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New typifications and synonyms in *Senecio* ser. *Culcitium* and related taxa (Asteraceae, Senecioneae)

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Abstract

Seven lectotypes and three neotypes are designated for ten names applicable to species of *Senecio* sect. *Senecio* ser. *Culcitium*. Our results show that *Senecio culcitenellus* and *S. vaginifolius* are conspecific with *S. magellanicus*, while *S. roripifolius* is considered a synonym of *S. aspleniifolius.*

Key words: *Aetheolaena*, Compositae, *Lasiocephalus*, lectotypes, neotypes, nomenclature, *Senecio*, synonymy

Introduction

Senecio L. (1753: 866) ser. *Culcitium* (Humboldt & Bonpland 1808: 1) Cabrera (1985: 112) is a South American group containing ca. 40 species characterized by discoid and usually nodding capitula with large calycular bracts, giving the involucrum the appearance of being composed of multiple series of phyllaries. Pelser *et al.* (2007) demonstrated that *S.* ser. *Culcitium*, in the sense as it has been treated in recent years (e.g. Cabrera 1949, 1985, Cabrera *et al.* 1999, Cuatrecasas 1978), is polyphyletic and that this series and two Andean genera from South America, *Lasiocephalus* Schlechtendal (1818: 308) and *Aetheolaena* Cassini (1827: 453), both including 2 (or 3), and ca. 15 species, respectively (Nordenstam 2007), are deeply nested within *Senecio* and therefore have been subsumed under that genus (Nordenstam *et al.* 2009, Pelser *et al.* 2010).

Two species names have been typified so far in *Senecio* ser. *Culcitium*: *S. magellanicus* Hooker & Arnott (1841: 343) by Porter (1999), and *S. gilliesii* Hooker & Arnott (1841: 43) by Tortosa & Bártoli (2010).

During a revision of *Senecio* ser. *Culcitium*, we have studied the nomenclatural types of South American species transferred by Cuatrecasas from *Culcitium* Humboldt & Bonpland (1808: 1) to *Senecio* (Cuatrecasas 1950, 1951), treated by Cabrera as members of *S.* ser. *Culcitium* (Cabrera 1949, Cabrera *et al.* 1999) and *S.* sect. *Aetheolaena* Hoffmann (1892: 301) (Cabrera 1985), and considered by Nordenstam (1978, 2007) as members of the genera *Aetheolaena* and *Lasiocephalus*. We have also studied types of the names treated by Cuatrecasas (1978) as referable to *Lasiocephalus*.

The aims of this study were to typify several names, for which no types had been designated previously or type material had been destroyed, and to propose synonymy for two species of *Senecio*.

Materials and Methods

Digital images of the type specimens at BR, G, GOET, W were requested and studied. We also examined type specimens from K, F, E, P, NY, G, HAL, US, CODR, GH at the website of JSTOR (http://plants.jstor.org). To designate neotypes we considered digital images at CUZ and USM, as well as collections at LP and SI, which contain relevant South American collections. Herbarium acronyms follow Thiers (2013).

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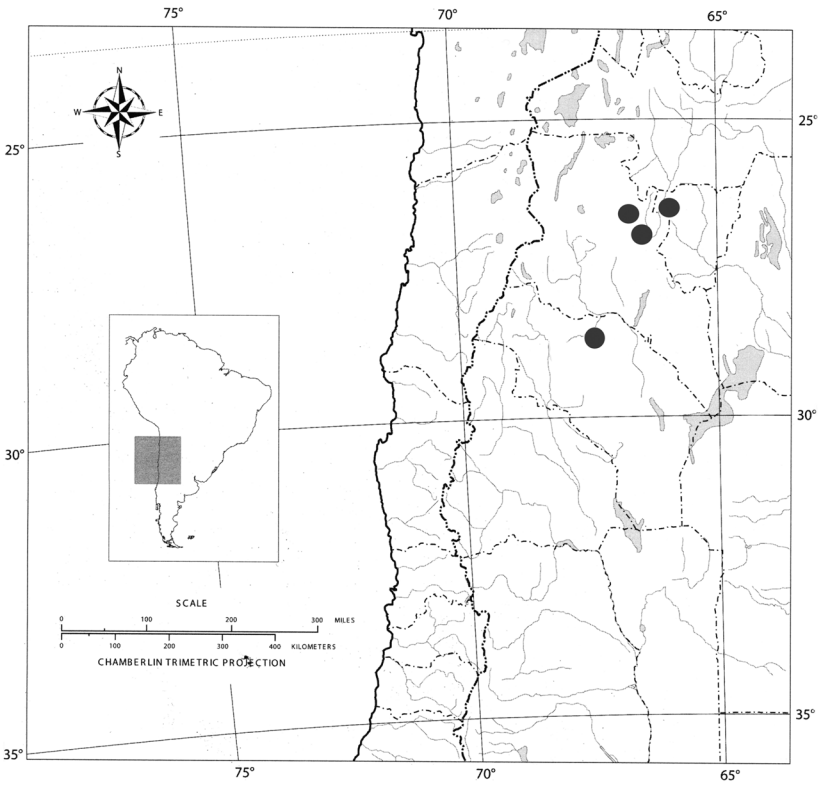
Taxonomic treatment

Senecio aspleniifolius Grisebach (1879: 207). Type:—ARGENTINA. Catamarca. Cerro de Las Capillitas, Jan 1874, *F. Schickendantz 326* (holotype GOET!, isotypes CORD!, LP!, B, photo F!).



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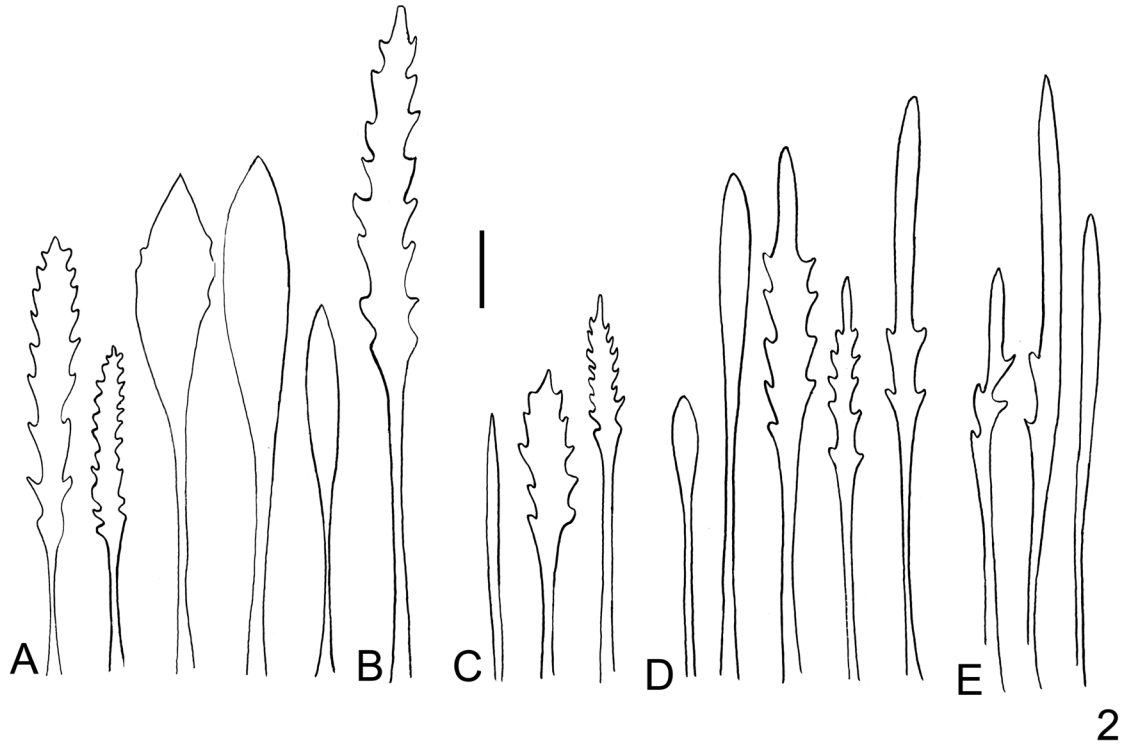

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FIGURE 1. *Senecio aspleniifolius* Griseb. 1. Distribution map. 2. Foliar variability: **A.** Schickendantz 326 (GOET, holotype of *S. aspleniifolius*), **B.** Salomón 253 (SI), **C.** Sleumer 2719 (LP), **D.** Gómez-Sosa 210 (SI), **E.** Lillo 7421 (LP, holotype of *S. roripifolius*). Scale bar = 1cm.

= *Senecio roripifolius* Cabrera (1939: 77), ***syn. nov.*** Type:—ARGENTINA. Tucumán. Tafí, Cerro Muñoz, 3900 m alt, 27 Jan 1908, *M. Lillo 7421* (holotype LP!, isotype LIL).

According to Cabrera (1939), *Senecio roripifolius* differs from *S. aspleniifolius* by its entire and pinnatisect leaves on the same plant, 4–8 mm wide, glabrous on both surfaces (vs. deeply lobed, 5–12 mm wide, lanuginose or tomentose on the lower surface in *S. aspleniifolius*). However, after the study of these characters in types and other collections under both names, we observed specimens with intermediate characters between the two presumed species. For example, the type specimen of *S. aspleniifolius* has entire glabrous leaves, a character that was used, as previously mentioned, to define *S. roripifolius* and to distinguish it from *S. aspleniifolius*. Therefore, from the morphological species concept, *Senecio roripifolius* is reduced to the synonymy of *S. aspeniifolius*. The variability of leaves of this species is displayed on Fig. 1.

Selected Specimens Examined**:**—ARGENTINA. Catamarca: Andalgalá. Cerro Yutuyaco. 3 Mar 1952, *H. Sleumer 2719* (LP); Cerro Yutuyaco. *P. Jörgensen 1321* (SI). Cerro del Candado. 3 Feb 2013, *L. Salomón 253* (SI). La Rioja: Famatina. Sierra San Juan. *F. Kurtz 13703* (CORD). Tucumán: Tafí. Jan 1933, *A. Burkart 5186* (SI); Cerro Bayo. 15 Mar 1984, *E. Gómez-Sosa & M. Múlgura 210* (SI); Quebrada del Barón. Feb 1958, *H. A. Fabris 1397* (LP).

Senecio candidans Candolle (1838: 412) ≡ *Cacalia candicans* Vahl (1794: 91) ≡ *Brachypappus candicans* (Vahl) Schultz Bipontinus (1855: 120). Type:—CHILE. Fret. Magell. *P. Commerson s.n.* (holotype C!; isotypes P 01816868!, P 01816869!, P 01816870!).

= *Culcitium gayanum* Rémy (1849: 130). Type:—CHILE. 1839. *C. Gay 142* (lectotype [**designated here**] P-01816871!; isolectotypes P-01816872!, F-0049329-fragment!).

Protologue information of *Culcitium gayanum* in Rémy (1849): No locality indicated, nor collector neither collecting date.

The specimen selected as lectotype was verified by Cuatrecasas in 1954, and is the best preserved specimen.

Cacalia candicans was described by Vahl in 1794, based on a specimen collected by Commerson. Candolle (1838: 412) transferred *Cacalia candicans* to *Senecio* under the name *S. candidans* but he changed the spelling of Vahl's epithet, using 'candidans' instead of 'candicans'. As pointed out by Whitehouse (2011: 8), since there was an earlier *S. candicans* Wallich ex Candolle (1834: 22), by adopting *S. candidans* as an intentional nom. nov. the problem of homonymy was avoided.

Senecio candollii Weddell (1856: 106) ≡ *Culcitium humile* Candolle (1838: 325), non *Senecio humilis* Desfontaines (1799: 271). Type:—PERU. *T. Haenke s.n.* (holotype M, isotype P!).

= *Culcitium glaciale* Meyen & Walpers in Meyen (1843: 278) ≡ *Senecio glacialis* (Meyen & Walp.) Cuatrecasas (1950: 46). Type:—BOLIVIA. Dpto. La Paz, Prov. Murillo, Kanton Milluni, Feuchter Granitgrus an der Paßhöhe der Straße ins Zongotal; eben; 4750 m, 22 Feb 1980, *J. Krach 8907* (neotype [**designated here**] SI!). Fig. 2.

Protologue information of *Culcitium glaciale* in Meyen (1843): 'Peruvia: in planitie circa Tacoram, alt. 14-17,000 ped. (v.s.)'.

The holotype of *Culcitium glaciale* kept at B was destroyed (photo F 18144!), and no other original material was located at BR, CAS, CGE, JE, K, L or W, where Meyen's original herbarium is kept. Since no material was available from the original locality (Peru, Tacoram) and no other appropriate material from Peru was located at CUZ, HAO, HUT, LP, SI or USM, we propose as neotype the collection *Krach 8907* from Bolivia. Even if the specimen selected as neotype is from Bolivia, it matches the morphological features described in the protologue and recognizable on the photo (F 18144) of the destroyed holotype, in its nodding capitula and large calycular bracts and especially the length of the scape (1.5–4 cm long), and the leaf shape (obovate, 2.5–3.5 × 0.6–1.2 cm).

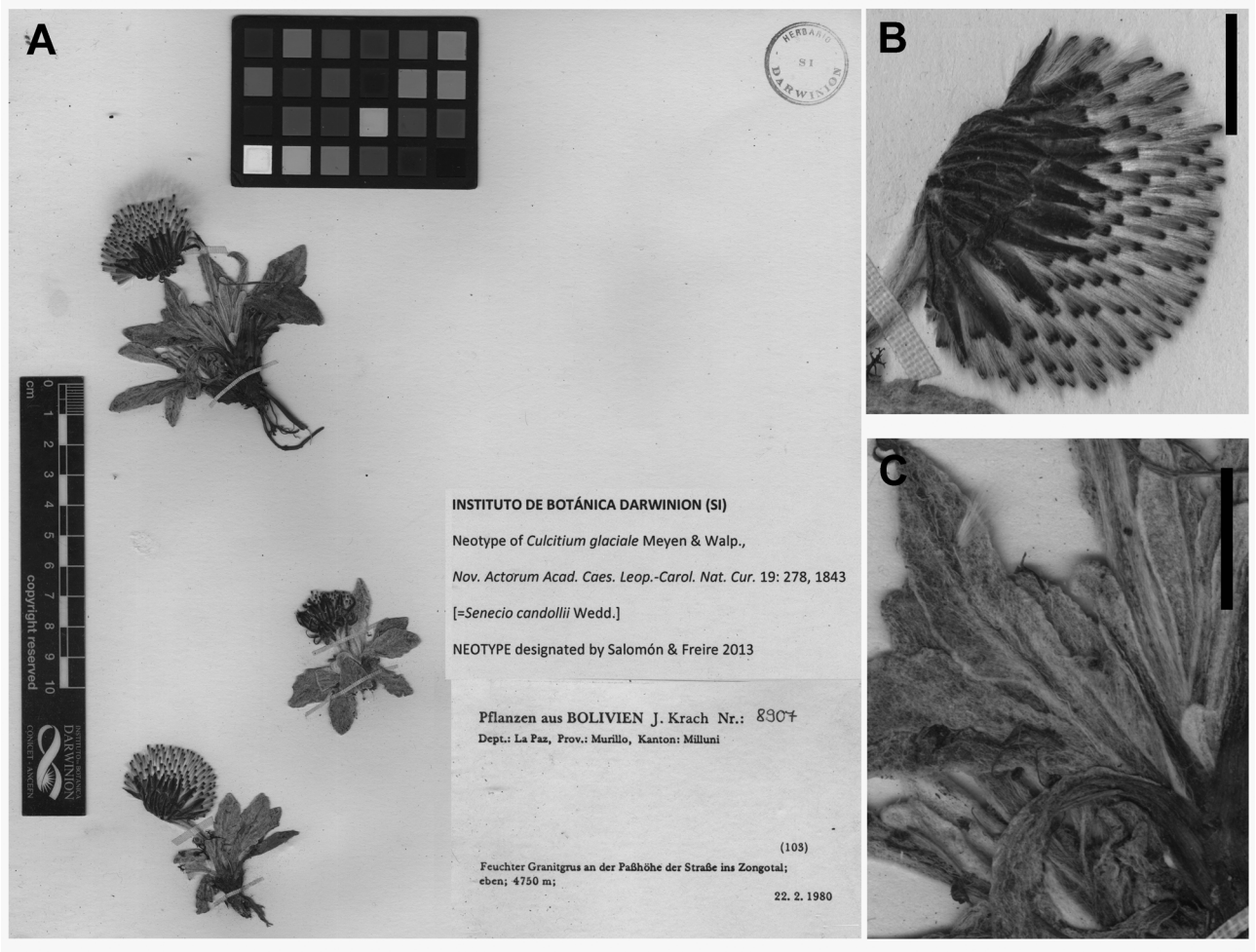

FIGURE 2. *Senecio candollii* Wedd. **A.** Neotype of *Culcitium glaciale* Meyen & Walp., **B.** Capitula nodding, **C.** Leaves linear-ovate, with sheath glabrous. Scale bars B, C = 1 cm.

Senecio gilliesii Hooker & Arnott (1841: 343) ≡ *Culcitium gilliesii* (Hook. & Arn.) Spegazzini (1902: 12). Type:—ARGENTINA. Mendoza. Valle del Río Atuel. *J. Gillies 146* (lectotype K! designated by Tortosa & Bártoli 2010: 379).

= *Culcitium poeppigii* Candolle (1838: 324), non *Senecio poeppigii* Hooker & Arnott (1841: 342). Type:—CHILE. [Bio-Bio] Nº *670 Cacalia candicans,* 1830, *E.F. Poeppig* (lectotype [**designated here**] G-00327293!; isolectotypes, F-fragment!, G-00386806!, HAL-0113452!, photo F-18148 ex B!, NY-00167822!).

= *Senecio passus-crucis* Kuntze (1898: 176). Type:—ARGENTINA. Mendoza. Paso Cruz, 1700–2500m alt., *C.E.O. Kuntze s.n.* (lectotype [**designated here**] NY-00259326!; isolectotypes NY-00259325!, US-00124325!).

Protologue information of *Culcitium poeppigii* in Candolle (1838): 'Chili austr. rupibus alpin. convall. Antucens. mense novembr. legit el. Pœppig. Cacalia candicans Pœpp.! pl. exs. n. 670, sed á Senecione candicante omninó differt. Cacalia? nivea Kunze! in cat. Pœpp. n. 185'. The specimen selected as lectotype is the best preserved in de Candolle's original herbarium at G.

Protologue information of *Senecio passus-crucis* in Kuntze (1898): 'Argentina: Paso Cruz 1700-2500 m. Erinnert einerseits an *S. candicans*, dessen Blätter aber mehr rundlich und kürzer gestielt, nicht radical gehäuft sind, andereseit an *S. anacephalus* Gris., dessen Blüthenschaft nur einköpfig, zarter und 2–3 mal kürzer ist'. We located two sheets at NY and the third at US, all of them being consistent with the information and morphological features described in the protologue. We selected as lectotype the specimen NY-00259326 which is the best preserved in Kuntze's original herbarium at NY.

Senecio lingulatus (Schltdl.) Cuatrecasas (1950: 44) ≡ *Lasiocephalus lingulatus* Schlechtendal (1818: 309) ≡ *Aetheolaena lingulata* (Schltdl.) Nordenstam (1978: 54). Type:—ECUADOR. *F.W.H.A. von Humboldt s.n.* (lectotype B-W16435!, designated as "holotype" by Cuatrecasas 1978: 310).

= *Culcitium adscendens* Bentham (1845: 205) ≡ *Senecio neoadscendens* Cuatrecasas (1950: 44). Type:—ECUADOR. Hacienda Antisana, *K.T. Hartweg 1134* (lectotype **[designated here]** K-00497735!; isolectotypes K-000497732!, F-0076803-fragment!, F-0BN018142 ex B!, E-00417026!).

Protologue information of *Culcitium adscendens* in Bentham (1845): '1134- Hacienda de Antisana, in sabulosis'.

The specimen selected as lectotype is one of the best preserved and agrees with the protologue information of the species.

Senecio magellanicus Hooker & Arnott (1841: 343), non *Senecio magellanicus* Philippi (1894: 24) ≡ *Culcitium magellanicum* (Hook. & Arn.) Hombron & Jacquinot (1847, pl. 11, f. X). Type:—CHILE. C. Negro, Sts. of Magellan, 31 Jan 1834. *C. Darwin 367* (lectotype K!, designated by Porter (1999: 193); isolectotype CGE).

= *Senecio vaginifolius* Schultz Bipontinus (1855: 117), ***syn. nov.*** Type:—[CHILE]. Prope Sandy Point ad terminum accessus maris, Feb, *W. Lechler 1244* (holotype P!; isotype K!).

= *Senecio tunicatus* Kuntze (1898: 179). Type:—[ARGENTINA]. Patagonia, *F.J.P. Moreno 77 / C. G.C. Burmeister 714* (lectotype **[designated here]** NY! specimen on the right hand).

= *Culcitium tenellum* Dusén (1914: 268), non *Senecio tenellus* Candolle (1838: 379) ≡ *Senecio culcitenellus* Cuatrecasas (1950: 43), ***syn. nov.*** Type:—ARGENTINA. [Santa Cruz] Patagonia australis, Lago Argentino, Jan 1905. *P. Dusén s.n.* (lectotype **[designated here]** CORD!; isolectotype G!).

The voyage of d'Urville (1841–1854) contains an atlas with botanical plates (Hombron & Jacquinot 1843–1853), and two volumes with descriptions. The second volume was written by Hombron, and after his death the work was eventually taken up by Decaisne, and published in 1853. The plate 11, figure X of the atlas (1847) shows *Culcitium magellanicum,* whereas a written description of *Culcitium magellanicum* Hombr. & Jacq. is found in the second volume (Hombron & Jacquinot 1853). Since the plate prepared by Hombron and Jacquinot is considered an "illustration with analysis" (ICBN Ch. 5, Sec. 2, Art. 38.7), the name *Culcitium magellanicum* was there validly published.

Protologue information of *Senecio tunicatus* in Kuntze (1898): 'Patagonia (77; 714 Moreno, [Burmeister)'.

Two specimens are mentioned in the protologue of *Senecio tunicatus* Kuntze: *Burmeister 77* and *Moreno 714*. We found at NY a sheet with two mounted plants (one of them has only leaves and the other has leaves and capitula) and two labels on the right-hand side. Since the collector and collection number can not be assigned with certainty to each mounted specimen, we selected as lectotype of *Senecio tunicatus* the plant located at the right hand of the sheet, because it is the most complete plant.

Protologue information of *Culcitium tenellum* in Dusén (1914): No locality indicated, nor collector neither collection date.

Unfortunately no material of *Culcitium tenellum* were located in Dusen's original herbarium (S). Nevertheless, one specimen was found at G, where original collections of Macloskie are located, with an attached label from Stuckert: "Teodoro Stuckert, Herbarium Argentinum 21436, *Culcitium tenellum* Dus., Lago Argentino, in montanis, c. 1000 m, I-1905, leg. P. Dusén". There is another specimen in Stuckert's original herbarium (CORD) with an attached label from Dusén: "*Culcitium tenellum* Dus., Patagonia australis, Lago Argentino, in montanis c. 1000, Jan. 1905". Both specimens perfectly match the protologue, and we have selected CORD 00004550 as the lectotype of the name because it contains a handwritten label from Dusén.

Senecio culcitenellus Cuatrec. and *Senecio vaginifolius* Sch. Bip. were considered by Cabrera (1971) and Cabrera *et al*. (1999) as a distinct species from *S. magellanicus*, based on their sessile capitula (vs. pedunculated in *S. magellanicus*) and spathulate tomentose leaves (vs. linear sericeus leaves in *S. magellanicus*), respectively. However, after the analysis of the material type and numerous specimens kept at BAB, LP and SI, we became certain that all these characters can be also found in *S. magellanicus*, and therefore *S. culcitenellus* and *S. vaginifolius*, from the morphological species concept, are reduced to the synonymy of *S. magellanicus*. The variability of the leaf shape of this species is illustrated on Fig. 3.

Selected Specimens Examined:—ARGENTINA. Santa Cruz: Lago Argentino. *P. James 235* (SI), *429* (SI); Cerro Buenos Aires. 5 Mar 1914, *C. Hicken 1097* (SI); Cerro Buenos Aires. 5 Mar 1914, *Inter Patagonicum 963* (SI) Güer Aike. Estancia La Carlota. 20 Jan 1978, *TBPA 2835* (SI) Estancia Las Viscachas. 26 Jn 1977, *TBPA 2523* (SI); Estancia Stag River. 14 Feb 1978, *TBPA 3214* (SI), 17 Feb 1978, *TBPA 3298* (SI); Estancia La Verdadera Argentina.

24 Nov 2012, *F. Zuloaga 14064* (SI); Tierra del Fuego: Rio Grande. *E. De Marco 599* (SI); Estancia Violeta. 15 Jan 2009, *E. Meza Torres et al. 954*[a] (SI); Ushuaia. 4 Jan 1904, *C. Hicken 59* (SI); ibid 19 Jan 2013, *Cellini 39* (SI). CHILE. Magallanes. Punta Arenas. *Riggi 61* (SI), 3 Jan 1912, *C. Hicken 165* (SI); ibid 14 Feb 1863, *J. Isern 8503* (SI). Morro Chico. 1 Mar 1917, G. Bonarelli s.n. (SI).

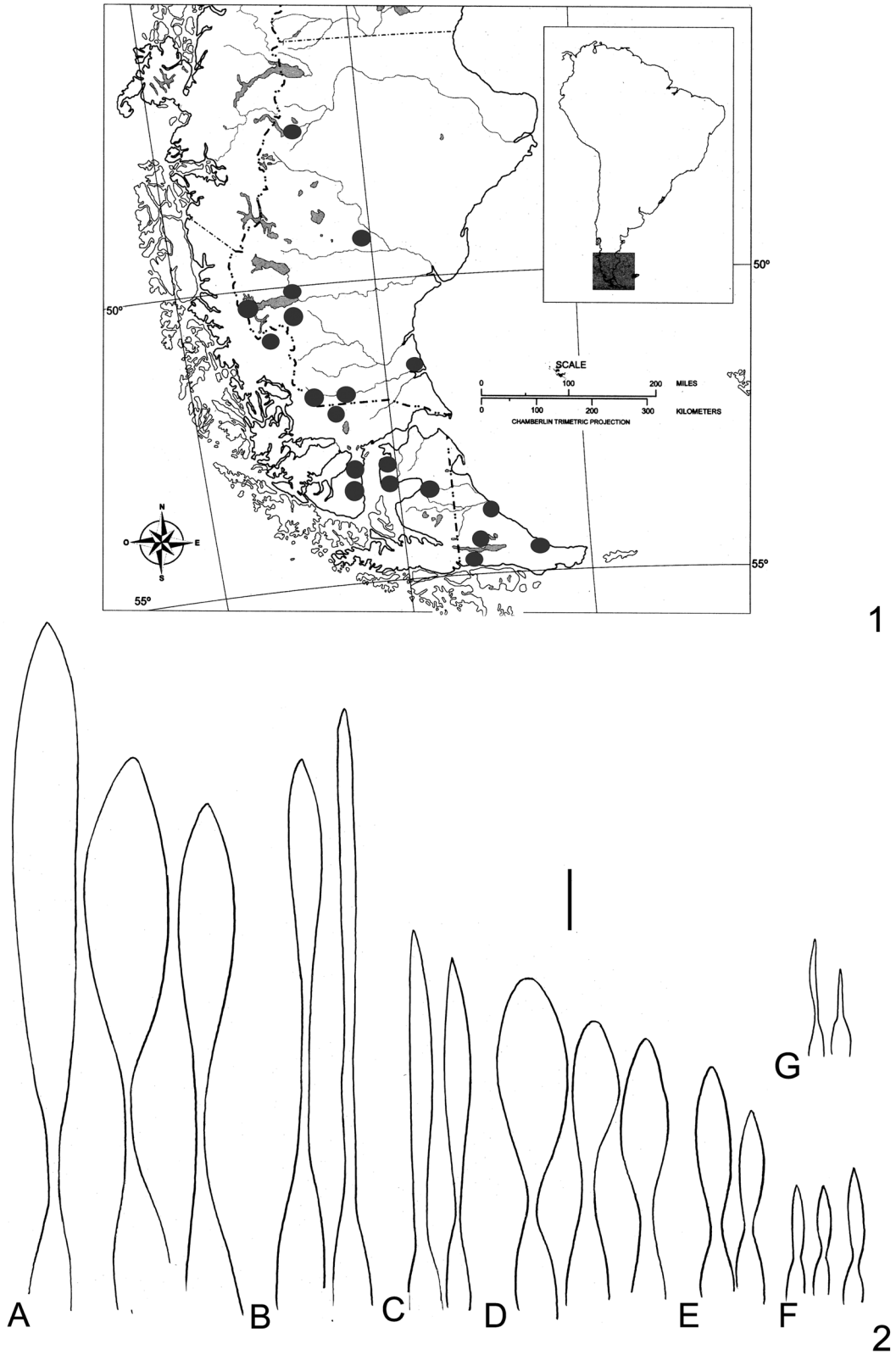

FIGURE 3. *Senecio magellanicus* Hook. & Arn. 1. Distribution map. 2. Foliar variability: **A.** TBPA 3214 (left one), 3298 (two at right) (SI), **B.** Darwin 367 (K, lectotype of *S. magellanicus*), **C.** Bonarelli s.n (SI), **D.** Lechler 1244 (P, holotype of *S. vaginifolius*), **E.** Inter pat. 963 (SI), **F.** Dusén s.n. (CORD, lectotype of *Culcitium tenellum*), **G.** TBPA 2835 (SI). Scale bar = 1 cm.

Senecio nivalis (Kunth) Cuatrecasas (1950: 44) ≡ *Culcitium nivale* Kunth (1818: 171). Type:—[ECUADOR] Monte Antisana, *A. Bonpland 2249* (lectotype [**designated here**] P- 00659944!; isolectotypes F-0076956F!, F-0BN018146 ex B!, GH-00012169!, P-00659945!, P-00320241!, HAL-0113453!).

Protologue information of *Culcitium nivale* in Kunth (1818): 'Crescit inter nives in monte ignivomo Antisanæ qua parte Chussulongum spectat, alt. 2340 hex. Floret Martio [Humboldt & Bonpland].'

There are three sheets in Kunth's original herbarium at P, one of which (P-00320241) with an attached label from Humboldt & Bonpland's herbarium and the number of collection ("2249") handwritten on another label. The other two sheets (P-00659945, P- 00659944) with a label which reads "Herb. Mus. Paris … Antisana …donné par M. A. Bonpland Nº 2249". Two of three sheets at P have the locality "Antisana" mentioned in the protologue. Even if the collector is not mentioned in the protologue, Kunth's species related to "Nova genera et species plantarum" were collected by Humbold & Bonpland and the material was deposited at P (Hind & Jeffrey 2001). We selected as lectotype the specimen P-00320244, because it is the best preserved and the label bears the locality "Antisana" and the collection number 2249.

Senecio pflanzii (Perkins) Cuatrecasas (1950: 49) ≡ *Culcitium pflanzii* Perkins (1913: 229). Type:—BOLIVIA. Dpto. La Paz, Palca, zona basal del Illimani, 4150 m, Feb 1979, *A. Ceballos, A. Charpin, J. Fernández Casas & E. Valdés-Bermejo 560* (neotype [**designated here**] SI!). Fig. 4

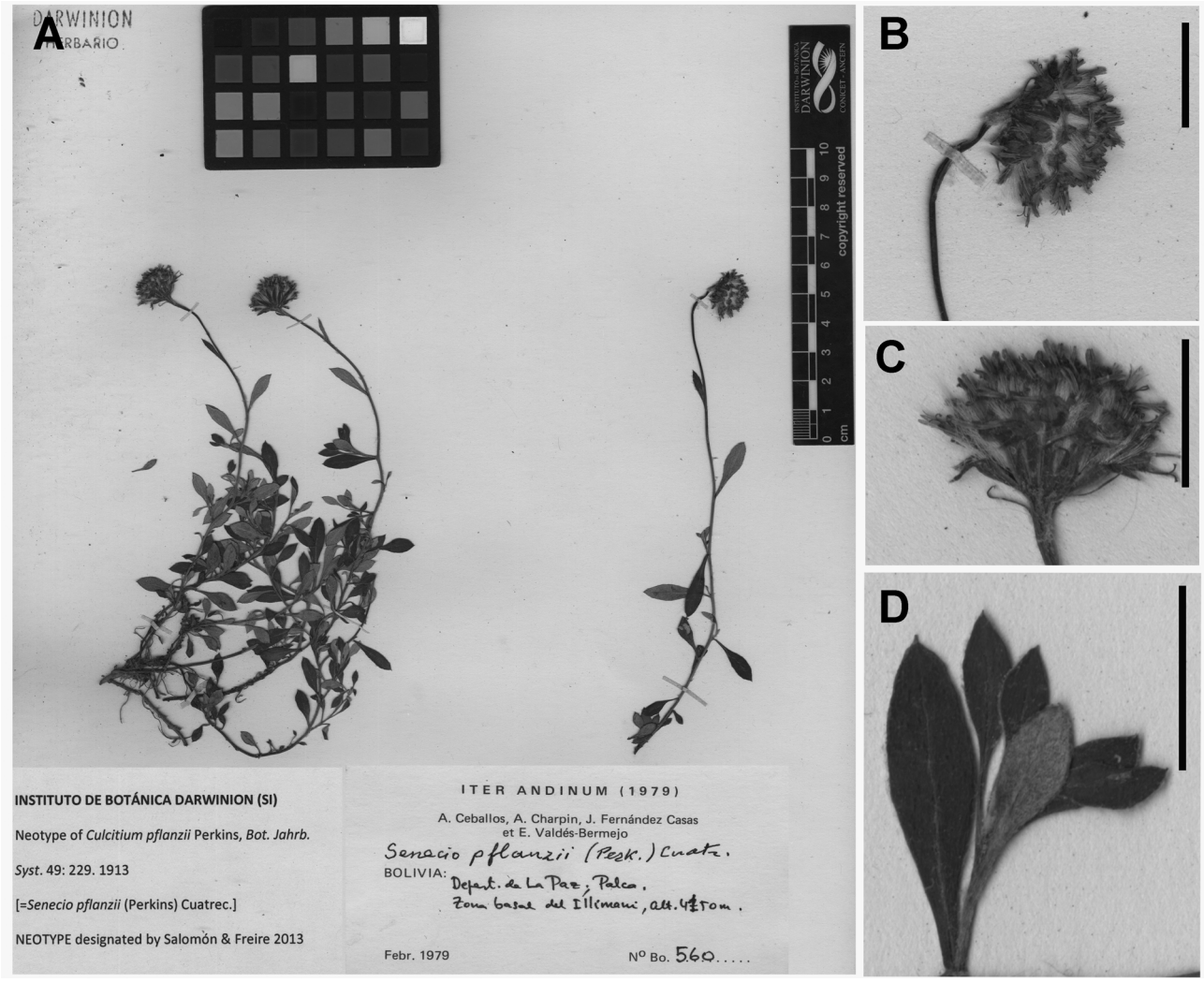

FIGURE 4. *Senecio pflanzii* (Perkins) Cuatrec. **A.** Neotype of *Culcitium pflanzii* Perkins, **B.** Capitula suberect, **C.** Involucre subbiseriate, **D.** Leaves, showing adaxial (glabrous) and abaxial (woolly) surfaces. Scale bars B–D = 1 cm.

Protologue information of *Culcitium pflanzii* in Perkins (1913): 'Bolivien: Palca bei La Paz, schiefriger Hang, 4000 m ü. M, (K. Pflanz n. 235[a].—Im April 1909 blühend); Takapaya, 3850 m ü. M. (K. Pflanz n. 451.—Im April 1910 blühend)'.

Since the type material of *Culcitium pflanzii* in B was destroyed (syntypes *Pflanz 235[a]* photo F! and *Pflanz 451*), and no other original material could be found at GH, F, G, JE or K, where Perkins's original herbarium is probably kept, we propose as neotype the collection *Ceballos et al. 560* from the type locality of Palca. The specimen matches the morphological features described in the protologue, especially those related to habit, leaf shape, suberect capitula, number of phyllaries and calycular bracts.

Senecio serratifolius (Meyen & Walp.) Cuatrecasas (1950: 45) ≡ *Culcitium serratifolium* Meyen & Walpers in Meyen (1843: 278). Type:—PERU. [Cuzco] Urubamba, Pumahuanca, 4100 m, 3 Mar 1957, *H. Zamalloa 1005* (neotype [**designated here**] LP!). Fig. 5

Protologue information of *Culcitium serratifolium* in Meyen (1843): 'Peruvia: in planitie circa Tacoram, alt. 14-17000 ped. (v.s.).'

Since the original material of *Culcitium serratifolius* in B was destroyed and no other original material could be found at BR, CAS, CGE, JE, K, L or W, where Meyen's original herbarium is kept, we propose as neotype the collection *Zamalloa 1005* from Peru. The specimen matches the morphological features described in the protologue, including those related to habit, leaf shape, leaf margin, nodding capitula and involucre.

Senecio superandinus Cuatrecasas (1951: 38) ≡ *Culcitium reflexum* Kunth (1818: 171), non *Senecio reflexus* Kunth (1818: 142–143). Type:—ECUADOR. [Monte Antisana]. *F.W.H.A. Humboldt & A.J.A. Bonpland 2280* (lectotype P-00320240!, designated as "holotype" by Cuatrecasas 1978: 311; isolectotypes P-00659938!, P-00659939!, F-0076811F!, NY-00167823!).

= *Lasiocephalus ovatus* Schlechtendal (1818: 309) ≡ *Culcitium ovatum* (Schltdl.) Blake (1937: 389). Type:—[ECUADOR]. América Meridionali in Monte Pichincha, [*Humboldt & Bonpland*] (lectotype B-Willd. 16434 -02 0!, designated as "holotype" by Cuatrecasas 1978: 311).

Protologue information of *Culcitium reflexum* in Kunth (1818): 'Crescit in summo monte nivoso Antisanæ, alt. 2300 hex. (Andibus Quitensium)'.

There are three sheets in P, one of which, lectotype P-00320240, has an attached label from Humboldt & Bonpland's herbarium and the number of collection ("2280") handwritten on another label. Also in this herbarium, there are two isolectotypes P-00659938 and P-00659939, with an attached label '*Bonpland 2280, Antisana*'. There is the fourth sheet P-0659940, with just one plant mounted with double collection numbers '*Bonpland 2280, Antisana*' and '*Bonpland 3046*, Pichincha' which is excluded from type material because of its ambiguous information.

Nomen dubium

Senecio culciklattii Cuatrecasas (1950: 49) ≡ *Culcitium peruvianum* Klatt (1894: 363), non *Senecio peruvianus* Persoon (1807: 32). Type:—'Hab.: Peru, legit?'

Protologue of *Culcitium peruvianum* in Klatt (1894): "Herbaceum, caule glabro ad apicem usque dense folioso tricephalo, foliis lineari-lanceolatis acutis supra canaliculatis glabris margine revolutis subtus cano-tomentosis sessilibus, capitulis nutantibus, involucri squamis biserialibus glabris linearibus apice ciliatis, achaenii glabris, pappi setis albis. Hab.: Peru, legit? Herba 20 cm alta; folia 4 cm longa, 3 mm lata; capitula 2 cm lata, 1 ½ mm. latae, margine membranaceae".

Cuatrecasas (1950) transferred *Culcitium peruvianum* Klatt to *Senecio* as *S. culciklattii* to avoid homonymy with *Senecio peruvianus* Pers. =*Monticalia peruviana* (Pers.) Jeffrey (1992: 72) = *Pentacalia peruviana* (Pers.)

Cuatrecasas (1981: 257). *Senecio culciklattii* was later cited by Vision & Dillon (1996) in their synopsis of the Peruvian species of *Senecio.* However, the morphology is deficient in the protologue, and no new information has been added or similar species has been collected from Peru after Klatt described his species. In addition, no collector is mentioned in the protologue, no original material of *Culcitium peruvianum* was found at B, CGE, GH, JE, K or W where Klatt's original herbarium is kept, and this species was not included by Beltran *et al.* (2006) into the list of the endemic Asteraceae of Peru. In consequence, *Culcitium peruvianum* Klatt is considered as a *nomen dubium* here.

FIGURE 5. *Senecio serratifolius* (Meyen & Walp.) Cuatrec. **A.** Neotype of *Culcitium serratifolium* Meyen & Walp., **B.** Capitula nodding with involucre subbiseriate, **C.** Leaf serrate-dentate. Scale bars B, C = 1 cm.

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