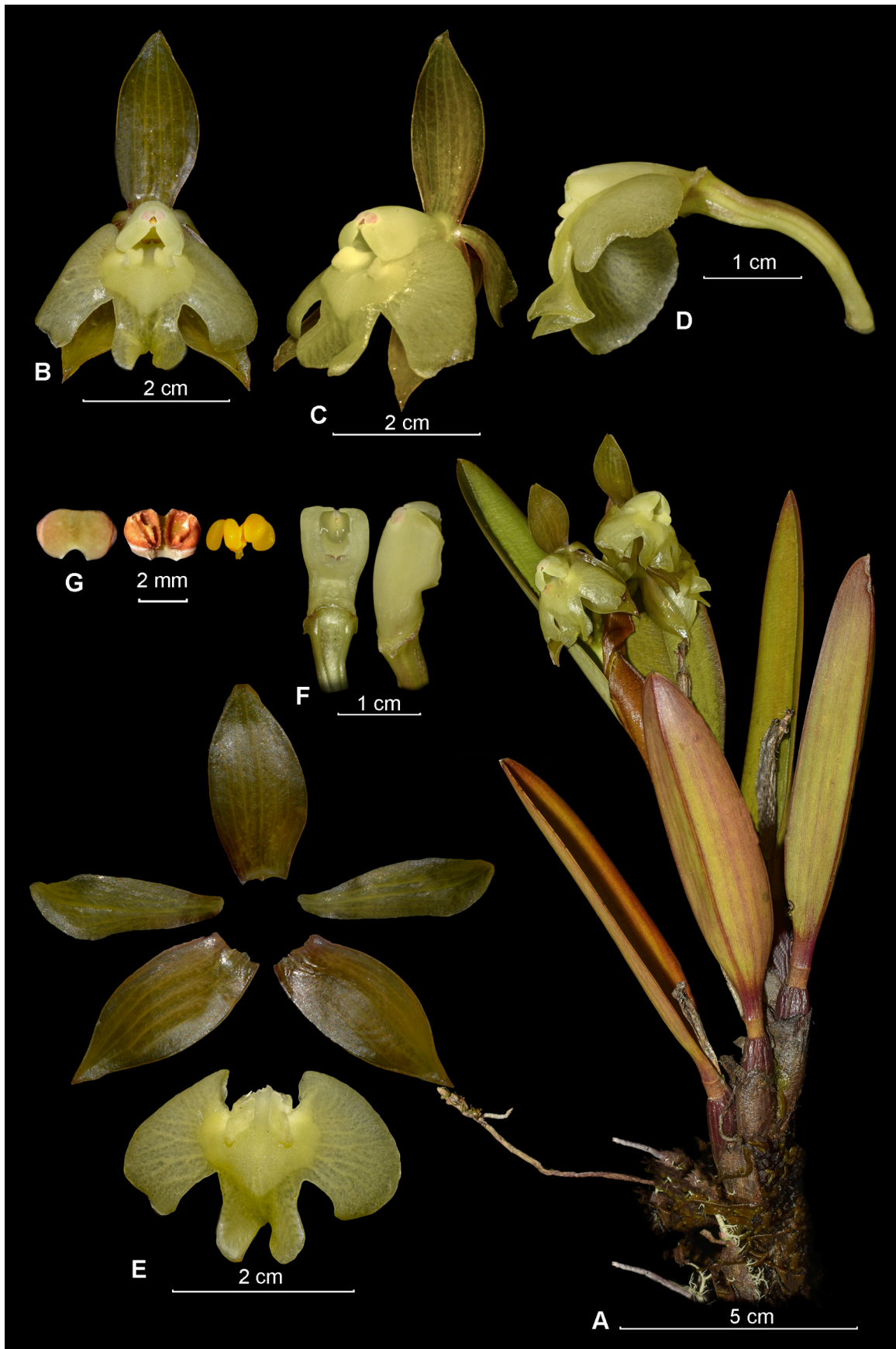


FIGURE 2. LCDP of *Epidendrum manusalinasiae*, from the type collection. **A.** Habit. **B.** Flower, front view. **C.** Flower, lateral view. **D.** Ovary, column and lip, lateral view. **E.** Dissected perianth. **F.** Column, ventral and lateral view. **G.** Anther cap and pollinarium. (Prepared by Miguel A. Pedraza, photos by Lucero E. Alfaro Curitumay).



FIGURE 3. Habitat of *Epidendrum manusalinasiae* A–B. Terrestrial, and epiphytic habit C. Flowers, close-up. D. Epiphytic plant in shade, leaves green. E. Terrestrial plant in full sun, leaves tinged reddish. Photos by Lucero E. Alfaro Curitumay (A, E) and Miguel A. Pedraza A (D).

Additional specimen examined (paratype):—BOLIVIA: La Paz: Franz Tamayo, Pelechuco, población Puina. Al este, en línea recta del poblado de Puina en el sector Hichucorpa y Chuncani pata, 3266 m, 7 October 2016, Zenteno-R, *F 18990* (LPB!).

Other records:—PERU. Cusco: La Convención, Aguas Calientes, 2800 m, received 01 II 2024, digital images, ¡AMO! <https://www.inaturalist.org/observations/118721310> *Ibid.* Prov. Paucartambo, Distr. Kosñipata, Orquídeas de la Reserva de la Biosfera del Manu, Zona de amortiguamiento, photo 42 by *Francisco Llacma*, as *Epidendrum sp.1*, (Suelli *et. al.* 2018).

Conservation status:—Data deficient (DD).

Taxonomic discussion:—*Epidendrum manusalinasiae* belongs to the Saxicola group (Hágsater *et al.* 2019) characterized by the pseudobulbous, the caespitose or scandent habit, the prominent spathaceous bract apically rounded, the few-flowered, erect inflorescence, the flowers purple or yellow, and the surface of the vegetative structures often rugose. The new species is recognized by the leaves $7.5\text{--}12.8 \times 1.7\text{--}2.2$ cm, conduplicate, elliptic to widely elliptic; the sepals $19\text{--}23 \times 8\text{--}10.5$, petals $18\text{--}19.4 \times 5.0\text{--}7.0$ mm, strongly reflexed or pendent, hidden behind the lateral sepals, the lip $13\text{--}14 \times 18.5\text{--}27.4$ mm, the disc large, fleshy thickened, forming wide cordiform platform, matte, wider than mid-lobe and reaching its base. The new species is most similar to *Epidendrum churumbambense* Ocupa, J. Duarte, E. Santiago & Hágsater, but that species has yellow-green flowers, column green at the base and white at the apex, the leaves $6.4\text{--}8.4 \times 0.9\text{--}1.2$ cm, narrowly lanceolate, the sepals $19.8 \times 6.0\text{--}6.6$ mm; petals 16.9×3.5 mm; the lip 11.5×13.7 mm, with the disc provided with 3 ribs, thickened, two in front of the calli and mid-rib slightly longer and wider towards the apex, fleshy reaching the apical, short mucro. Other species of the Saxicola group, morphologically close to *E. manusalinasiae* are *Epidendrum tetartociclum* Collantes & Hágsater (2013: pl. 1487), having pale green to creamy

green, translucent, somewhat opaque, the petals and lip creamy green to citrus yellow, the mid-lobe of the lip pale green, translucent to somewhat opaque; sepals 25–29 × 9.0–10.2 mm, elliptic (*vs.* 19–23 × 8–10.5 mm, ovate-elliptic) the petals 20–25 × 8.0–8.5 mm, oblong-elliptic to oblong-obtrullate, spreading, slightly arched forward (*vs.* 18–19.4 × 5.0–7.0 mm, elliptic-lanceolate, strongly reflexed or becoming pendent, hidden behind lateral sepals) lip mid-lobe 8 × 8 mm, with a square isthmus abruptly dilated into a pair of rounded to sub-deltoid lobes (*vs.* 12 × 7.0 mm, sub-rectangular, apex deeply bilobed, forming pair of semi-orbicular lobes) and *Epidendrum herreranum* C.Schweinfurth (1943: 350) having the perianth red brown, the floral inner segments yellow, the sepals 19–20 mm long, the petals 19 × 11 mm, rhombic-spatulate, spreading; the lateral lobes of the lip 18 × 12 mm obliquely semi-orbicular (*vs.* 10 × 15 mm, obliquely dolabriform, wider at apex), and the mid-lobe 7 × 14 mm, inverted “T”-shaped with the apex forming two divaricate lobules which are overlaid on the corners of the lateral lobes (Figure 4).



FIGURE 4. Species of *Saxicola* group similar to *Epidendrum manusalinasiae*: **A.** *Epidendrum manusalinasiae*; photographer L. Alfaro (*L. Alfaro 22* [USM]). **B.** *Epidendrum tetartociclium*, B. Collantes (*R. Suarez & G. Alegría 006 ex B. Collantes 903* [USM]). **C.** *Epidendrum churubambense*, L. Ocupa (*L. Ocupa 298* [USM]). **D.** *Epidendrum herreranum*, B. Collantes (*B. Collantes 918* [USM]).

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