



Senecio beltranii (Asteraceae, Senecioneae): a new caespitose species endemic to South Peru

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Key words

Asteraceae
Senecio subser. *Caespitosi*
South America
taxonomy

Abstract *Senecio beltranii*, a new species of Asteraceae (Senecioneae) belonging to *S.* ser. *Suffruticosi* subser. *Caespitosi*, is described from the highland mountains of southern Peru. Morphologically, *S. beltranii* is similar to *S. algens*, but can easily be distinguished by its subshrub matt-forming habit, the presence of scattered papillose trichomes on stems and leaves, its pinnatilobate leaf shape, larger involucre and pedicel length, calycular bracts nearly glabrous, larger phyllary length and by the larger number of phyllaries. The major differences between the species are outlined in a morphological comparison table and discussed. The IUCN status is defined as Vulnerable (VU).

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INTRODUCTION

Senecio L. (Linnaeus 1753: 866) is one of the largest genera of Asteraceae with about 1250 species ranging from herbs to woody plants growing in temperate, subtropical and tropical areas of the world (Bremer 1994, Nordenstam 2007, Nordenstam et al. 2009). There are currently 183 species recorded for Peru (Brako & Zarucchi 1993, Montesinos-Tubée 2014, Montesinos-Tubée et al. 2015, 2017, 2018, Beltrán & Granda-Paucar 2017, Calvo & Fuentes 2018, Beltrán & Calvo 2019), 94 of them being endemic.

In this paper, a new species is described on the basis of morphological characters, this species was found above 5000 m on highland puna slopes in the boundary between the Arequipa and Cusco regions. It was collected in the framework of the ongoing study of *Senecio* subser. *Caespitosi* in the Andes (Montesinos-Tubée 2014, Montesinos-Tubée et al. 2015, 2017). The new species is named in honour of the Peruvian botanist Hamilton Beltrán, who has contributed greatly to the knowledge of the Asteraceae family in Peru and described eight species of *Senecio*, as well as other species within the family.

MATERIAL AND METHODS

Measurements and assessments of morphological characters are based on dried specimens in herbaria (CUZ, F, HSP, HUT, LP, LPB, MO, USM; acronyms according to Thiers 2016), online repositories (<http://plants.jstor.org>, <http://tropicos.org>, [\[www.fieldmuseum.org\]\(http://www.fieldmuseum.org\)\) and fresh material in the field. The field observations resulted in the discovery of new taxa and showed that closely related species occur in different environments. Except when specified otherwise, the measurements stated for the morphological portions refer to dried material and the colours to fresh specimens. All morphological characters were studied under a NSZ-405 1X-4.5X stereo microscope. The conservation status was estimated following the criteria and categories of the IUCN Red List version 14 \(IUCN 2019\).](http://</p></div><div data-bbox=)

TAXONOMY

Senecio beltranii P.Gonzáles & Montesinos, *sp. nov.* — Fig. 1, 2

Differs from the most resembling *Senecio algens* Wedd. from the Central Andes, but differs in the following characters: matt-forming subshrub (against procumbent herb in *S. algens*), the presence of scattered papillose trichomes (0.05–0.15 mm long) on stems and leaves (glabrous in *S. algens*), leaf margin shape (pinnatilobate vs entire), pedicel length (12–18 mm vs 8–12 mm), involucre length (12–15 mm vs 7.5–10 mm), calycular bracts (nearly glabrous vs glabrous), phyllary length (9–11 mm vs 7–9 mm), phyllary width (1.9–2.1 mm vs 2–3 mm) and by the larger number of phyllaries (18–22 vs 10–15). — Type: *D.B. Montesinos 5150* (holo HSP; iso B, CUZ, F, HUT, LP), Peru, Arequipa, Caylloma, Chivay, roadside along Abra Apacheta, S15°43'12" W71°36'10", 4800 m, 27 March 2017.

Etymology. The specific epithet refers to the Peruvian botanist Hamilton Beltrán Santiago (1963) to honour his contributions to the knowledge of the Andean flora.

Perennial subshrub, caespitose, creeping, rhizomatous, with fibrous roots, forming mats 2–4 cm tall and 5–30 cm diam. *Trichomes* almost absent except for a few papillose trichomes on stems and leaves, 0.05–0.15 mm long, apex rotund. *Stems* woody, 1–2 cm by 3–4 mm, often covered with persistent remains of senescent leaves towards the base. *Cauline leaves* spatulate-ob lanceolate, alternate, 2–3 cm long; lamina thick, lustrous, involute, curved, 8–12 by 2–4 mm, pinnatilobate (denticles 5–7, triangular, 0.5–0.8 mm wide), margin and surfaces glabrous except for a few papillose trichomes of about 5–15 µm

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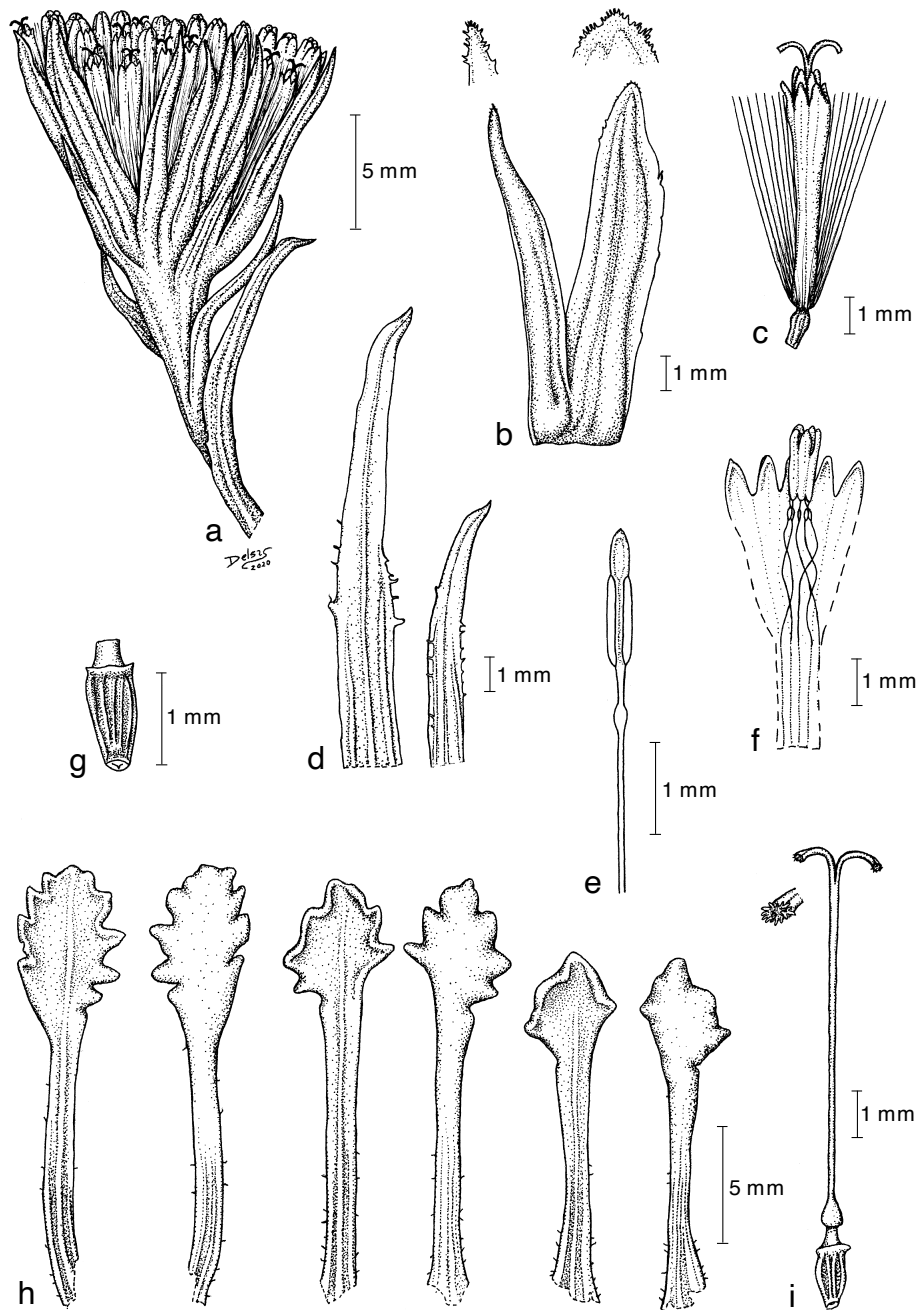


Fig. 1 *Senecio beltranii* sp. nov. a. Capitulum; b. phyllaries (complete form and apex); c. floret with pappus and achene; d. calycular bract; e. stamen; f. stamens arrangement; g. achene; h. leaves (adaxial and abaxial views); i. style (with detail of apex of style branch) (all: D.B. Montesinos 5150, HSP). Drawing by Delsy Trujillo.

long, apex obtuse-acute, base truncate to rounded, margin entire; young leaves pale greenish grey turning yellowish brown with age. *Synflorescence* a solitary capitulum, homogamous, discoid; peduncle 5–12 mm long, reddish purple to plum-purple; pedicels 12–18 mm long, margin with few trichomes of 0.05–0.15 mm long, base truncate; involucre cylindrical, 12–15 mm long, 7–9 mm wide. *Calycular bracts* linear-oblong, 6–9 by 0.8–1.1 mm, scarcely covered with thin, 0.05–0.3 mm long papillose trichomes on the margin and surface, surface and margins pale green except for the reddish purple to plum-purple coloured midrib, apex covered with 10–20 μ m long glands. *Phyllaries* 18–22, oblong, 9–11 by 1.9–2.1 mm, apex acute, surface and margins pale green to reddish purple, midrib reddish purple, glabrous except for 0.1–0.3 mm long transparent trichomes at the apex. *Florets* 44–54, tubular, abruptly constricted near the base, pale yellow; corolla lobes 5, triangular, 0.8–1 mm long; tube 6–8 by 0.3–1.2 mm. *Anthers* oblong, 6–7 by 0.2–0.3 mm,

ecalcarate, terminal appendages oblong, rounded, pale reddish purple with yellowish margin. *Style* truncate, 8–12 mm long, apex bifid (branches 0.8–1.3 mm long, curved), with papillae covering the whole surface of the apex, pale yellow turning bright yellow towards the apex. *Receptacle* flat, epaleate, 2–3 mm diam. *Achenes* cylindrical-conical, 0.8–1.2 by 0.3–0.4 mm, glabrous, light brown. *Pappus* of smooth bristles, 5–7 mm long, white, barbellulate.

Distribution — *Senecio beltranii* is reported from the northern Arequipa region at the boundary with southern Cusco region (South Peru) and the Cordillera of Vilcanota, in the basin of Laguna Sibinacocha. Elevation range: 4700–5470 m.

Habitat & Ecology — *Senecio beltranii* occurs on highland puna and subnival puna slopes with scattered rocks and cushion plants. It co-occurs with *Pycnophyllum molle* J.Rémy (*Caryophyllaceae*) and *Azorella compacta* Phil. (*Apiaceae*). Flowers and fruits were observed between March and May.



Fig. 2 *Senecio beltranii*. a. Plateaus along Abra Apacheta (4800 m) in Arequipa showing the habitat; b. habit showing relative size; c. capitulum; d. branch with leaves and one capitulum. — Photos a, b, d by Daniel Montesinos; c by Paúl Gonzáles.



Fig. 3 Images of some of the *Senecio* species mentioned in the discussion. a. *Senecio algens* Wedd., Ticra, Colca Canyon, Arequipa, South Peru, 4850 m; b. *Senecio crithmoides* Hook. & Arn., Cristo Redentor de los Andes, Mendoza, Argentina, 3220 m; c. *Senecio danai* A.Gray, Pampa Bellavista, Haquira, Cotabambas, Apurimac, South Peru, 4230 m; d. *Senecio trifurcifolius* Hieron., Ticsani volcano basins, Moquegua, South Peru, 4800 m. — Photos by Daniel Montesinos.

Table 1 Comparison between *Senecio beltranii* and its closest relatives belonging to ser. *Suffruticosi* subser. *Caespitosi* (Cabrera et al. 1999).

	<i>S. algens</i>	<i>S. aquilaris</i>	<i>S. beltranii</i>	<i>S. crithmoides</i>	<i>S. danai</i>	<i>S. menesesiae</i>	<i>S. trifurcifolius</i>	<i>S. woodii</i>
Distribution ¹	AR, BO, PE	AR, BO, PE	Arequipa, Cusco (PE)	AR, CH	PE	BO, PE	BO, CH, PE	BO
Elevation (m)	4500–5000	4850–4900	4800–4900	3000–3500	3300–4230	4400–5300	4000–4500	4900–5000
Habit	procumbent herb	suffruticose	caespitose subshrub	caespitose subshrub	decumbent subshrub	caespitose herb	suffruticose	caespitose herb
Plant dimensions: height, diameter (cm)	4–6, > 6	5–20, 10–25	2–4, 5–30	5–15, 15–35	10–30, 30–60	> 6, –	5–8, > 8	–
Indumentum	glabrous	lanate indumentum,	few papillose trichomes	scarcely pubescent	glabrous to scarcely pubescent	glabrous except base	glabrous	glabrous except base
Leaf shape	spathulate, entire, obtuse	spathulate, entire or dentate	spathulate-oblancoolate, pinnatifid	ovate(linear)-spathulate, entire or subpinnatifid	spathulate, subpinnatifid	spathulate, dentate	cuneiform-linear, dentate	linear-oblong, spathulate, entire
Leaf lamina: length × width (mm)	10–35 × 2–5	10–15 × 5	20–30 × 2–4	10–30 × 3–7	8–12 × 1–1.5	6–13.5 × 1.6–3.9	10–20 × 1–4	6.3–11 × 2–3.2
Leaf pubescence in margins and surface	glabrous	lanate adaxially and on margins	scarce presence of hispidulous trichomes	few fimbriate or fine arachnose pubescence	scarce, with ciliate trichomes	glabrous	glabrous	glabrous
Involute: shape, length × width (mm)	cylindrical-campanulate, 7.5–10 × 8–12	campanulate, 11–14 × 14–15	cylindrical, 12–15 × 7–9	campanulate, 12–16 × 5–7	campanulate, 10–14 × 14–17	8.2–12 × 6–8	campanulate, 8–9 × 6	7.5–9.5 × 7
Pedicels: length (mm)	8–12	–	12–18	20–100	5–15	–	–	–
Calycular bracts: shape, margin, size (mm)	linear, glabrous, 6–9 × 0.8–1.1	linear, lanate,	linear ovate, glabrous or few ciliates, 6–9 × 0.8–1.1	linear-ovate, scarcely pubescent, 10–12 × 1–1.2	linear-ovate, scarcely ciliate on margins, 6–10 × 0.8–1	linear-subulate, glabrous, 4.2–8 × 0.7–1	linear, glabrous, 7–8 × 0.8–1.2	linear-oblong, glabrous, 6.7–8 × 1.4–1.9
Phyllaries: shape, length × width (mm)	linear, 7–9 × 2–3	oblong, lanose, 9–10 × 2–3.5	linear, 9–11 × 1.9–2.1	linear-oblong, 10–15 × 1.8–2.1	linear-ovate, 6–11 × 0.9–1.2	linear-oblong, 7.7–9.5 × 1.3–1.7	lanceolate, attenuate, 6–8 × 1–1.5	linear-oblancoolate, 6.8–8 × 0.9–1.7
Phyllaries (number)	10–15	< 20	18–22	18–20	14–16	13–14	8	10 (12–14)
Phyllaries (margins)	glabrous	lanose	glabrous	glabrous	glabrous except at the margin, scarcely ciliate	glabrous	glabrous	almost glabrous
Corolla (color)	yellow	yellow	yellow	yellow	pale yellow to red	yellow	yellow	yellow
Achene (shape, indumentum)	cylindrical, glabrous	densely lanate	cylindrical-conyca, glabrous	cylindrical, glabrous	cylindrical, densely sericeous	glabrous	cylindrical-ovate, densely sericeous	trichomes
Pappus: length (mm)	6–8	–	5–7	1.2–4	6–7	6.6–7.4	6–7	6.2–7.6

¹ AR = Argentina; BO = Bolivia; CH = Chile; PE = Peru.

Conservation status — Following the criteria and categories of IUCN (2019), a preliminary status of Vulnerable (VU) is recommended, since the isolated populations observed are estimated to be in a geographic range of < 5000 km². The suitable habitats for *S. beltranii* are the large plateaus above 4700 m north of the Arequipa region and south of the Cusco region and dangers such as volcanic activity, road construction, and the exploitation of natural resources can lead to the gradual disappearance of the species.

Additional material examined (paratypes). PERU, Arequipa, Caylloma, Chivay, roadside along Abra Apacheta, S15°43'33" W71°35'18", 4738 m, 28 Mar. 2016, D.B. Montesinos 4553 (B, HSP); Cusco, Espinar, Condoroma, 5 km offroad from Condoroma, S15°14'34" W71°08'28", 4850 m, 15 Mar. 2018, P. Gonzáles & E. Huamán 4254 (USM); Cusco, Cordillera de Vilcanota, cuenca de la laguna Sibinacocha, cerro Yurak, S13°46'00" W71°05'16", 5470 m, 8 Mar. 2019, R.I. Meneses, H. Alberto, A. Lliully, K. Yager, V. Urrelo, F. Velarde, M. Jihuallanca, J. Villalobos & R. Azócar 7028 (LPB).

DISCUSSION

Table 1 lists the major differences between *S. beltranii* and other members of ser. *Suffruticosi* subser. *Caespitosi*. The differences with *S. algens* are listed in the diagnosis. In addition, when a leaf of *S. beltranii* is crushed, it releases a slightly sweet scent that reminds of *S. nutans* Sch.Bip. (Schultz-Bipontinus 1856: 51–52, 55). *Senecio algens* does not release a particular scent when the leaves are crushed. Furthermore, the new species differs from *S. crithmoides* Hook. & Arn. (Hooker & Arnot 1841: 347) (Fig. 3b) in shorter plant height, larger involucre width, shorter pedicel length, shorter calycular bract size, longer pappus length, and by geographical distribution, since *S. crithmoides* occurs in the high Andes of Central Chile at the border with Argentina (according to herbarium collections from LP and pers. obs. of the first author in 2018 at Cristo Redentor, Mendoza, Argentina). The new species differs from *S. menesesiae* J.Calvo (Calvo & Fuentes 2018: 74) by having only a few papillose trichomes that lightly cover the leaves, and by shorter leaf length, larger involucre and pedicel length. The latter is not provided by Calvo & Fuentes (2018) but the illustration shows apparent short pedicels of less than 3 mm long. The differences between the new species and *S. woodii* J.Calvo (Calvo & Fuentes 2018: 77) are the larger leaf length, presence of scattered papillose trichomes on leaf and stem surfaces, larger involucre length, shorter calycular bract length, larger phyllary length and phyllary width, larger phyllary number, shorter achene size and glabrous achene texture. Differences with *S. aquilaris* Cabrera (Cabrera 1950: 74) are the presence of scattered papillose trichomes, larger leaf length, glabrous phyllary margin and achene. Differences with *S. danai* A.Gray (Gray 1861: 142) (Fig. 3c) include plant habit and geographical distribution (*S. danai* at 3300–4500 m in central-southern Peru), larger leaf length and leaf width, shorter involucre width, larger phyllary number, yellow corolla colour and glabrous achene texture. Finally, differences with *S. trifurcifolius* Hieron. (Hieronymus 1895: 358) (Fig. 3d) include the absence of papillose trichomes in *S. trifurcifolius*, spatulate-oblongate, pinnatifid leaf shape, larger leaf length, involucre size and phyllary size and by the glabrous achene texture.

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