

A new species and a new synonym in Peruvian *Senecio* (Compositae)

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Abstract. The species *Senecio contumazensis* sp. nov. from the southern department of Cajamarca, in northwestern Peru, is described herein. It shows morphological affinities with species of the *Senecio* series *Otopteri*, especially with the Bolivian *Senecio sepium*. In addition, the putative endemic *Senecio piurensis* from northern Peru is synonymized with *S. pericaulis*, a species previously described from southern Ecuador. Discussions on the morphology of these species, illustrations, and a distribution map are provided.

Keywords. Andes, Asteraceae, Senecioneae, South America, taxonomy.

Resumen. Se describe la especie *Senecio contumazensis* sp. nov. del sur del departamento de Cajamarca, en el noroeste del Perú. Presenta similitudes morfológicas con las especies pertenecientes a *Senecio* serie *Otopteri*, especialmente con la especie boliviana *Senecio sepium*. Por otra parte, el supuesto endemismo *Senecio piurensis* del norte del Perú se sinonimiza con *S. pericaulis*, una especie descrita anteriormente en el sur del Ecuador. Se presentan discusiones sobre la morfología de estas especies, ilustraciones y un mapa de distribución.

Palabras clave. Andes, Asteraceae, Senecioneae, Sudamérica, taxonomía.

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INTRODUCTION

The Andes are an important center of diversity of the genus *Senecio* L. (Compositae, Senecioneae), especially the highlands (Cabrera 1985; Funk & al. 1995; Calvo & Beltrán 2022). Recently, Beltrán & Galán de Mera (2022) recorded 153 species of *Senecio* in Peru, most of them thriving between 3000 and 4500 m of elevation. This list should be taken as an estimate, since several accepted names published by Candolle were omitted (e.g., *S. bonplandianus* DC., *S. scrobicarioides* DC., *S. vallestris* DC.). Furthermore, the poor knowledge of species boundaries in several groups suggests that adjustments will be necessary to prepare a comprehensive taxonomic revision. This is the case, for example, of the species closely related to *S. hohenackeri* Sch.Bip. and *S. tephrosioides* Turcz.

While working on the taxonomy of the genus *Senecio* and allies from northern Peru and southern Ecuador, we found specimens from Cajamarca that did not match the morphology of any previously described species. This new

entity is represented in the herbaria by six specimens from the same region, suggesting that it might be a restricted endemic taxon. According to the herbarium labelling, it was misidentified as *S. lancidentatus* Cuatrec., but in fact it presents more morphological affinities with the Bolivian *S. sepium* Sch.Bip. & Rusby. On the other hand, we realized that *S. piurensis* Sagást. & Zardini from northernmost Peru appears to be a synonym of the priority name *S. pericaulis* Greenm., a species described from southern Ecuador and currently accepted under the genus *Dendrophorbium* (Cuatrec.) C.Jeffrey. The ca. 75 species of *Dendrophorbium* are predominantly distributed along the Andes with a second center of diversity in southeastern Brazil, north-eastern Argentina, and southeastern Paraguay. Fourteen species of *Dendrophorbium* have recently been accepted in Ecuador (Calvo & Pérez 2023), whereas a revision is still needed for Peru. According to the available information (e.g., Dillon & Hensold 1993; Beltrán 1999; Pruski 2018), ca. 22 species would be found in the Peruvian territory.

The new species of *Senecio* and the new synonym are formally presented and discussed below. A distribution map, illustrations or pictures of living plants, and lists of specimens examined are also provided.

MATERIAL AND METHODS

This contribution is the result of an exhaustive review of the published bibliography, new observations from fieldwork, and the revision of herbarium specimens from AAU, G, HA, LOJA, and US. Additionally, digitized specimens from F and LP were studied.

The preliminary conservation status of the new species was assessed following IUCN Red List Categories and Criteria (IUCN 2012). We calculated the extent of occurrence (EOO) and the area of occupancy (AOO, with a 2×2 km grid) using the online “GeoCAT” software (<http://geocat.kew.org>; Bachman & al. 2011).

RESULTS AND DISCUSSION

Taxonomic treatment

Senecio contumazensis J. Calvo & A. Granda, **sp. nov.**
Type: Peru, Cajamarca, Contumazá, Cruz del Hueco, [7°23'S, 78°47'W], 2800 m, 26 May 1981, A. Sagástegui, S. López & J. Mostacero 9928 (holotype: US01837978!; isotype: HUT n.v.). Figs. 1, 3B.

Diagnosis.—This species differs from other species of *Senecio* in having the following combination of characters: leaves oblong-lanceolate, truncate at base, glabrescent to sparsely pubescent, radiate capitula arranged in corymbiform synflorescences, involucre composed of 13 bracts 4.7–5 mm long, and achenes with indumentum.

Description.—Suffrutescent plant ca. 1 m tall. Stem terete, barely striate, glabrous or scarcely pubescent at upper part, usually not branched. Leaves alternate, simple, petiolate, tending to form fascicles at primary cauline leaf axils; laminae 6.5–8 × 0.9–2.5 cm, oblong-lanceolate, base truncate and usually oblique, apex acute to attenuate, margins denticulate, glabrescent to sparsely pubescent, with secondary and tertiary venation noticeable on abaxial surface (dried specimens), chartaceous; petioles 1–3 cm long, sparsely pubescent. Synflorescences corymbiform; lower synflorescence bracts foliose, similar in shape to cauline leaves but shortly petiolate and auriculate or sessile and semiamplexicaul, upper synflorescence bracts linear-subulate. Capitula radiate on peduncles 4–15 mm long with 1–4 bracteoles. Involucre 5–5.5 mm long, 4–4.5 mm in diam., campanulate, glabrous; receptacle flat, fimbriate; involucre bracts 13, 4.7–5 × 0.7–1.2 mm, linear-oblong, glabrous; supple-

mentary bracts (calyculus) 5–6, 1.7–2.3 × 0.28–0.3 mm, linear, with scattered trichomes. Ray florets ca. 8, pistillate; corollas 10–11 mm long, limbs ca. 7 × 2 mm, 4-nerved, 3-toothed at apex, yellow. Disc florets ca. 34, hermaphrodite; corollas 6–6.8 mm long, tubular, limbs 3.3–3.5 mm long, 5-lobed, yellow; filament collars balustriform; anthers 2 mm long (including appendage), bases acute, yellowish, appendages ca. 0.4 × 0.2 mm; style branches truncate with a crown of sweeping trichomes, yellowish. Achenes ca. 2.6 mm long, ca. 0.5 mm in diam., cylindrical, 7–8-ribbed, with trichomes on ribs ca. 0.1 mm long (usually sparse), white; pappus 5–6 mm long, barbellate, white.

Distribution and habitat.—Species known from Contumazá Province and San Miguel Province in northwestern Peru (Fig. 2). It occurs at elevations of 2800–4000 m, in paramo-like areas referred as “jalca” or “páramo del norte peruano” (Weberbauer 1945; Sagástegui 1989). The “jalca” formations are usually interpreted as transitional alpine communities above 3,000 m, between the paramo of southern Ecuador and the puna of the central Andes (> 8° S), which longitudinally extend from the west of the Marañón River to the western foothills (Smith & Young 1987; Sánchez-Vega & Dillon 2006). The vegetation of the “jalca” is typically composed of tussock- or bunch-grasslands (“pajonales”) that include both herbaceous and woody plants.

Phenology.—Flowering from May to July.

Etymology.—The epithet refers to the Peruvian province of Contumazá, from where most of the studied collections come from. The province is located in the southwest of Cajamarca Department, in northwestern Peru.

Conservation status.—*Senecio contumazensis* is known from six collections representing five locations with an estimated EOO of 628 km² and an AOO of 24 km². None of the locations are in protected areas and the most important threat is habitat transformation for agriculture, as well as livestock grazing and illegal mining. Since a projected continuing decline of the habitat is inferred, the species is provisionally assessed as “Endangered” [EN B1ab(i-ii)+B2ab(iii)] in accordance with the IUCN Red List Categories and Criteria (IUCN 2012). The region where *Senecio contumazensis* thrives is known to harbor other species with a restricted distribution area (Weigend & al. 2005), e.g., *Caxamarca sanchezii* M.O. Dillon & Sagást. (Compositae), *Jaltomata contumacensis* S. Leiva & Mione (Solanaceae), *Nasa contumazensis* Weigend & E. Rodr. (Loasaceae), *Ribes contumazensis* Weigend (Grossulariaceae), *Urtica peruviana* Geltman (Urticaceae).

Notes.—The new species is very similar to the putative Bolivian endemic *Senecio sepium*, which is known only

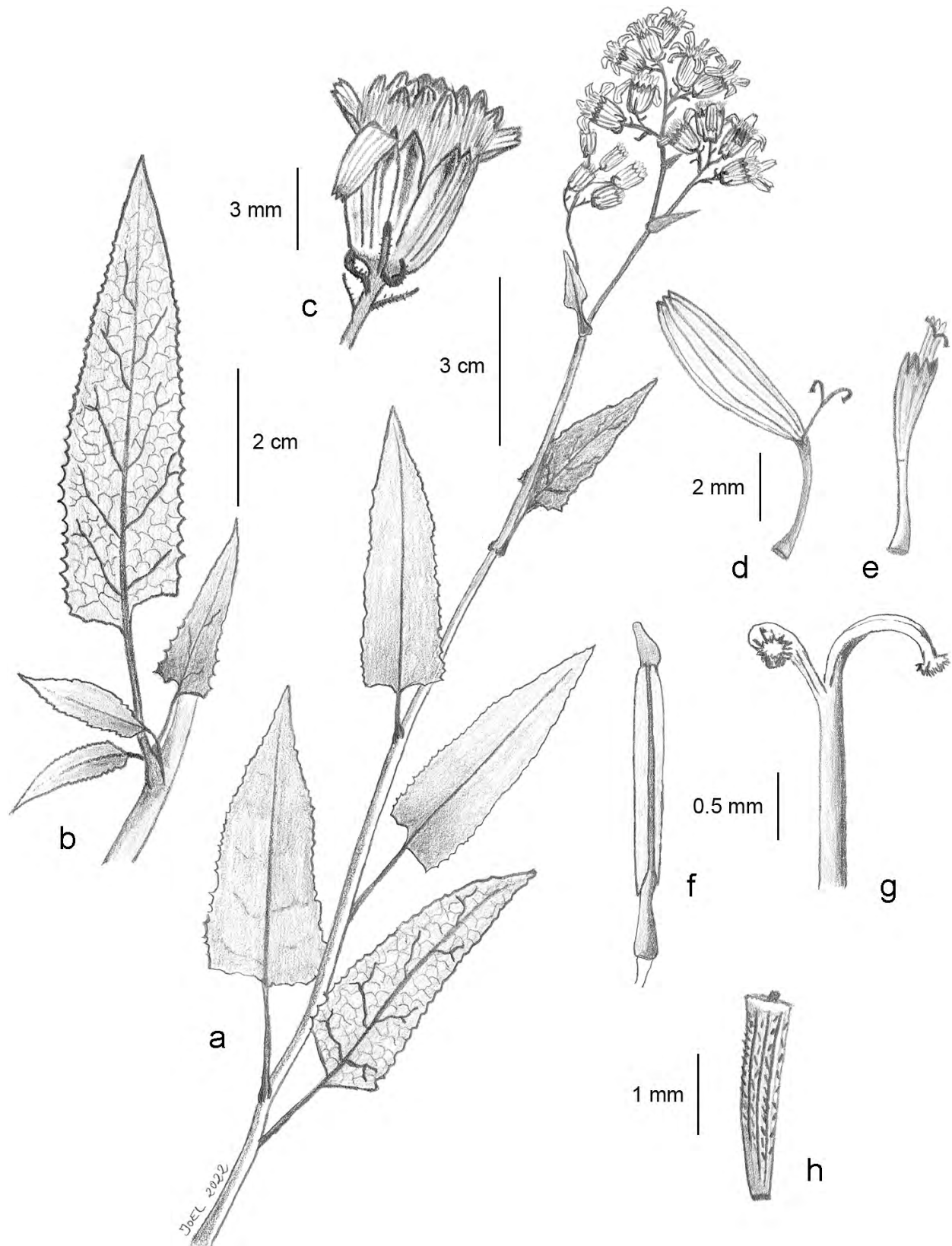


Fig. 1. *Senecio contumazensis* J. Calvo & A. Granda, sp. nov.: **a**, flowering branch; **b**, leaf detail; **c**, capitulum; **d**, ray floret (achene and pappus removed); **e**, disc floret (achene and pappus removed); **f**, anther; **g**, style branches; **h**, achene (pappus removed) [a, c from Sagástegui & al. 10042, US; b, d–h from Sagástegui & al. 9928, US; drawn by J. Calvo].

from La Paz Department (Cabrera 1985; Beck & Ibáñez 2014). The latter species, however, differs in having slightly longer involucral bracts (6–6.8 vs. 4.7–5 mm), remarkably broader supplementary bracts (see Fig. 3), and achenes with denser indumentum. The supplementary bracts are deep-purple to black in the upper half, whereas those of *S. contumazensis* are barely tinted at the apex. The petioles of *S. sepium* are usually winged and bear two auricles at the base. In contrast, the petioles of the new species are not winged, just somewhat broadened at the insertion point with the stem and the auricles usually lack. *Senecio herrerae* Cabrera from southern Peru and Bolivia (see Calvo & Beltrán, 2022) and *S. pseudotites* Griseb. from north-

western Argentina further differ from *S. contumazensis* in having 20–21 involucral bracts (vs. 13). Because of the aforementioned morphological characters and affinities, *S. contumazensis* is provisionally included within the series *Otopteri* (Cabrera 1985; Freire & al. 2014).

In the known distribution range of *Senecio contumazensis*, it also occurs *S. betonicifolius* DC. This species has similar leaves to the new species but it can be easily separated by the lianoid habit, the leaves with arachnoid indumentum on the abaxial surface, and the involucre tending to be nodding with florets that have penicillate style branches (Mostacero & al. 1184, US01846373).

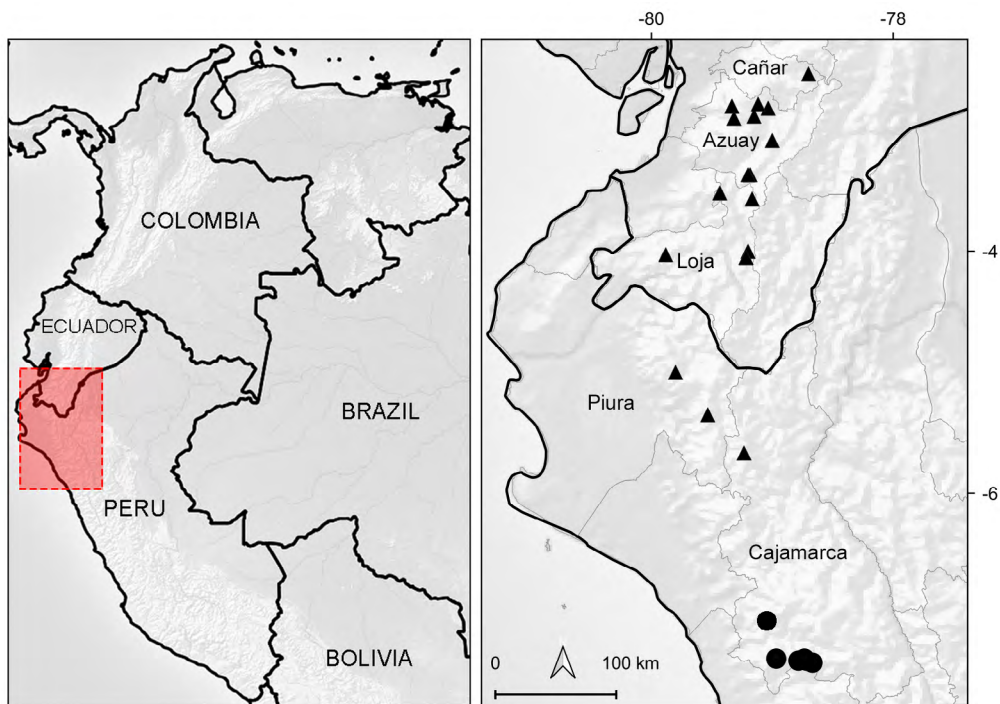


Fig. 2. Distribution map of *Senecio contumazensis* J. Calvo & A. Granda sp. nov. (circles) and *Dendrophorbium pericaule* (Greenm.) B. Nord. (triangles).

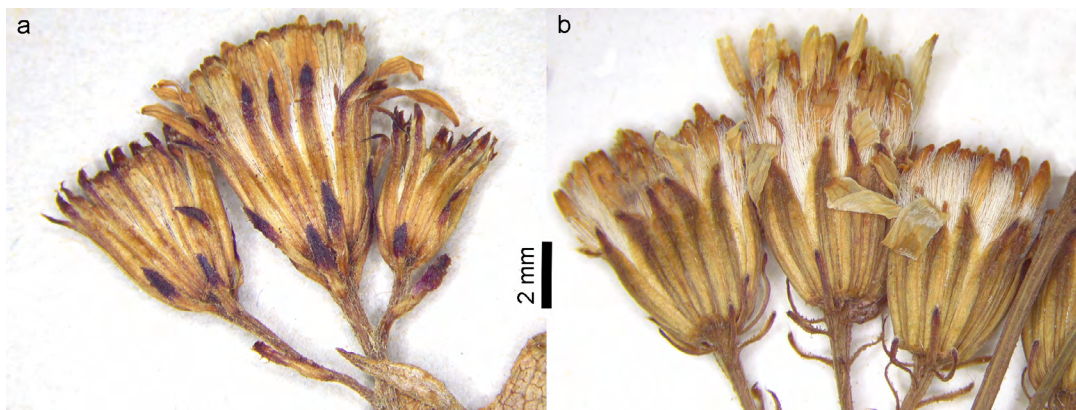


Fig. 3. *Senecio sepium* Sch. Bip. & Rusby: a, capitula [from Mandon 133, G]. *Senecio contumazensis* J. Calvo & A. Granda, sp. nov.: b, capitula [from Sagástegui & al. 9928, US].

Lastly, it should be noted that *Senecio contumazensis* has been confused with *S. lancidentatus* Cuatrec., a species known from the regions of Junín, Pasco, and Huánuco in central Peru. This latter species clearly differs in having long-pedunculate, discoid capitula arranged in very lax cymose synflorescences; the leaves are also remarkably smaller than in *S. contumazensis*.

Additional specimens examined.—PERU. **Cajamarca:** San Miguel, cerro Quillón (Agua Blanca), 7°01'S, 79°03'W, 5 Jul. 1986, J. Mostacero & al. 1260 (MO n.v., US); Contumazá, Pampa de la Sal (Cascabamba–Pozo Kuan), 7°23'S, 78°43'W, 13 Jun. 1981, A. Sagástegui & al. 10042 (US); Contumazá, jalca del Pozo Kuán, 7°24'S, 78°40'W, 27 Jun. 1983, A. Sagástegui, J. Mostacero & E. Alvitez 10778 (US); Contumazá, Ventarrón (Trinidad–Totorillas), 7°22'S, 78°58'W, 6 Jul. 1977, A. Sagástegui, E. Alvitez & J. Mostacero 8985 (US); Contumazá, Cascabamba (arriba de Contumazá), 7°22'S, 78°44'W, 8 Jul. 1977, A. Sagástegui, E. Alvitez & J. Mostacero 9027 (US).

Senecio piurensis, a later heterotypic synonym of *Senecio pericaulis*

Dendrophorbium pericaule (Greenm.) B.Nord., *Compositae Newslett.* 31: 22 (1997). *Senecio pericaulis* Greenm., *Ann. Missouri Bot. Gard.* 10: 89 (1923). Type: Ecuador, Azuay, province of Cuenca, Jul. 1864, W. Jameson s.n. (holotype: US00123338 [image!]).

Senecio toreadoris Cuatrec., *Fieldiana, Bot.* 27: 34 (1950). *Dendrophorbium toreadoris* (Cuatrec.) B.Nord., *Compositae Newslett.* 29: 49 (1996). Type: Ecuador, Azuay, between Molleturo and Toreador, [2°48'S, 79°20'W], 2590–3900 m, 14 Jun. 1943, J.A. Steyermark 53021 (holotype: F0361315F [image!]).

Senecio piurensis Sagást. & Zardini, *Hickenia* 1(58): 313 (1982), **syn. nov.** Type: Peru, Piura, Huancabamba, cuello del Indio-Huancabamba, [5°21'S, 79°32'W], 3000 m, 2 Sep. 1976, A. Sagástegui & J. Cabanillas 8580 (holotype: HUT n.v.; isotypes: F0092637F [image!], LP002461 [image!]).

Notes.—Originally described from one collection from the province of Huancabamba in the department of Piura, *Senecio piurensis* was defined as having: vegetative parts glabrous; stems simple, flexuous, herbaceous; leaves sessile, subamplectant or amplexicaul, repand-toothed at margins, up to 8 cm long; synflorescence corymbiform with divaricate branches and heterogamous capitula with 13 involucreal bracts and 12 ray florets. In the discussion, the authors briefly mentioned its morphological affinities with the lianoid *S. bullatus* Benth. (= *S. patens* (Kunth) DC.) and *S. gonocaulos* DC. (= *Pentacalia gonocaulos* (DC.) A.Granda & J.Calvo), the

former with discoid capitula and the latter with petiolate leaves. They also suggested similarities with *S. cerrateae* Cabrera (≡ *Lomanthus cerrateae* (Cabrera) B.Nord. & Pelser), a barely similar species except for its sessile leaves. Until now, the species has been considered endemic to northern Peru (Beltrán & al. 2006; Beltrán & Galán de Mera 2022).

Upon further study, the type material of *S. piurensis* reveals a rather suffruticose habit, the presence of trichomes on the leaf margins, and sagittate anther bases. It cannot be separated from *Dendrophorbium pericaule*, a species originally described within *Senecio* as *S. pericaulis* and known from southern Ecuador (Azuay, Cañar, Loja; Nordenstam 1999, see also examined material below). According to the information of the herbarium specimens and our direct observations in the field, the habit of *D. pericaule* can be erect or subscandent. Similarly, the leaf indumentum varies from pilose-hirsute (Lewis 2590; see also Fig. 4A) to glabrous with trichomes restricted to the margins (Madsen & al. 8004B; see also Fig. 4C). These latter forms are the ones that we studied from Peru and that have been referred to *S. piurensis* so far. Consequently, *D. pericaule* is a species distributed from the Ecuadorian province of Cañar to the departments of Piura and Cajamarca in Peru.

As pointed out by Nordenstam (1997, 1999), the inclusion of *S. pericaulis* in *Dendrophorbium* may be arguable in light of those forms that have a rather scrambling habit and resemble to members of *Pentacalia* Cass., characterized to have a lianoid habit (Robinson & Cuatrecasas 1978; Jeffrey 1992). Instead, *Dendrophorbium* is interpreted to include erect suffrutescent and tree-like species with usually moderately large, dentate leaves, and terminal synflorescences composed of radiate capitula, rarely discoid (Jeffrey 1992). As mentioned above, the scrambling habit is not consistent in *D. pericaule* (cf. Chacón 8, Lewis 2590, Minga & al. 2843) and strong morphological affinities with other members of *Pentacalia* cannot be established; instead, Greenman (1923) and Nordenstam (1997) related this species by the shape of the leaf base to *S. amplexicaulis* Kunth (cited as “*S. amplexifolius* HBK.” by Greenman), currently accepted as a member of *Dendrophorbium*, i.e., *D. amplexicaule* (Kunth) B.Nord. Because of the lack of further information that would help to settle the generic position of this species, we consider it appropriate to follow Nordenstam's treatment and keep for now this species in *Dendrophorbium*. Molecular data might help to firmly set the position of this species.

Additional specimens examined.—ECUADOR. **Azuay:** Cuenca, río Tomebamba, 2°47'S, 79°7'W, 25 Sep. 2018, R. Arias & D. Orellana 201 (HA); Mazán, Dudahuayacu, 2°53'S, 79°9'W, 14 Jul. 1994, G. Chacón 8 (HA);



Fig. 4. *Dendrophorbium pericaule* (Greenm.) B.Nord.: **a**, adaxial leaf surface with pilose-hirsute indumentum; **b**, capitula; **c**, adaxial leaf surface with trichomes restricted to the margins; **d**, abaxial leaf surface [a, b from Ecuador, Cañar, La Libertad, propiedad de Stuart White (not collected); c, d from Ecuador, Loja, Guachanamá (Espinosa-Ortega & al. 1039, HUTPL); pictures by J. Calvo].

between Oña and Cuenca, 3°22'S, 79°11'W, 9/10 Sep. 1923, A.S. Hitchcock 21600 (US); Cuenca Chaucha, Angas, 2°54'S, 79°19'W, 11 Jun. 2015, D. Minga & al. 2843 (HA); Garupamba, Fundación Gamma, 3°22'S, 79°12'W, 6 Sep. 2018, D. Minga, A. Verdugo & M. Jiménez 3655 (HA); vicinity of Cumbe, 3°5'S, 79°0'W, 25 Sep. 1918, J.N. Rose, A. Pachano & G. Rose 22983 (US); El Pongo, 3°7'53''S, 79°4'48''W, 24 Jun. 1999, F. Serrano, D. Minga & A. Verdugo 807 (HA); Sinincay, sector Cashaloma, 2°49'S, 79°2'W, 15 Jun. 2006, A. Verdugo & D. Minga 1219 (HA). **Cañar**: Dudas-Mazar, hacienda Dr. White, 2°32'S, 78°42'W, 31 Aug. 1999, F. Serrano, D. Minga & A. Verdugo 1076 (HA). **Loja**: Paltas, Guachanamá, cerro Guachahurco, parte alta cercana a las antenas, 4°2'10''S, 79°52'20''W, 22 Jul. 2023, N. Espinosa-Ortega, J. Calvo & G. Benítez 1039 (HUTPL); 15 km S of the Loja/Azuay border on road to Loja, 3°34'S, 79°10'W, 26 Sep. 1996, G.P. Lewis 2590 (AAU, LOJA); track from Universidad Nacional to Uritusinga, km 9.1, 4°0'S, 79°12'W, 7 May

1997, G.P. Lewis & al. 3255 (AAU, LOJA); rd. Loja–Las Achira (Uritusinga), km 10 from Universidad Nacional de Loja, 4°3'S, 79°13'W, 17 May 2001, J.E. Madsen, A. Byg & J. Gálvez 8004A (AAU, LOJA); rd. Loja–Las Achira (Uritusinga), km 10 from Universidad Nacional de Loja, 4°3'S, 79°13'W, 17 May 2001, J.E. Madsen, A. Byg & J. Gálvez 8004B (AAU, LOJA); Saraguro, Manú, Moras, 3°31'S, 79°26'W, 26 Jun. 1994, F. Vivar, Z. Aguirre & B. Merino 4261 (LOJA). **PERU. Cajamarca**: Jaén, Sallique, localidad La Cocha, 5°40'S, 79°14'W, 16 Jun. 1998, J. Campos & al. 4969 (US). **Piura**: Ayabaca, Cerro Negro (Meseta Andina), 5°0'S, 79°48'W, 23 Apr. 2004, A. Sagástegui & al. 17511 (US).

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