

Taxonomic notes, distribution, and conservation status of two species of *Asteraceae* firstly recorded for Colombia

Antoni Buira^{1,*}, Carlos A. Velasco² & Joel Calvo³

¹Real Jardín Botánico de Madrid CSIC, Pza. de Murillo n.º 2, 28014 Madrid, Spain.

²Herbario Universidad del Cauca-CAUP, Cra 2 n.º 1A-25 Popayán, Colombia.

³Instituto de Geografía, Facultad de Ciencias del Mar y Geografía, Pontificia Universidad Católica de Valparaíso, Avda. de Brasil 2241, 2362807 Valparaíso, Chile.

*Author for correspondence: abuira@rjb.csic, <https://orcid.org/0000-0002-2775-7017>

²caavelasco@unicauca.edu.co, <https://orcid.org/0000-0002-5090-541X>

³calvocasas@gmail.com, <https://orcid.org/0000-0003-2340-7666>

Abstract. As a result of herbarium studies and field work carried out by the signing authors, two *Asteraceae* species are recorded for the first time in Colombia, i.e., *Floscaldasia azorelloides* Sklenář & H.Rob. (tribu *Astereae*) and *Senecio subinvolutus* Cuatrec. (tribu *Senecioneae*). Taxonomic notes, pictures, conservation status, and distribution maps are provided for both species.

Keywords. *Compositae*, *Floscaldasia*, *Senecio*.

Resumen. Como resultado de la revisión de material de herbario y del trabajo de campo llevado a cabo por los autores, se citan por primera vez en Colombia dos especies de *Asteraceae*, i.e., *Floscaldasia azorelloides* Sklenář & H.Rob. (tribu *Astereae*) y *Senecio subinvolutus* Cuatrec. (tribu *Senecioneae*). Se presentan además notas taxonómicas, imágenes, estatus de conservación y mapas de distribución de ambas.

Palabras clave. *Compositae*, *Floscaldasia*, *Senecio*.

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INTRODUCTION

The *Asteraceae* Bercht. & J.Presl is the second largest family of the Colombian flora, consisting of c. 1,303 species represented by 258 genera (Ávila & al. 2018). It is one of the most important plant groups in the *páramo* and the montane forest ecosystems, becoming the most diverse family along the altitudinal gradient of 3000–5000 m a.s.l. (Bernal 2016).

Herein, we record two new species of *Asteraceae* for the Colombian flora belonging to the tribes *Astereae* Cass. and *Senecioneae* Cass.: *Floscaldasia azorelloides* Sklenář & H.Rob. and *Senecio subinvolutus* Cuatrec. respectively. Both were considered hitherto endemic to Ecuador. These new findings were possible due to collection trips carried out by the authors, which highlights the importance of the field work, and the revision of herbarium specimens. Taxonomic notes, pictures, conservation status, and distribution maps are provided for both species.

MATERIAL AND METHODS

This contribution is the result of an intensive review of the published bibliography, and the revision of specimens

kept at CAUP, COL, QAP, QCA, and QCNE. Furthermore, photographs of specimens from other institutions were studied: F, MO, UDBC, and US; herbarium acronyms follow Thiers (2018). The conservation status of both species —considered endemic to Ecuador— was reassessed following the IUCN methodology, according to *IUCN Red List Categories and Criteria*, version 3.1 (IUCN 2001). Distribution maps were prepared using QGIS version 3.0.1 (QGIS Development Team 2018), and geographical coordinates were obtained from herbarium specimens.

RESULTS AND DISCUSSION

Floscaldasia azorelloides Sklenář & H.Rob., *Novon* 10 (2): 146 (2000). Type: Ecuador, Chimborazo/Morona Santiago, cerros Yuibug-Pailacajas, 1°45' S 78°27' W, 4400 m a.s.l., 31-VII-1997, P. Sklenář and V. Sklenářová 2950 leg. (holo-: QCA image!; iso-: AAU n.v., MO image!, PRC n.v., QCNE n.v., US image!).

Tiny rosetiform perennial herb with ramified creeping rhizomes. It is well characterized by its 3-lobed leaves, the solitary terminal capitula, which are sessile in bloom

and become long pedunculate as time passes, and the smooth bristles of the pappus (fig. 1).

Distribution and habitat.—In Ecuador it is known from four Andean localities in the northern half of the country —Sara-Urco, Yuibug-Pailacajas, Hermoso and El Altar mounts—, where it forms loose mats in shallow, wet, and sandy substrata on both metamorphic and igneous bedrock of the upper *superpáramo* —*sensu* Cleef (1978)—, between elevations of 4200–4500 m a.s.l. (Sklenář & Robinson 2000). The new Colombian locality was found in the summit of the Sotará Volcano —Cauca Department, southern Central Andes—, about 300 km away from the northernmost Ecuadorian known population (fig. 2). The species was found thriving in moist sandy soils around igneous rocks, with sparse surrounding vegetation dominated by *Calamagrostis* sp., *Halenia elata* Wedd., *Hypochaeris sessiliflora* Kunth, *Phlegmariusus* cf. *rufescens* (Hook.) B.Øllg., *Xenophyllum humile* (Kunth) V.A.Funk, and *Xenophyllum sotarense* (Hieron.) V.A.Funk.

Conservation status.—It was catalogued as ‘Vulnerable D2’ (Barriga & al. 2011) due to its low number of known locations. This new Colombian locality, besides a recent collection in Central Ecuador —*P. Sklenář 13145* leg., QCA—, has considerably increased the extent of occurrence and the number of known populations. While it is still a rare species, it does not meet the criteria to be considered as ‘Vulnerable’, since the number of known locations is over five. Consequently, *Floscaldasia azurelloides* is qualified as ‘Near Threatened’.

Remarks.—The 3-lobed leaves are very useful to distinguish this species from the other members of the genus, i.e., *Floscaldasia hypsophila*

Cuatrec. The genus *Floscaldasia* Cuatrec. is strictly endemic to the *páramo* and consists of only two species that thrive in Colombia and Ecuador.

Additional specimens examined.—COLOMBIA. **Cauca:** Sotará, cima del volcán Sotará, 2°06' N 76°35' W, 4440 m a.s.l., 30–XI–2017, A. Buira, J. Calvo and C.A. Velasco 7638 leg. (CAUP, MA 923838).

ECUADOR. **Chimborazo:** El Altar, N side of the volcano, 1°41' S 78°24' W, 4400 m a.s.l., 19 Aug 1995, P. Sklenář and V. Kostečková 93-13 leg. (QCA). **Pichincha/Napo:** Mountain ridge to the west from Cerro SaraUrcu, 0°06' S 77°58' W, 4350 m a.s.l., 30–VIII–1995, P. Sklenář and V. Kostečková 1179 leg. (QCA); W side of a mountain ridge c. 2 km to the west Cerro SaraUrcu, 0°06' S 77°58' W, 4400 m, a.s.l., 29–VIII–1995, P. Sklenář and V. Kostečková 102-108 leg. (QCA). **Tungurahua:** P.N.N. Llanganates, summit ridge on the SW side of Cerro Hermoso, 1°13' S 78°17' W, 4430 m a.s.l., 4–XII–2010, P. Sklenář 13145 leg. (QCA).

Senecio subinvolucratum Cuatrec., Feddes Repert. Spec. Nov. Regni Veg. 55: 149 (1953); *Aetheolaena subinvolucrata* (Cuatrec.) B.Nord., Opera Bot. 44: 56 (1978); *Lasiocephalus subinvolucratum* (Cuatrec.) Cuatrec., Phytologia 40: 312 (1978). Type: Ecuador, Pichincha, Quito, 23–VIII–1920, E.W.D. Holway and M.M. Holway 938 leg. (holo-: US image!).

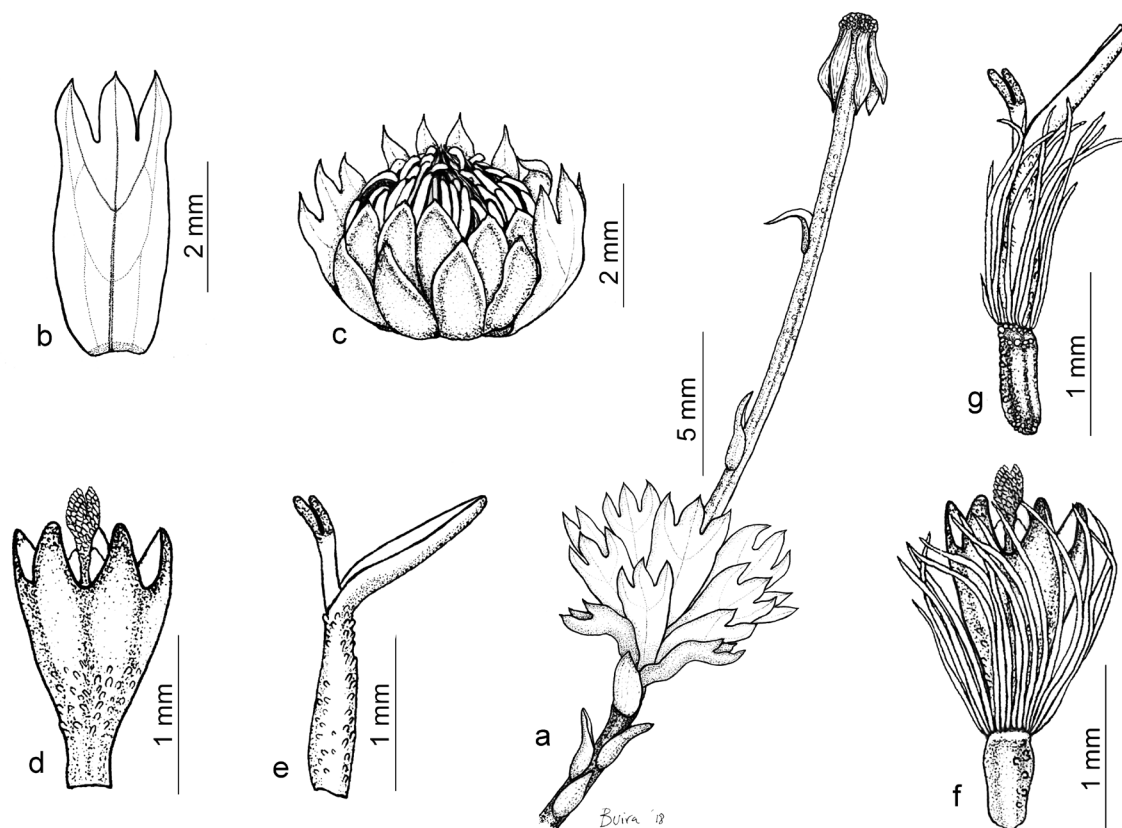


Fig. 1. *Floscaldasia azurelloides* Sklenář & H. Rob.: **a**, rosette and receptacle after the seed dispersal; **b**, leaf; **c**, capitulum with some leaves; **d**, disc floret without ovary and pappus; **e**, ray floret without ovary and pappus; **f**, disc floret; **g**, ray floret. [A. Buira, J. Calvo and C.A. Velasco 7638 leg. (MA 923838); drawing by A. Buira.]

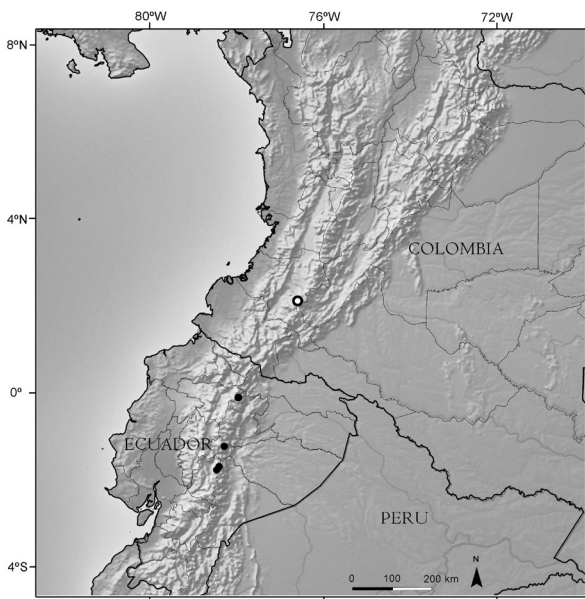


Fig. 2. Distribution map of *Floscaldasia azorelloides* Sklenář & H. Rob. [open dot, new record; closed dots, previous records].

Scandent subshrub characterized by displaying discoid, homogamous, nodding capitula, supplementary bracts at the base of the involucre as a calyculus, and penicillate style branches. It has c. 13 involucral bracts and supplementary bracts usually not addressed to the capitulum and very conspicuous (fig. 3).

Distribution and habitat.—*Senecio subinvolutratus* occurs from Cotopaxi—northern Ecuadorian Andes—to Puracé—southern Colombian Andes—, growing from the montane forest to the páramo—*sensu* Cleef 1978), between elevations of 3200–4550 m a.s.l. It has to be noted that the distribution map (fig. 4) of *Senecio subinvolutratus* provided in this work is not exhaustive and further Colombian herbarium material should be

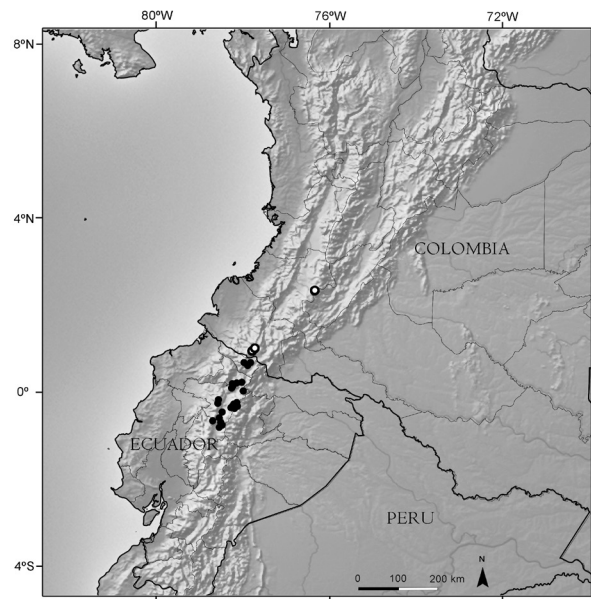


Fig. 4. Distribution map of *Senecio subinvolutratus* Cuatrec. [open dot, new record; closed dots, previous records].

revised in order to accurately delimit its distribution area—see Remarks section below.

Conservation status.—It was catalogued as ‘Endangered B1ab(iii)’—Barriga (2011); *sub Aetheolaena subinvolutrata*—since only two collections were considered when it was evaluated. Both the current extent of occurrence and the number of known localities show that it is a widespread species and should be treated as ‘Least Concern’.

Remarks.—This species, which belongs to the informal ‘*Senecio* group *Lasiocephalus*’ (Calvo & Freire 2016), is morphologically close to *Senecio patens* (Kunth) DC. Indeed, it has been frequently misidentified as the latter species. They can be basically differentiated by the shape and arrangement of the supplementary bracts. *Senecio subinvolutratus* displays lanceolate to broadly lanceolate supplementary bracts, clearly

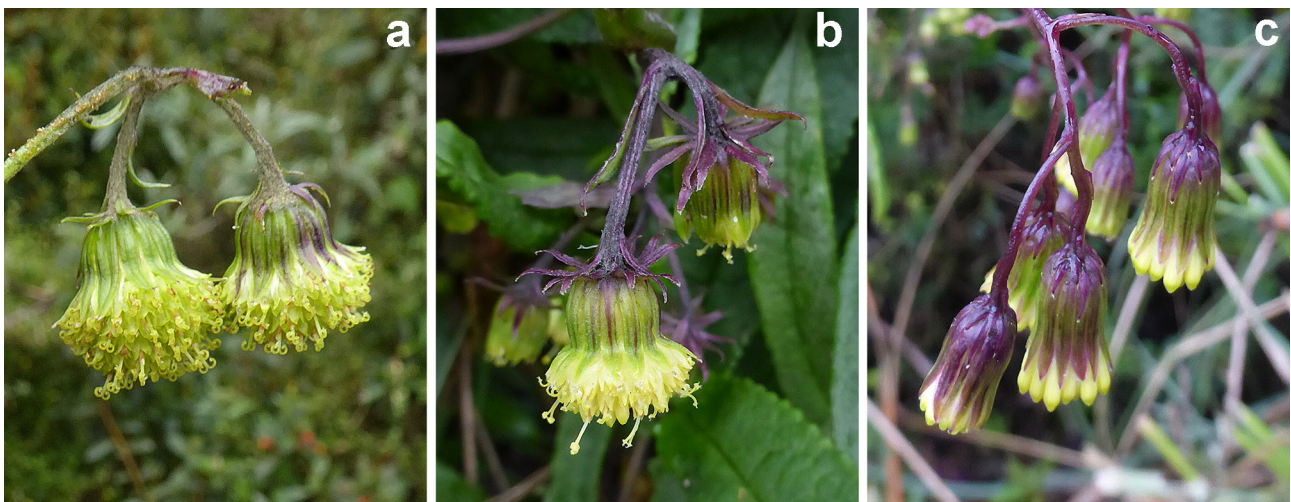


Fig. 3. Discussed species of *Senecio* L.: **a, b**, *S. subinvolutratus* Cuatrec.; **c**, *S. patens* (Kunth) DC. [a, Cauca, southern Colombia, J. Calvo 7669 leg. (CAUP); b, c, Carchi, northern Ecuador; photographs by J. Calvo.]

patent or even slightly reflexed —not adpressed to the capitulum—, and arising from the same level at the base of the capitulum (fig. 3). In contrast, the supplementary bracts of *Senecio patens* are narrower, almost linear, usually adpressed to the capitulum or almost so, and arising from different levels at the base of the capitulum. This latter feature makes that the supplementary bracts of *Senecio patens* seem imbricate or multiseriate, and therefore, it is usually difficult to differentiate between the supplementary bracts and the uppermost synflorescence bracts of the pedicel. All the studied specimens of *Senecio subinvolucratus* have capitula with 13 involucre bracts, while in *Senecio patens* the number ranges from 11 to 13. These species are sympatric, which means that a detailed study of the aforementioned characters is required to properly identify them. Until now, *Senecio subinvolucratus* was only recorded from Ecuador (Salomón & al. 2018) although Calvo & Freire (2016) pointed out the possible presence in Colombia on the basis of the Ecuadorian localities near the border. The field work carried out in southern Colombia has enabled us to confirm that *Senecio subinvolucratus* also occurs in this country. A later revision of some herbarium specimens of this group revealed that *Senecio subinvolucratus* was already collected in Colombia but misidentified as *Senecio patens*.

Additional specimens examined.—COLOMBIA. **Cauca:** Puracé, entrada a la laguna de San Rafael, 02°21' N 76°21' W, 3450 m a.s.l., 7–XII–2017, *J. Calvo 7669* leg. (CAUP). **Nariño:** Túquerres, vereda Amarillo, 1°3' N 77°46' W, 3345 m a.s.l., 23–IV–2009, *S. Ángel et al. 267* leg. (UDBC); laguna de Cumbal, 0°56' N 77°48' W, 3500 m a.s.l., 2–XI–2008, *R. Cortés and B. Devia 2551* leg. (COL).

ECUADOR. **Carchi:** 11.4 km NE of El Ángel on road toward Tulcán, 0°38' N 77°53' W, 3240 m a.s.l., 13–V–1990, *R.M. King et al. 10098* leg. (QCNE); Espejo, parroquia La Libertad, reserva ecológica El Ángel, 0°42' N 77°58' W, 3640 m a.s.l., 10–VIII–2010, *J. Brito and F. Anaguano 26* leg. (QAP); El Ángel-Tulcán, vía lagunas El Voladero, km 34, 0°42' N 77°49' W, 3350 m a.s.l., 9–VIII–1990, *P.M. Jørgensen et al. 92336* leg. (QCA); Espejo, páramo de El Ángel, 0°40' N 77°50' W, 3400 m a.s.l., 10–X–1993, *D. Neill et al. 10250* leg. (QCNE). **Cotopaxi:** área de recreación El Boliche, 0°47' S 78°32' W, *C. Cerón and G. Toasa 22698* leg. (QAP); N.P. Cotopaxi, 14 km E along entrance road opposite km 60 of Panamerican highway, 0°44' S 78°28' W, 3535 m a.s.l., 15–V–1982, *J.L. Luteyn et al. 8388* leg. (QCA); P.N.N. Cotopaxi, 1 km antes de la entrada, 0°40' S 78°30' W, 3500 m a.s.l., 15–V–1982, *L. Muñoz 187* leg. (QCA); volcán Iliniza, 0°38' S 78°41' W, 4200 m a.s.l., 18–X–2006, *P. Sklenář 9003* leg. (QCA). **Imbabura:** Otavalo, sector lagunas de Mojanda, 0°7' N 78°15' W, 3600 m a.s.l., 27–VI–2015, *C. Cerón and C. Reyes 76471* leg. (QAP); volcán Imbabura, quebrada Rumipamba, 0°14' N 78°8' W, 20–VIII–1995, *C. Cerón et al. 29508* leg. (QAP); volcán Imbabura, 0°10' N 78°13' W, 4000 m a.s.l., 20–VIII–1995, *M. Reina and C. Cerón 177* leg. (QAP); Mariano Acosta, 0°15' N 78°1' W, 3500 m a.s.l., 1–XI–1986, *P.M. Jørgensen and J. Jaramillo s.n.* leg. (QCA). **Napo:** reserva ecológica Oyacachi, 0°18' S 78°7' W, 3986 m a.s.l., 29–IX–2007, *K. Romoleroux et al. 4608* leg. (QCA); Baeza, parroquia Papallacta, laguna Sucus, 0°21' S 78°11' W, 3600 m a.s.l., 28–XI–2007, *C. Cerón and C. Reyes 61221* leg. (QAP); reserva ecológica Oyacachi, 0°13' S 78°8' W, 3783 m a.s.l., 16–XII–2008, *D. Cárate, K. Romoleroux and L.E. López 44* leg. (QCA). **Pichincha:** el Inga alto, 0°20' S 78°16' W, 4025 m a.s.l., 13–I–2010, *D. Cárate, S. Duchicela and M. Subia 1223* leg. (QCA); vía Tabacundo-Tocachi-Malchingui, 0°13' N 78°14' W, 3960 m a.s.l., 24–IV–1999, *J. Jaramillo, I. Tapia and A. Pérez 21039* leg. (QCA); páramo de la Virgen, 0°20' S 78°13' W, 3650 m a.s.l., 29–IV–2007, *C. Cerón 58636* (QAP); volcán Rumiñahui, 0°34' S 78°32' W, 3800 m a.s.l., 4–IX–1993, *C. Cerón et al. 23002* leg. (QAP); Quito, Ruccu Pichincha, 0°9' S 78°33' W, 4450 m a.s.l., 27–IX–2009, *C. Cerón and D. Simba 65850* leg. (QAP); páramo de Guamaní, app. 5 km W of paso de la Virgen, 0°19' S 78°13' W, 3700 m a.s.l., 19–IV–1984, *S. Laegaard et al. 52184* leg. (QCA); Quito, cerro Longüi, 0°14' S 78°34' W, 3200 m a.s.l., 17–VI–2001, *C. Cerón et al. s.n.* leg. (QAP); NE of Pasocha, 0°26' S 78°28' W, 3850 m a.s.l., 30–VII–1980, *J. Jaramillo et al. 3175* leg. (QCA); Tabacundo, lagunas Mojanda, 0°7' N 78°16' W, 3800 m a.s.l., 30–VII–1992, *W. Palacios et al. 10191* leg. (QCNE); laguna de Hoyas, páramo de Guamaní, 0°15' S 78°12' W,

4050 m a.s.l., 9–VIII–1987, *P.M. Ramsay and P.J. Merrow-Smith 235* leg. (QCNE); páramo de la Virgen, 0°18' S 78°14' W, 3500 m a.s.l., 12–VIII–2007, *C. Cerón 60581* leg. (QAP); N side of nevado Cayambe, 0°3' N 77°59' W, 4300 m a.s.l., 6–VIII–2004, *P. Sklenář 8100* leg. (QCA); páramo of Ruccu Pichincha, 0°9' S 78°33' W, 4550 m a.s.l., 29–X–2010, *P. Sklenář 9313* leg. (QCA); N side of nevado Cayambe, quebrada Angureai, 0°3' N 77°59' W, 4220 m a.s.l., 3–XI–2007, *P. Sklenář and E. Rejzková 10715* leg. (QCA)

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