

Notes on taxonomy, distribution and ecology of some Ecuadorian high páramo Asteraceae, tribe Senecioneae

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Abstract

Notes on taxonomy and distribution of three species, *Lasiocephalus sodiroi* SCHLDTL., *Senecio ferrugineus* (KLATT) CUATREC., and *Pentacalia chimboraensis* SKLENÁŘ sp. nov., from the high páramos of Ecuador are presented. For the latter species, the illegitimate synonym, *Senecio hallii* HIERON., is cited.

Introduction

The family Asteraceae is the most diverse and most important plant group in the páramo vegetation of the tropical Andes (VAN DER HAMMEN & CLEEF 1986, RAMSAY 1992, LUTEYN 1999, SKLENÁŘ 2000). The páramo checklist contains 858 species from 101 genera which accounts for 25 % of the total species diversity of the páramos (LUTEYN 1999), and new species are still being added to this list (e.g. DÍAZ-PIEDRAHÍTA & VÉLEZ-NAUER 1994, SKLENÁŘ & ROBINSON 2000). *Senecioneae* belongs to the tribes which contribute most to the diversity of the family in the Andean highlands (FUNK 1997). In the páramos this tribe is represented by several important genera among which the most diverse are *Senecio*, *Pentacalia*, and *Lasiocephalus*.

During the years 1995–99 flora and vegetation of the Ecuadorian high Andes were studied with the emphasis on the highest altitudinal zone - the superpáramo (SKLENÁŘ 2000). The study was carried out in eighteen superpáramo areas located in the northern and central parts of the country, and a brief excursion to southern páramos of Ecuador was undertaken in

1999. The research resulted in about 100 species of the family Asteraceae, in involving recollections of some rare and less known species which may be sometimes confused with other species. This contribution aims at clarifying the status of three Ecuadorian superpáramo species and at providing information of their ecology and distribution.

Treatments of the species

Lasiocephalus sodiroi (HIERON.) CUATREC., *Phytologia* 69: 313 (1990).
Basionym: *Culcitium sodiroi* HIERON., *Bot. Jahrb. Syst.* 29: 63 (1900). - Syn.:
Senecio sodiroi (HIERON.) CUATREC., *Field. Bot.* 27 (1): 45 (1950). - Orig. coll.:
SODIRO s.n., Ecuador: "Crescit in summis pascuis montium Imbabura et Chimborazo" (B destroyed, photo 18150 F!, US!; lectotype P, designated by CUATRECASAS in *Phytologia* 69: 313 (1990), not seen).

In the recent checklist of Ecuadorian vascular plants the species *Lasiocephalus sodiroi* occurred in the synonymy of a wide-spread Andean species *L. ovatus* SCHLTDL. (NORDENSTAM 1999). From the descriptions, photographs of type specimens, and field observations it is evident, however, that *L. sodiroi* is a very distinct species within *Lasiocephalus*, a genus reinstated by CUATRECASAS (1978), or within the genus *Aetheolaena* sensu NORDENSTAM (1978).

Lasiocephalus sodiroi can be easily distinguished by its delicate stature and height up to 20 cm, and one-nerved, linear to linear-lanceolate leaves with revolute margins; the needle-like leaves are indeed a unique feature in the Ecuadorian members of the genus. The species *L. ovatus* is much more robust in habit, often it attains a height over 50 cm, and the leaves are three-nerved, ovate.

During the survey in the Ecuadorian páramos, both species, *Lasiocephalus ovatus* and *L. sodiroi*, were repeatedly collected. The former species is a conspicuous superpáramo element and was found in various types of habitats, e.g. closed vegetation of the lower superpáramo, rocky outcrops, sandy soils, and very often it can be found colonizing surfaces of cushion plants. It is known from the páramos of Colombia and Ecuador (LUTEYN 1999). In Ecuador it occurs throughout the high páramos ranging from Volcán Chiles at the Colombian border down to the Sangay National Park (SKLENÁŘ 2000); it was not found further south in the Cajas region but there is a recent collection of *Lasiocephalus* cf. *ovatus* from that area (w³TROPICOS 2000). The species *L. sodiroi* is much rarer than the previous one and so far only few

collections have been made. Including the type material, the species has been recorded from the following Ecuadorian mountains: Volcán Chiles, Cerro Imbabura, Cayambe, Corazon, Chimborazo. The species was mostly collected in rocky habitats in the (super)páramo belt, but there is a remarkable record from lower altitudes of the Andean montane forest in the mountain Corazon (CERÓN & MENA 1214).

List of specimens: Carchi: HOLM-NIELSEN et al. 5893, 19 May 1973, 3900–4050 m (MO!); SKLENÁŘ & KOSTEČKOVÁ 1404, 6 Oct. 1995, 4100 m (AAU!, US!). **Imbabura:** CAZALET & PENNINGTON 5775, 16 Dec. 1961, 14000 ft. (NY!); SKLENÁŘ & KOSTEČKOVÁ 505, 5 Jun. 1995, 4300–4350 m (AAU!, QCA). **Pichincha:** CERÓN & MENA 1214, 19–20 Apr. 1987, 3200–3500 m (AAU!, MO, US!); SKLENÁŘ & KOSTEČKOVÁ 786, 3 Jul. 1995, 4300 m (AAU!, NY, PRC!, QCA, QCNE, US!); in 1998 at the US Herbarium, additional collections of the species from the Cayambe volcano were inspected, however, no notes were made about label information at that time.

Senecio ferrugineus (KLATT) CUATREC., Field. Bot. 27 (1): 44 (1950).
 Basionym: *Culcitium ferrugineum* KLATT, Ann. K. K. Naturhist. Hofmus. 9: 363 (1894). - Orig. coll.: HALL s.n., Ecuador: "Chimborazo, juxta litem nivis perpetuae" (B destroyed, photo 18143 F!).

This "culcitioid" species was transferred to the large and heterogeneous genus *Senecio* by CUATRECASAS (1950), where it was maintained until NORDENSTAM (1999) put it in the synonymy of *Culcitium rufescens* BONPL. Descriptions, photographs of type specimens, and field observations give evidence that *Senecio ferrugineus* is a very distinct species among the Ecuadorian "senecios". Unlike *C. rufescens* and *C. canescens* BONPL. (sensu NORDENSTAM 1999), which may grow as tall as 50 cm and have a basal rosette of 15–25 cm long, tomentose leaves, and up to four capitula per plant, *Senecio ferrugineus* is a small delicate plant only up to 15 cm tall, with a basal rosette of 10–15 narrowly oblong-lanceolate barbulate-lanate leaves, 2–4 cm long with revolute margins, dark reddish stem, and a solitary nodding capitulum.

Senecio ferrugineus is a very rare species and most likely endemic to the Chimborazo volcano. Its occurrence seems to be restricted to a narrow altitudinal belt on the eastern mountain side; in 1997 the species was found growing among rocks on sparsely colonized glacial moraines at altitudes of 4500–4700 m. Although the label information by HITCHCOCK (21970) indicates altitudes 3600–4500 m (see below), from the observed habitat requirements it can be assumed that the species most probably does not occur below the upper superpáramo belt.

List of specimens: Chimborazo: HITCHCOCK 21970, 4 Oct. 1923, 3600–4500 m (US!); SKLENÁŘ & SKLENÁŘOVÁ 2223, 3 Jul. 1997, 4600 m (AAU, PRC!, QCA, QCNE, S!, US!), 2230, 4 Jul. 1997, 4680 m (QCNE), 2278, 4 Jul. 1997, 4600–4700 m (QCA).

Pentacalia chimborazensis SKLENÁŘ **sp. nov.** Type: Ecuador, Bolívar/Chimborazo: Volcán Chimborazo, W. side of the mountain, sparse superpáramo vegetation, sandy slope on the right side of the gully which crosses the road to the refuge in its hair-pin bend ca 4 km from the road Ambato–Guaranda, 1°28'S 78°48'W, 14 Sept. 1995, 4600–4800 m, SKLENÁŘ & KOSTEČKOVÁ 1275 (PRC! Holotype; QCA, QCNE Isotypes).

Syn.: *Senecio hallii* HIERON., Bot. Jahrb. Syst. 21: 358 (1895), nom. illeg. non *S. hallii* BRITTON, Trans. New York Acad. Sci. 9: 11 (1889).

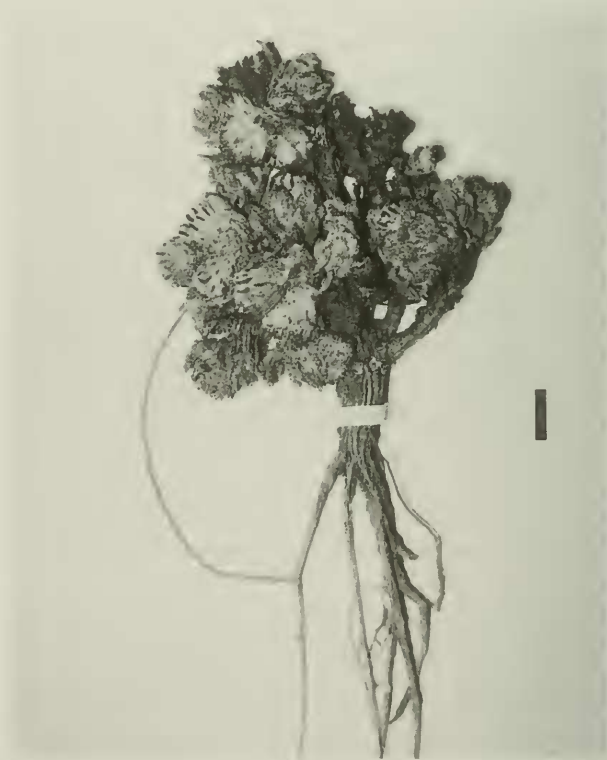


Fig. 1.

Pentacalia chimborazensis SKLENÁŘ, bar = 1 cm (from holotype).

Suffrutex 10–20 cm altus, radice ramosa, caule dense folioso, ferrugineo, ramoso, rami ad 5 cm longis. Folia alterna, petiolata; lamina lanceolata, supra purpurea, subtus viridis cum costa purpurea, utrinque pilis longis articulatis dense obsita, margine subserratodentata, revolutaque. Anthodia terminalia, solitaria vel in corymbo, calyculata, bracteis involueralibus numero 9–13, biseriatis, pilis longis articulatisque tectis. Flosculi bisexuali, numero (25) 30–45, corollis claviformibus, flavescentibus vel flavovirentibus, ramis stigmatibus linearibus, superne truncatis, antheris apice acutis. Achenia costata, pubescentia, pappo albedo.

Perennial suffrutescent herb 10–20 cm tall. Roots ramified, 15–40 cm long. Stem light brown with little red in younger parts, densely covered with leaves, ramified, sometimes numerous branches clustered above the woody base or no branches present at all, the branches up to 5 cm long. Leaves alternate, petiolate; petiole 0.5–1.1 cm long, dark red, glabrous or with few to numerous long articulated hyaline hairs along the margins or in the middle of the abaxial side; lamina lanceolate, 0.7–1.6 cm long and 0.3–0.7 cm wide, upper surface dark red, sometimes pale green in the middle, lower surface green with dark red midrib, sparsely to densely covered on both sides with up to 6–7 (10) mm long articulate hyaline hairs, some hairs with red septa between cells, leaf margins subserrate-dentate, revolute. Capitula solitary or (1) 2–5 in small terminal corymbs, peduncle ca 3 mm long. Capitulum discoid, 8–12 mm wide and 9–11 mm high, with 8–10 narrowly linear bracteoles 6–10 mm long and with acute apex forming calyculus, light green below middle, dark red above middle with black tip and with long articulate hyaline hairs along margins up to upper third. Involueral bracts 9–13, biseriate, 6–10 mm long, pale green becoming dark red in the upper third and with black tips, the green part of the bracts covered with long articulate hyaline hairs; outer bracts lanceolate to narrowly ovate, apex acute; inner bracts ovate to broadly ovate with membranaceous margins, apex acute to obtuse. Florets bisexual, (25)30–45 per capitulum; corolla narrowly clavate, light yellow to greenish-yellow, 5-lobed; corolla lobes 0.6–0.8 mm long and ca 0.5 mm wide at the base, acute, cucullate; throat 3.3–3.6 mm long and 0.9–1.1 mm wide; tube 1.9–2.5 mm long and 0.25–0.45 mm wide; style ca 1.6 mm long, yellow-brown to reddish-brown, style branches ca 0.6–0.8 mm long, linear, apex truncated with numerous papillae; anthers 2–2.1 mm long, light brown, apical appendage acute, base shortly pointed. Pollen grains echinate, ca 22 μm diam. Pappus bristles ca 5.0–5.5 mm long, usually no longer than throat when in flower, white, slightly curved. Achenes 1.5–3.2 mm long and 0.5–0.65 mm wide, ribbed, sparsely to densely pubescent, light green when young, becoming brown when mature.

The species *Pentacalia chimborazensis* was first collected by FRANCIS HALL on the eastern side of Chimborazo volcano (HALL s.n., Ecuador: "Chimborazo, infra litem nivis perpetuae" (B destroyed, photo 15607 F!, US!)) probably during BOUSSINGAULT's expedition to Chimborazo in 1831. Two collections of this species were later made by ALPHONS STÜBEL in 1872. His first collection was again from the eastern side of Chimborazo (STÜBEL 307, Ecuador: "crescit in monte Chimborazo infra litem nivis perpetuae", 4900 m, (B destroyed), but an additional locality was found in the Eastern Cordillera of Ecuador in the páramos located NW of the Sangay volcano (STÜBEL 259, Ecuador: "crescit prope Calcitpungo in Páramo del Alao haud procul ab urbe Riobamba", 4200 m, (B destroyed), where a very abundant population of the species was observed (STÜBEL 1897, p. 247). Though the latter locality was not found on the recent maps (?perhaps Cerro Caluispungo, 4110 m, on the IGM map sheet Llactapamba de Alao), both localities were most likely within today's limit of the Chimborazo Province. The material mentioned above was studied by HIERONYMUS (1895) who described the species as *Senecio hallii* HIERON., which was, however, an illegitimate later homonym of *S. hallii* BRITTON (Trans. New York Acad. Sci. 9: 11, 1889). The type material at B was destroyed and it is unlikely that any duplicates exist; thus only a photograph of HALL's collection is available. To provide a firm basis for typification of this species, it is here newly described and the illegitimate homonym replaced.

NORDENSTAM (1999) correctly pointed to the sub-shrubby habit of the species by stating "dubious species; not a *Senecio*, possibly a *Monticalia*". The suffrutescence is similar to some other high páramo "senecioid" species of Ecuador, e.g. *Pentacalia microdon* (WEDD.) CUATREC., which along with the floral structure justify the transfer to the genus *Pentacalia* subg. *Microchaete*, sometimes distinguished as a separate genus, *Monticalia*.

Since STÜBEL, few collections of the species were made and those were mainly from the western side of the Chimborazo volcano; on this mountain side the species was also observed by me in 1995 and 1999. The plants were found on sandy soils in rocky habitats of the upper superpáramo, and only solitary growing individuals were seen. Although some of the páramos in the Alao region were surveyed in 1997 (but not the STÜBEL locality) the species was not found there (SKLENÁŘ 2000). A small and distinct population of the species was found in 1999 on the SW side of the Carihuairazo volcano (province Tungurahua, ca 10 km to NW of Chimborazo), inhabiting analogous environment as observed on Chimborazo. This population differs by the almost complete lack of red pigmentation which results in a yellowish-green

appearance of the plants; all examined plants from Chimborazo have remarkably red-green leaves. Due to the limited number of localities and scattered occurrence, the species *P. chimborazensis*, apparently endemic to central Ecuador, is very rare.

Further collections: **Bolívar/Chimborazo:** SKLENÁŘ & KOSTEČKOVÁ 1320, 14 Sept. 1995, 4400–4600 m (AAU!); SKLENÁŘ & KOSTEČKOVÁ 1394, 14 Sept. 1995, 4700 m (QCA). **Chimborazo:** RAUH & HIRSCH E 319, 20 Sept. 1951, 4900 m (NY!), LÆGAARD 102811, 11 May 1992, 4980 m (AAU!); 102815, 11 May 1992, 5040 m (AAU!); 102830, 11 May 1992, 5090 m (AAU!); SKLENÁŘ 7507, 5 Jul. 1999, 4800 m (QCA); 7531, 5 Jul. 1999, 4600–4800 m (PRC!, QCNE). **Tungurahua:** SKLENÁŘ & LÆGAARD 7252, 12 Jun. 1999, 4600 m (AAU, PRC!, QCA, QCNE, S!).

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