

Alien taxa of the tribe *Senecioneae* (Asteraceae) in Italy: a nomenclatural synopsis

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Key words: diagnostic characters, naturalization, non-native flora, *Roldana*, typification.

Ključne besede: diagnostični znaki, naturalizacija, tujerodna flora, *Roldana*, tipifikacija.

Abstract

A nomenclatural synopsis of the alien species belonging to the tribe *Senecioneae* currently recorded in Italy (8 species) is presented. The occurrence at the regional level, as well as the level of naturalization and ecological notes for each taxon are provided. A diagnostic key of the non-native Italian species is also given. The names *Cineraria petasitis* (now *Senecio petasitis*), *Delairea odorata*, *Eupatorium auriculatum* (now *Senecio deltoideus*), *E. fulvum*, *Mikania ternifolia* var. *senecioides*, *Senecio andryaloides*, *S. angulatus*, and *S. leucanthemifolius* subsp. *vernalis* are typified on specimens preserved at E, F, P, SBT, and UPS, and on images by Lamarck, Lemaire, Sims, and Waldstein & Kitaibel. The type of the name *S. pterophorus*, as indicated by Iamónico in 2015, was wrongly reported as holotype and need to be corrected to lectotype according to the Art. 9.9 of ICN. The names *Cacalia auriculata*, *Cacalia fimbriifera* (nom. nov., nom. superfl. et illeg. pro *Eupatorium auriculatum*), *Cacalia scandens* by Thunberg, *Cineraria crassiflora*, *Eupatorium scandens* by Link (nom. illeg.), *Mikania senecioides* (nom. illeg.), *Senecio auriculatum*, and *Senecio mikanioides* are also investigated and discussed.

Izvleček

V članku smo predstavili nomenlaturni pregled tujerodnih vrst plemena *Senecioneae*, ki so trenutno zabeležene v Italiji (8 vrst). Predstavili smo pojavljanje taksonov na regionalnem nivoju, njihovo naturalizacijo in ekološka opažanja. Podali smo tudi določevalni ključ tujerodnih vrst v Italiji. Tipizirali smo imena *Cineraria petasitis* (zdaj *Senecio petasitis*), *Delairea odorata*, *Eupatorium auriculatum* (zdaj *Senecio deltoideus*), *E. fulvum*, *Mikania ternifolia* var. *senecioides*, *Senecio andryaloides*, *S. angulatus*, and *S. leucanthemifolius* subsp. *vernalis* na primerkih shranjenih v E, F, P, SBT in UPS, in na podlagi slik Lamarck, Lemaire, Sims in Waldstein & Kitaibel. Tip imena *S. pterophorus*, naveden v delu Iamónico (2015) je bil napačno določen kot holotip in je popravljen v lektotip v skladu s členom 9.9. ICN. Preučili in razpravljali smo o imenih *Cacalia auriculata*, *Cacalia fimbriifera* (nom. nov., nom. superfl. et illeg. pro *Eupatorium auriculatum*), *Cacalia scandens* Thurnberga, *Cineraria crassiflora*, *Eupatorium scandens* Linka (nom. illeg.), *Mikania senecioides* (nom. illeg.), *Senecio auriculatum* in *Senecio mikanioides*.

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Introduction

Senecio L. (Asteraceae Bercht. & J. Presl, Asteroideae Lindl.) is a genus of about 1250 species with a cosmopolitan distribution (APG III 2009, APG IV 2016). Several molecular and phylogenetic investigations (e.g., Milton 2009, Pelser et al. 2002, 2004, 2006, 2007, 2010) clearly demonstrated that, as traditionally circumscribed, this genus is non-monophyletic. In order to achieve monophyly, some groups were split off (e.g., *Jacobaea* Mill., *Roldana* La Llave & Lexarza, *Delairea* Lemaire; see e.g., Pelser et al. 2007, Barkley 2010, APNI 2012), others were merged with *Senecio* (e.g., *Aethelolaena* Cass., *Culcitium* Humb. & Bonpl., *Lasiocephalus* Willd. ex Schlecht.; see e.g., Pelser et al. 2010, Marhold & Sklenář 2013, Salomón & Freire 2014), while the taxonomic placement of some genera [e.g. *Abrotanella* (Gaud.) Cass., *Doronicum* L.] remains currently still uncertain (see e.g. Pelser et al. 2007, Nordenstam et al. 2009, Peruzzi et al. 2012).

Among the species of *Senecioneae* recorded in Italy 8 are considered as alien: *Delairea odorata* Lem., *Roldana petasitis* (Sims) Rob. & Brett., *Senecio angulatus* L. f., *Senecio crassiflorus* (Poir.) DC, *Senecio deltoideus* Less., *Senecio pterophorus* DC. (= *S. grisebachii* Backer; see Iamónico 2015b), *S. inaequidens* DC., and *S. leucanthemifolius* Poir. subsp. *vernalis* (Waldst. & Kit.) Greuter (Conti et al. 2005, Celesti-Grapow et al. 2010).

As part of the research work carried out in cooperation for the treatment of *Asteraceae* for the new edition of the Italian Flora, ed. S. Pignatti (e.g., Del Guacchio & Iamónico 2015, Iamónico 2015a, 2015b, Iamónico & Alessandrini 2008, Iamónico & Managlia 2014, Iamónico & Hjertson 2015, Iamónico & Peruzzi 2016, Iamónico et al. 2016), a contribution concerning the alien species of *Senecioneae* in the Italian flora is presented here.

Materials and methods

This paper is based on examination of specimens kept in the Herbaria E, F, G, GOET, JE, K, LD, LIV, P, RO, SBT, UPS, W, and WU (acronyms according to Thiers 2017+), and field surveys. Analysis of the relevant literature (protologues included) is also carried out.

Comments on typifications are added after each studied name. Accepted names (according to Greuter 2006–2009, 2008) are given in bold, while the synonyms are in italic and not in bold. The names are listed in alphabetical order based on the current accepted name. The nomenclatural articles cited throughout the text follow the *Melbourne Code* (McNeill et al. 2012).

The alien status is provided according to Pyšek et al. (2004), and Richardson & Pyšek (2006), including data about native range, and invasion status. The degree of naturalization is indicated both at national and regional level, it is based on both literature (mainly Conti et al. 2005, 2007, Celesti-Grapow et al. 2009, 2010) and personal observations in field, and it was assigned for each region on the basis of the highest stage in the invasion process documented in any region (see Pyšek et al. 2012).

The regional occurrences (subparagraphs “Occurrence in Italy” in “taxonomic treatment”) follow Celesti-Grapow et al. (2010) which is however not cited through the text. Further recent works (contemporary or later published than Celesti-Grapow et al. 2010) were also consulted and cited when necessary (Anzalone et al. 2010, Banfi & Galasso 2010, Arrigoni & Viegi 2011, Podda et al. 2012, Camarda et al. 2016, Celesti-Grapow et al. 2016).

Taxonomic treatment

1. *Delairea odorata* Lem., Ann. Sci. Nat., Bot., sér. 3: 380–381. 1844a. – Lectotype (designated here): [Icon] *Delairea odorata* in Lemaire (1844c). Image of the lectotype available at <http://www.biodiversitylibrary.org/item/53983#page/326/mode/1up>

= *Senecio mikanoides* Otto ex Walpers, Allg. Gartenzeitung 13(6): 42. 1845. – Neotype (designated here): South Africa, Eastern Cape, Amathole, woods near Komga [as “Komgha”], 2000, May 1891, *Flanagan* 706 (P-00138785!). Image of the neotype available at <http://sonneratphoto.mnhn.fr/2011/11/17/3/P00138785.jpg>

Photos: Acta Plantarum (2007a onwards).

Habitat: Human-made habitats, meadows along coasts, shrubs.

Native distribution: South Africa (Brunel et al. 2010: 235).

Alien status in Italy: Invasive. *Delairea odorata* was reported as invasive in Sardinia, where however it occurs in ruderal habitats only, not causing ecological impacts (Bacchetta et al. 2009, Camarda et al. 2016). In the peninsular Italy, this species is mostly considered as a casual taxon.

Occurrence in Italy (Table 1): Invasive in Sardinia (Bacchetta et al. 2009, Camarda et al. 2016); naturalized in Tuscany (Frangini & Carta 2010); casual in other regions of peninsular Italy [Liguria, Lazio, Abruzzo, Campania (Stinca et al. 2012) and Calabria].

Typification of *Delairea odorata*: Lemaire (1844a²:

² Alternative references for *Delairea*, and *D. odorata* are the Tome no. 4 of *Herbier General de l'Amateur* (Lemaire 1844b: no. 59), and the Tome no. 5 of *L'Horticulteur universel* (Lemaire 1844c: 288).

380–381)³ published the new genus *Delairea*, dedicating it to M. Delaire (“....*amantissimo* Dom. Delaire... *genus hoc dicavi*.”). The genus was described upon one species only (*D. odorata*), which is therefore to be considered the generic type (holotype, see Art. 10.1 Note1). A detailed diagnosis, and the presumed provenance (“*Patria ignota! (Mexico probabiliter)*”) were given. The species is actually from South African origin (Barkley 2006), not Mexico; maybe Lemaire (1844a) could have seen a plant originated from seeds which were collected in Mexico (the author reports “*In hortis quibusdam sub nomine improprio Breonia (non A. Rich.) palmata occurrit*”). Lemaire (1844a, 1844c) published a good coloured illustration of the species, which can be considered original material for the name. Since no specimens useful for the lectotypification purposes were found [since the Lemaire’s herbarium is not known to be deposited in a specific herbarium (see Stafleu & Cowan 1979) I try to check the main European herbaria, such as B, BM, G, K, MPU, P, ect.], the illustration in Lemaire (1844a, 1844c) appears to be the only extant original material, and it is here designated as the lectotype of the name *Delairea odorata*.

Typification of *Senecio mikanioides*: *Senecio mikanioides* was first described by Walpers (1845: 42) who provided a long and detailed diagnosis, and cited two synonyms, “*Mikania senecioides* Hortor. [= *Hortorum*]” [this name should be referred to *Mikania fulva* (Hook. & Arn.) Baker; see a detailed discussion below], and “*Ipomoea hederacea* Hortor. [= *Hortorum*]”⁴. Walpers indicated “Otto” after the binomial, and it is possible that Walper referred to a specimen collected by C. F. Otto. According to Stafleu & Covas (1981: 858), the Otto’s collection is preserved at B (mainly destroyed with the general herbarium in 1943), while duplicates are kept in GOET and LIV. No Otto’s specimens were traced. Moreover, neither specimens collected by Walper were found. As a consequence, a lectotype cannot be designated (Arts. 9.2 and 9.3). A neotypifica-

tion is therefore required (Art. 9.7). The neotype was chosen on the basis of 1) provenance (South Africa, the native range of *S. mikanioides*), and 2) preservation state of the specimen. We selected a sheet preserved at P (barcode 00138785) bearing two fragments of apparently a single plant collected by H. G. F. Flanagan in May 1891 at Komgha (South Africa).

The name *Senecio mikanioides* was synonymized with *Delairea odorata* by many authors (e.g., Alvarez 1997, Barkley 2006, Greuter 2006–2009, Celesti-Grapow et al. 2010, The Plant List 2013, APNI 2012, Prabu et al. 2012). I confirm here the synonymization of these two names.

Typification of *Mikania senecioides* Backer: *Mikania senecioides* appears in *Flora Brasiliensis* (Backer 1873–1876: 223) as a synonym of the new variety, *M. ternifolia* DC. var. *senecioides*. The protologue of *M. ternifolia* var. *senecioides* consists of a short diagnosis, provenance, and collector’s data (“*Ad Montevideo: Sello n. 274*”). Ritter & Miotto (2003: 15) reported that the type was not found, and a neotype have to be consequently designated (Art. 9.7). There are two specimens at P (code 02683013, image available at <http://sonner-atphoto.mnhn.fr/2011/08/01/1/P02683013.jpg>) and F (code 0BN016501), that are part of the Schultz-Bipontinus’ collection and were collected by Sellow (collection number 3576) in Brasil. Since Backer (1873–1876: 223) listed *M. senecioides* Sch.-Bip. as synonym of his new var. *senecioides*, I think that one of these two *exsiccata* (both matching the Backer’ diagnosis) can be selected for the neotypification purpose. The specimen at F appears to be better preserved and more complete (a part of one plant with several leaves and capitula) than those at P (only one leaf and few capitula), so we here designate the sheet F-0BN016501 as the neotype of the name *Mikania ternifolia* var. *senecioides*.

The comparison between the protologues, types of *S. mikanioides*, *Delairea odorata* and *M. ternifolia* var. *senecioides* (respectively at P, and F) and other specimens, clearly shows that these two names cannot be considered synonyms. Actually, the var. *senecioides* is currently accepted as *Mikania fulva* (Hook. & Arn.) Baker (see e.g., Ritter & Miotto 2003, Zuloaga et al. 2008, Tropicos 2009). The basionym of the latter name (*Eupatorium fulvum*) is here lectotypified on a specimen preserved at E collected by J. Tweede in the locality Rio Grande as indicated in the protologue (Hooker & Arnott 1835: 241).

Mikania fulva (Hook. & Arn.) Baker (1873–1876: 222)
≡ *Eupatorium fulvum* Hooker & Arnott (1835: 241).

Type (lectotype here designated): – BRAZIL.

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³ In the same year, Lemaire (1884b: 287–288, 1884c: 59) published the name *Delairea*. The month of publication of the volume 5 of *L’Horticulteur universel* is march (day 6) (Stafleu & Cowan 1979: 835). Unfortunately, the month of publication of the volume 4 of *Herbier General de l’Amateur* is not available (Stafleu & Cowan 1981: 150). However, in both these works, Lemaire (1844b, 1844c) cited his paper in *Annales des Sciences Naturelles*. As a consequence, I here considered this latter publication (Lemaire 1844a: 380) as the first one in which “*Delairea genus novum*” was proposed.

⁴ *Ipomoea hederacea* was published by Jacquin (1787: 124–125) as a new species, not new combination of *Convolvulus hederaceus* Linnaeus (1753: 154, see Austin 1986, and Austin et al. 2014: 169); the lectotype was designated by Austin et al. (2014) on a specimen preserved at W (image available at <http://herbarium.univie.ac.at/database/detail.php?ID=290378>).

Rio Grande do Sul, Rio Grande, Tweede s.n. (E-00322899!). Image of the lectotype available at <http://elmer.rbge.org.uk/bgbase/vherb/bgbasevherb.php?cfg=bgbase/vherb/zoom.cfg&filename=E00322899.zip&queryRow=7> = *Mikania ternifolia* var. *senecioides* Baker (1873–1876: 223).

Type (neotype here designated):—BRAZIL. *S.d.*, Sello 3576 (F-0BN016501!). Image of the neotype available at <http://emuweb.fieldmuseum.org/web/pages/common/imagedisplay.php?irn=32000&refra=efmnh&refirn=224075>

2. *Roldana petasitis* (Sims) H. Rob. & Brettell, *Phytologia* 27(6): 423. 1974 = *Cineraria petasitis* Sims, *Bot. Mag.* 37: t. 1536. 1813 = *Senecio petasitis* (Sims) DC., *Prodr.* 6: 431. 1837: 431. – Lectotype (designated here): [Icon] Table 1536 in Sims (1813). Image of the lectotype available at <http://www.biodiversitylibrary.org/page/486917#page/90/mode/1up>

Photos: Acta Plantarum (2007b onwards).

Habitat: Cliffs, river banks, human-made habitats.

Native distribution: Central America (Jeffrey 1986: 933).

Alien status in Italy: Naturalized. The Ligurian population at Polanesi locality seems to expand itself and the species was considered as naturalized (Longo 2012: 219). On the contrary, *Roldana petasitis* is a casual alien in the other Italian regions.

Occurrence in Italy (Table 1): Naturalized in Liguria (Longo 2012); casual in Lazio (Anzalone et al. 2010), Apulia, Basilicata, and Sardinia (Bacchetta et al. 2009).

Typification of *Cineraria petasitis*: Sims (1813) provided a short diagnosis for *Cineraria petasitis* (“*CINERARIA petasitis; (radiata) floribus paniculati sexradiatis, foliis petiolatis suborbiculatis undulato-lobatis pubescentibus verrucosis*”), also publishing an illustration (“N° 1536”), that can be considered as original material for the name; the provenance (“*Mexico*”) was also given. No specimens of original material were traced at K (where the Sims’ collection is deposited; see Stafleu & Cowan 1985), so Sims’ illustration represents the only extant material which is eligible as the lectotype. The coloured illustration shows a terminal part of one plant, including upper leaves and the inflorescence (capitula arranged in corymbs, each capitulum with green and slightly pubescent involucral bracts, 5–6 yellow ligulate flowers, an undefined number of yellow tubulate flowers) plus one basal leaf. The illustration corresponds to the current concept of the species (see e.g., Charter & Walters 1976 sub *Senecio petasitis*, PlantNET 2015), and it is here designated as the lectotype of the name *Cineraria petasitis*.

3. *Senecio angulatus* Linnaeus filius (1781: 369). Lectotype (designated here): South Africa, *Caput bonae Spei*, Thunberg s.n. (UPS-19537!) (Figure 1).

Photos: Acta Plantarum (2007c onwards).

Habitat: Roadsides, walls, Mediterranean maquis, uncultivated lands.

Native distribution: South Africa (Foden & Potter 2005a).

Alien status in Italy: Invasive. *Senecio angulatus* is able to form self-replacing populations unsupported by humans, and sometimes it widely spreads, so becoming invasive. As a whole, in Italy this species can cause ecological impact by the loss of biodiversity. Personal observations in Apulia region (Taranto Province – Iamónico & Maglio 2008: 258) showed that *S. angu-*



Figure 1: Lectotype of the name *Senecio angulatus* (UPS-19537!). A magnification of the Thunberg’s script is squared and placed on the top of the specimen.

Slika 1: Lektotip imena *Senecio angulatus* (UPS-19537!). Povečava Thurnbergovega napisa je uokvirjena nad primerkom.

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latus easily grows in the Mediterranean maquis where it is strictly associated and could potentially competes with native species.

Occurrence in Italy (Table 1): Invasive in Liguria, and Sardinia (Bacchetta *et al.* 2009); naturalized in Tuscany, Campania, Basilicata (Iamonico 2008: 25), and Sicily; casual in Lazio, Apulia (Iamonico & Maglio 2008: 258), and Calabria.

Typification of *Senecio angulatus*: Linnaeus filius (1781: 369) described *S. angulatus* in the 13th edition of *Supplementum Plantarum*, providing a short diagnosis (“*angulatus. SENECIO corollis radiantibus, foliis petiolatis ovatis dentato-angulatis glabris*”), the provenance (“*Habitat in Cap. Bonae spei*”), the collector (“*Thunberg*”) and morphological details of the leaf blade (“*Folia subcarnosa, glauca*”). Two specimens were found at UPS (nos. 19537, and 19538), each bearing parts of the same plant (M. Hjertson pers. comm.) which morphological characteristics (leaves glabrous, with blades ovate with margins dentate, and capitula with ray florets) match the protologue and correspond to the current concept of the species (see e.g., Charter & Walters 1976, Pignatti 1982). Both specimens include (on verso) the Thunberg’s script “*Cap. B. Spei. Thunberg.*”. We designate UPS-19537 as the lectotype of the name *Senecio angulatus*, since it bears more capitula (each one 4–5-flowered) whose features have a high taxonomic value in *Senecio*. Since I am not sure that the specimen UPS-19538 is part of the same gathering, it is not regarded as a isolectotype.

4. *Senecio crassiflorus* (Poir.) DC., Prodr. 6: 412. 1837 ≡ *Cineraria crassiflora* Poir., Encycl. Suppl. 2: 267. 1811 – Lectotype (designated here): [Icon] Pl. 675 f. 4 in Lamarck 1796. Image of the lectotype available at <http://www.biodiversitylibrary.org/item/104446#page/359/mode/1up> = *Senecio andryaloides* DC., Prodr. 6: 420. 1837 ≡ *Senecio crassiflorus* var. *andryaloides* (DC.) Arechav., Ann. Mus. Nat. Montevideo 6(3): 386. 1908 – Lectotype (designated here): Brazil, Rio Grande, 1833, *Gaudichaud 922* (P-03782380!). Image of the lectotype available at <http://sonneratphoto.mnhn.fr/2011/09/07/10/P03782380.jpg>

Photos: BGFlora.net (2009).

Habitat: Human-made environments.

Native distribution: South America (Thompson 2006: 82).

Alien status in Italy: Not confirmed casual (see just below “Occurrence in Italy”).

Occurrence in Italy (Table 1): Doubtfully occurring in Italy (Liguria region). Celesti-Grapow *et al.* (2010: 203) reported *S. crassifolius* (sub *S. andryaloides*) as not

recorded in Italy (Liguria) since 1950. Fiori (1927: 602) stated: “*S. andryaloides...avvent. nella Lig. fra Quarto e Quinto*” (= *S. andryaloides...adventive in Liguria between Quarto and Quinto*) and he referred to Penzig (1889: 276). Since neither herbarium specimens (see Stafleu & Cowan 1983: 156 for the list of herbaria in which the Penzig’s collection is deposited) nor populations in field were found, I prefer to consider the occurrence of this species in Italy as doubtful. Greuter (2006–2009) recorded *S. crassifolius* (sub *S. andryaloides*) only in Italy, so the current presence in Europe of this species should be also considered uncertain.

Typification of *Senecio andryaloides*: *Senecio andryaloides* was recognized by Candolle (1838: 420) as a member of ser. *Brasilienses* DC., which was described in *Prodromus* to include taxa occurring in southern Brazil. In particular, *S. andryaloides* was included into the informal group “*Foliis indivisis, caule frutescente*” (the other two groups are “*Foliis indivisis, caule herbaceo*”, and “*Foliis tri-se u pinnatilobatis*”). A description, the provenance (“*in Brasiliae prov. Rio Grande*”), and a specimen (“*h. Mus. imp. Bras. N. 922!*”) were provided. We found one specimen at P (code 03782380, a syntype) bearing one plant whose characteristics match the Candolle’s diagnosis, and the label “*Senecio crassiflorus DC. / Cineraria crassiflora Poir. / Brésil. Province de RIO-GRANDE. / (Herbier Impérial du BRÉSIL N.° 922) / C. GAUDICHAUD 1833*”. Although Candolle (l.c.) reported the collection number “922”, I cannot be sure that P-03782380 is the only element used by Candolle for describing the species, so it is appropriate to designate it as the lectotype of the name *Senecio andryaloides* (see also the wide discussion by McNeill 2014).

The name *Senecio andryaloides* was rarely cited in literature (e.g., Backer 1884: 307 as a synonym of “*Senecio crassiflorus DC. Prodr. VI. 412*”, Greuter 2006–2009, Celesti-Grapow *et al.* 2009, The Plant List 2013 as “unresolved”).

Typification of *Cineraria crassifolia*: *Cineraria crassifolia* was described by a diagnosis (Poirét 1811: 267) and an illustration from Lamarck (1796: tab. 675. fig. 4). This latter image is part of the original material for the name, and matches the Poirét’s diagnosis. Since no specimens which are useful for the lectotypification purpose were found, the Lamarck’s image became the only extant original material and it is here designated as the lectotype of the name *C. crassifolia*. On the basis of the comparison between the diagnoses, the types of *Cineraria crassiflora*, and *Senecio andryaloides*, and personal examination of other specimens, we agree with the proposal of Backer (1884: 307) who first synonymized the two names.

5. *Senecio deltoideus* Less., Syn. Gen. Compos.: 392. 1832 = *Eupatorium auriculatum* Lam.⁵, Encycl. 2(2): 411. 1786 = *Mikania auriculata* (Lam.) Willd., Sp. Pl. Ed. 4, 3(3): 1745. 1803 = *Cacalia fimbriifera* Cassini (1827: 460), nom. nov. pro *Eupatorium auriculatum*, nom. illeg. et superfl. (Art. 52.1) = *Willoughbya auriculata* (Lam.) Kuntze, Revis. Gen. Pl. 1: 372. 1891 = *Senecio fimbriifolius* (Cass.) B.L. Rob., Proc. Amer. Acad. Arts 47: 215. 1911 – Lectotype (designated here): South Africa, *Caput bonae Spei*, Sonnerat s.n. (SBT-13652!). Image of the lectotype available at <http://info.bergianska.se/bilder/bergius/43/SBT13652.jpg>

= *Cacalia scandens* Thunb., Prodr. Pl. Cap.: 142. 1800, non *Senecio scandens* Buchanan-Hamilton ex D. Don, Prodr. Fl. Nepal.: 178. 1825 – Lectotype (designated here): South Africa, *Caput bonae Spei*, Thunberg s.n. (UPS-18767!, Figure 2; isoelectotypes UPS-18768!, LD-1253428!, image of the isoelectotypes available at <http://plants.jstor.org/canescensspecimen/ld1253428>)

Photos: Acta Plantarum (2007d onwards).

Habitat: Roadsides, railways (Table 2).

Native distribution: Tropical Africa (Beentje & Ghazanfar 2005).

Alien status in Italy: Naturalized.

Occurrence in Italy (Table 1): Naturalized in Liguria (Zappa & Campodonico 2005, Peccenini et al. 2010).

Typification of *Eupatorium auriculatum*: Lamarck (1786: 411) provided a short diagnosis ("*Eupatorium caule scandente multangulo, foliis alterni triangularis-hastatis dentatis, petiolis auriculatis*. N. [Nobis]"), a long description (in French), and the provenance ("*Cap de Bonne-Espérance*"). Indicating the original material, he stated "...nous été communiquée par M. Sonnerat (v. s.)" (= "...it was communicated by M. Sonnerat (v. s.)").

Jeffrey (1986: 386) stated "*Senecio deltoideus* Less. ... Type: South Africa, Cape of Good Hope, Sonnerat (holotype P)". However, Lamarck (1786: 411) did not indicate any holotype and a typification is required. Moreover, any specimen of *Eupatorium auriculatum* (or *Senecio deltoideus*, see below) collected by M. Sonnerat was traced at P. As a consequence, on the basis of the Art. 9.11, a lecto- or neotypification is necessary. There is one specimen at SBT (no. 13652) represented by a flowering stem matching the Lamarck's diagnosis and description, and corresponding to the current concept of *S. deltoideus* (see e.g., Beentje & Ghazanfar 2005, Foden & Potter 2005b, Peccenini 2009). We here des-

ignated this specimen as the lectotype of the name *Eupatorium auriculatum*. Since Lessing (1832: 392) proposed *Senecio deltoideus* as replaced name of *Eupatorium auriculatum*, the type of these two names is the same.

Typification of *Cacalia scandens*: the protologue by Thunberg (1800: 142) consisted of a short diagnosis ("*scandens*. C. [*Cacalia*] caule scandente, foliis triangularibus sinuato-dentatis") without cited synonyms and illustrations. Three specimens, which are part of the original material, were found. The first one is preserved at LD (barcode 1253428, image available at <http://plants.jstor.org/specimen/ld1253428>), and bears a plant collected by C. P. Thunberg at "*Caput bonae Spei*". The other two specimens are part of the Thunberg's collection at UPS [nos. 18767 (three parts of the same plant (M. Hjertson pers. comm., the Art. 9.17 can be applied), and 18768)], and they include, respectively, the Thunberg's scripts



Figure 2: Lectotype of the name *Cacalia scandens* (UPS-18767!). A magnification of the Thunberg's script is squared and placed on the top of the specimen.

Slika 2: Lektotip imena *Cacalia scandens* (UPS-18767!). Povečava Thunbergovega napisa je uokvirjena nad primerkom.

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⁵ The name *Eupatorium auriculatum* by Lamarck (1786: 411) cannot be used under *Senecio*, since Burmann (1768: 181) earlier published *S. auriculatus* Burm. f., which is actually referable to *Emilia sonchifolia* (L.) DC. (see Davidse et al. 2017).

“*Capute bonae spei. C. P. Thunberg*”, and “*Cap. b. spei. Thunberg*”. All the *exsiccata* show features that match the Thunberg’s diagnosis and include the script “Missus e Cap. b. spei a Clariss. DD. Thunberg, anno 1773”. We here designated the No. 18767 as the lectotype of the name *Cacalia scandens*. The others *exsiccata* (No. 18768 at UPS and LD-1253428) are isoelectotypes.

6. *Senecio inaequidens* DC., Prodr. 6: 401. 1837 – Lectotype [designated by Jeanmonod et al. 2004: 47]: South Africa, 1835, *Drège 5879* (G-00130597!, plant of the right). Image of the lectotype available at <http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=147731&base=img&lang=fr>

Photos: Acta Plantarum (2007e onwards).

Habitat: Uncultivated lands, meadows, roadsides, railways, fields, river banks, forest edges.

Native distribution: South Africa (Sans et al. 2004).

Alien status in Italy: Invasive. *Senecio inaequidens* is the most aggressive *Senecio* alien species in Italy, having a high capability to spread in both human-made and natural environments, from sea level to 2000 m a.s.l. [as it happens in the National Park of Gran Sasso and Monti della Laga, Central Italy (see Giunti et al. 2015)]. This species causes ecological, economical and social impacts: loss of biodiversity (especially in meadows and pastures, see Giunti et al. 2015), reduction in productivity and quality of cultivated lands (especially vineyards, see Banfi & Galasso 2010: 248), and threats to the health of humans and domesticated animals (cows, horses, and sheeps) on account of its a high concentration of toxic pyrrolizidine alkaloids, which are passed also through milk and honey (see e.g., Dimande et al. 2007). Giunti et al. (2015) highlighted that *S. inaequidens* grows in vegetation communities characterizing three sites listed in the Habitat Directive 92/43/EEC, that are: 6110-Rupicolous calcareous or basophilic grasslands of the *Alyso-Sedion albi*, 6210-Semi-natural dry grasslands, and scrubland facies on calcareous substrates (*Festuco-Brometea*), and 6220-Pseudo-steppe with grasses and annuals (*Thero-Brachypodietea*).

Occurrence in Italy (Table 1): Invasive in northern, central Italy (except for Tuscany where *Senecio inaequidens* is naturalized), and Sardinia (Bacchetta et al. 2009); naturalized in Basilicata; casual in Calabria, and Sicily.

Typification of *Senecio inaequidens*: Jeanmonod (2004: 47) proposed, as a lectotype for this name, a specimen (plant of the right) preserved at G in Candolle’s collections (barcode 00130597): it was collected in South Africa by J. F. Drège in 1835. The lectotypification is correct and it is here accepted.

7. *Senecio leucanthemifolius* subsp. *vernalis* (Waldst. & Kit.) Greuter, Willdenowia 33: 247. 2003 ≡ *Senecio vernalis* Waldst. & Kit., Descr. Icon. Pl. Hung. 1: 23. 1800 ≡ *Senecio leucanthemifolius* var. *vernalis* (Waldst. & Kit.) C.Alexander, Not. Roy. Bot. Gard. Edinburgh 37(3): 403. 1979 – Lectotype (designated here): [Icon] Table 24 in Waldstein & Kitaibel (1800). Image of the lectotype available at <http://bibdigital.rjb.csic.es/ing/Libro.php?Libro=1916&Pagina=116>

Photos: Danin (2015).

Habitat: Uncultivated lands, meadows, human-made habitats.

Native distribution: East Europe, West and Central Asia (Comes & Abbott 2001: 1944).

Alien status in Italy: Casual (escaped from gardens).

Occurrence in Italy (Table 1): Lombardy, Trentino-Alto Adige, and Veneto.

Typification of *Senecio vernalis*: The protologue of *Senecio vernalis* (Waldstein & Kitaibel 1800: 23) consists of a short diagnosis (“*Senecio corollis radiantibus, radiis patentibus, foliis pinnatifidis crispis, cauleque piloso-lanatis*”), a detailed description, and an associate illustration (“*Tab. 24*”) which is part of the original material for the name. This image, which shows all parts of one plant plus a magnification of tubular (“*a*” in the table) and ligulate (“*b*”) flowers and one achene with pappus (“*c*”), matches the diagnosis and description by Waldstein & Kitaibel (l.c.), corresponds to the current concept of the species (see e.g., Charter & Walters 1976, Pignatti 1982, Sell & Murrell 2006), and it is here designated as the lectotype of the name *Senecio vernalis*.

8. *Senecio pterophorus* DC., Prodr. 6: 389. 1838⁶ – Lectotype [designated by Iamónico 2015b: 732 (“holotype”, here corrected according to the Art. 9.9)]: Africa, Cape region, *Omsamtendo u. Osmamculo & Drège s.n.* (P-126474!). Image of the lectotype available at <http://dsiphotomnhn.fr/sonnerat/apiJOIN/JH/JH20050715/P00126474.jpg>

Photos: Acta Plantarum (2007f onwards).

Habitat: Cliffs, burned forests, human-made habitat, uncultivated lands.

Native distribution: Uncertain. According to Iamónico (2015b), the native range of *S. pterophorus* is currently to be considered as uncertain, and two hypotheses can be made: 1) a disjunct natural distribution (South America-South Africa), eventually related to long-dis-

⁶ For a complete synonymy see Iamónico (2015b).

tance dispersal, or 2) a recent accidental introduction into America from Africa (or viceversa) by man.

Alien status in Italy: Naturalized.

Occurrence in Italy (Table 1): Naturalized in Liguria. In Liguria it was observed in three out of the four provinces, which are (west to east): Imperia Province (within 9 municipalities), Savona Province (10 municipalities), and Genoa (2 municipalities) (S. Peccenini pers. comm.).

Note on the typification of *Senecio pterophorus*: Iamonico (2015b) indicated the specimen P-126474 as

the holotype of the name *Senecio pterophorus*. However, according to the Art. 9.1 [see also the discussion by McNeill (2014)], the selected specimen (a syntype according to the Art. 9.5) cannot be considered as the holotype, since any precise indication that it is the single one used by Candolle occurs in the protologue. As a consequence, P-126474 is the lectotype, and the previous statement by Iamonico (2015b) is here corrected, according to the Art. 9.9.

Table 1: Occurrence of alien *Senecioneae* taxa in Italy (accepted names in bold, listed in alphabetical order). Symbols and abbreviations of regional names follow Conti et al. (2005: 14–15). Legend: ? = doubtful occurring taxon, C = casual, N = naturalized, I = invasive.

Tabela 1: Pojavljanje tujerodnih taksonov plemena *Senecioneae* v Italiji (veljavna imena so napisana krepko po abecednem vrstnem redu). Simboli in okrajšave regionalnih imen sledijo delu Conti et al. (2005: 14–15). Legenda: ? = pojavljanje taksona je dvomljivo, C = prehoden, N = naturaliziran, I = invaziven.

	VDA	PIE	LOM	TAA	VEN	FVG	LIG	EMR	TOS	MAR	UMB	LAZ	ABR	MOL	CAM	PUG	BAS	CAL	SIC	SAR
<i>Delairea odorata</i> (= <i>S. mikanoides</i>)							C		N			C	C		C			C		I
<i>Roldana petasitis</i> (= <i>S. petasitis</i>)							N					C				C	C			C
<i>Senecio angulatus</i>							I		N			C			N	C	N	C	N	I
<i>Senecio crassifolius</i> (= <i>S. andryaloides</i>)							?													
<i>Senecio deltoideus</i>							N													
<i>Senecio inaequidens</i>	I	I	I	I	I	I	I	I	N	I	I	I	I	I	I		N	C	C	I
<i>Senecio leucanthemifolius</i> subsp. <i>vernalis</i>				C	C	C														
<i>Senecio pterophorus</i> (= <i>S. grisebachii</i>)							N													

Table 2: Synoptic list of the Italian alien members of *Senecioneae* (accepted names in bold, and alphabetical order), including data about native range, status and preferential habitats (the more impacted habitats are underlined).

Tabela 2: Sinoptični seznam tujerodnih taksonov plemena *Senecioneae* v Italiji (veljavna imena so napisana krepko po abecednem vrstnem redu) s podatki o naravnem območju razširjenosti, statusu in rastiščih (najbolj vplivani habitati so podčrtani).

	Native range	Italy	Preferential habitat
<i>Delairea odorata</i> (= <i>S. mikanoides</i>)	S-Africa	INV	Human-made habitats
<i>Roldana petasitis</i> (≡ <i>S. petasitis</i>)	Mexico, C-America	NAT	Cliffs, human-made habitats
<i>Senecio angulatus</i>	S-Africa	INV	Roadsides, walls, <u>Mediterranean scrub</u> , uncultivated lands
<i>Senecio crassifolium</i> (= <i>S. andryaloides</i>)	S-America	?	
<i>Senecio deltoideus</i>	Tropical Africa	NAT	Human-made habitats
<i>Senecio inaequidens</i>	S-Africa	INV	Uncultivated lands, roadsides, railways, <u>cultivated fields</u> , river banks
<i>Senecio leucanthemifolius</i> subsp. <i>vernalis</i>	E-Europe, W- and C-Asia	CAS	Uncultivated lands, meadows, human-made habitats
<i>Senecio pterophorus</i> (= <i>S. grisebachii</i>)	uncertain *	NAT	Cliffs, burned forests, human-made habitats, uncultivated lands

* See the wide discussion by Iamonico (2015b)

Diagnostic key to the alien taxa in *Senecio*, *Roldana* and *Delairea* reported for Italy

1. Leaves blades with palmate venation⁷ 2
 - Leaves blades with pennate venation 5
2. Stems erect, pubescent; involucre without supplementary phyllaries *Roldana petasitis*
 - Stems climbing, glabrous; involucre with 2–7 supplementary phyllaries 3
3. Leaves with false stipules at the base of petiole *Senecio deltoideus*
 - Leaves without false stipules at the base of petiole 4
4. Capitula 5–7 mm in diameter; ray florets absent; involucre with 2–4 supplementary phyllaries *Delairea odorata*
 - Capitula 10–25 mm in diameter; ray florets 4–5; involucre with 3–7 supplementary phyllaries *Senecio angulatus*
5. Leaves deeply lobed to dissected, with margins dentate; plants annual *Senecio leucanthemifolius* subsp. *vernalis*
 - Leaves never lobed or dissected, with margin entire to dentate; plants usually perennial (excepting some forms of *S. pterophorus*) 6
6. Leaves all linear [1–3(–5) mm width], usually with margins entire *Senecio inaequidens*
 - Leaves linear-lanceolate to oblanceolate lanceolate (more than 1 cm width), dentate to entire 7
7. Capitula arranged in compound corymbs; ray florets (8–)10–12(–15) *Senecio pterophorus*
8. Capitula solitary or in pair; ray florets 15–22 *Senecio crassiflorus*

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⁷ Palmate venation is a vein arrangement in a leaf with the veins radiating outward from the base of the leaf like fingers spread out from the palm of a hand.

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