



Taxonomic notes on *Erechtites* (Asteraceae: Senecioneae)

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Abstract

In this work we present taxonomic notes for the genus *Erechtites*. More specifically, we present evidence for the re-establishment of *E. petiolatus*, a species that was hitherto being considered as a synonym of either *E. valerianifolius* or *E. valerianifolius* f. *preanthoides*. Thus, we raise to six the number of accepted species of *Erechtites*. We present field photographs of *E. petiolatus* and *E. valerianifolius* and assess the conservation status of these species. Furthermore, we present taxonomic notes for *E. valerianifolius* and *Senecio preanthoides*.

Keywords: overlooked species; species re-establishment; typification.

Introduction

The tribe Senecioneae Cass. is part of family Asteraceae Bercht. & J.Presl, subfamily Asteroideae (Cass.) Lindl. and comprises ca. 150 genera and ca. 3,500 species, with a worldwide distribution (Jeffrey & Chen 1984, Jeffrey 1992, Hind 1993, 1999, Knox & Palmer 1995, Matzenbacher 1998, Thompson 2006, Nordenstam 2007, Pelsler *et al.* 2007, Teles 2008, Teles & Stehmann 2016).

The genus *Erechtites* Rafinesque (1817: 65) was hitherto understood as to include five species, being native to the Americas and including many currently accepted names at the ranks of variety and form (Belcher 1956, Nordenstam 2007). Two sections are accepted for the genus, *i.e.* *Erechtites* sect. *Erechtites*, comprising annual herbs with deeply-lobed corollas (*E. hieracifolius* [L.] Raf. *ex de Candolle* [1838: 294], *E. missionis* Malme [1899: 73] and *E. valerianifolius* [Link *ex Spreng.*] de Candolle [1838: 295]) and *Erechtites* sect. *Goyazenses* Belcher (1956: 11), comprising perennial subshrubs with shallowly-lobed corollas (*E. goyazensis* [Gardner] Cabrera [1950: 54] and *E. ignobilis* Baker [1884: 299]). All these five species occur in Brazil (Hind 1993, Teles & Stehmann 2016).

According to Belcher (1956: 11), species of *Erechtites* can be distinguished from *Crassocephalum* Moench (1794: 516–517), *Gynura* Cass. *in Cuvier* (1825: 391–392), *Adenostyles* Cass. *in Cuvier* (1816: 59–60[*suppl.*]) (= *Cacalia* von Linné [1753b: 834], *nom. rej.*) and discoid species of *Senecio* von Linné (1753b: 866) by corollas of the filiform marginal florets more or less regularly 4- or 5-fid *vs.* ligulate in these other genera; *Erechtites* can be further distinguished from *Senecio* by the style arm appendaged with fused papillose hairs *vs.* truncated or bluntly rounded, and from *Arrhenechthites* Mattfeld (1938: 288) by the disc florets being numerous and developing viable embryos *vs.* few or solitary and abortive.

As a result of extensive field work efforts in southern Brazil we noticed considerable distinctiveness between different populations of *E. valerianifolius*. Our field observations, complemented by study of herbarium specimens (including types) and relevant literature, convinced us of the necessity of re-establishing *E. petiolatus* Benth (1845:

209), a species that was hitherto being considered as a synonym of either *E. valerianifolius* or *E. valerianifolius* f. *preanthoides* (Kunth) Cuatrec. ex Belcher (1956: 30). Thus, we raise to six the number of accepted species of *Erechtites*. We present field photographs of *E. petiolatus* and *E. valerianifolius*, and assess the conservation status of these species. Furthermore, we present taxonomic notes for *E. valerianifolius* and *Senecio preanthoides* Richard (1834: 96–98).



FIGURE 1. Lectotype of *Erechtites petiolatus* (K.T. Hartweg 1160, K barcode K000527730). Copyright: Royal Botanic Gardens, Kew.



FIGURE 2. Lectotype of *Erechthites prenanthoides* (A.J.A. Bonpland & F.W.H.A. von Humboldt s.n., P barcode P00320232). Copyright: Muséum National d'Histoire Naturelle.



FIGURE 3. Field photographs of *Erechites petiolatus*. A. Capitulescence. B. Habit. C. Detail of the capitula. D, E. Median leaf blades. F. Stem.

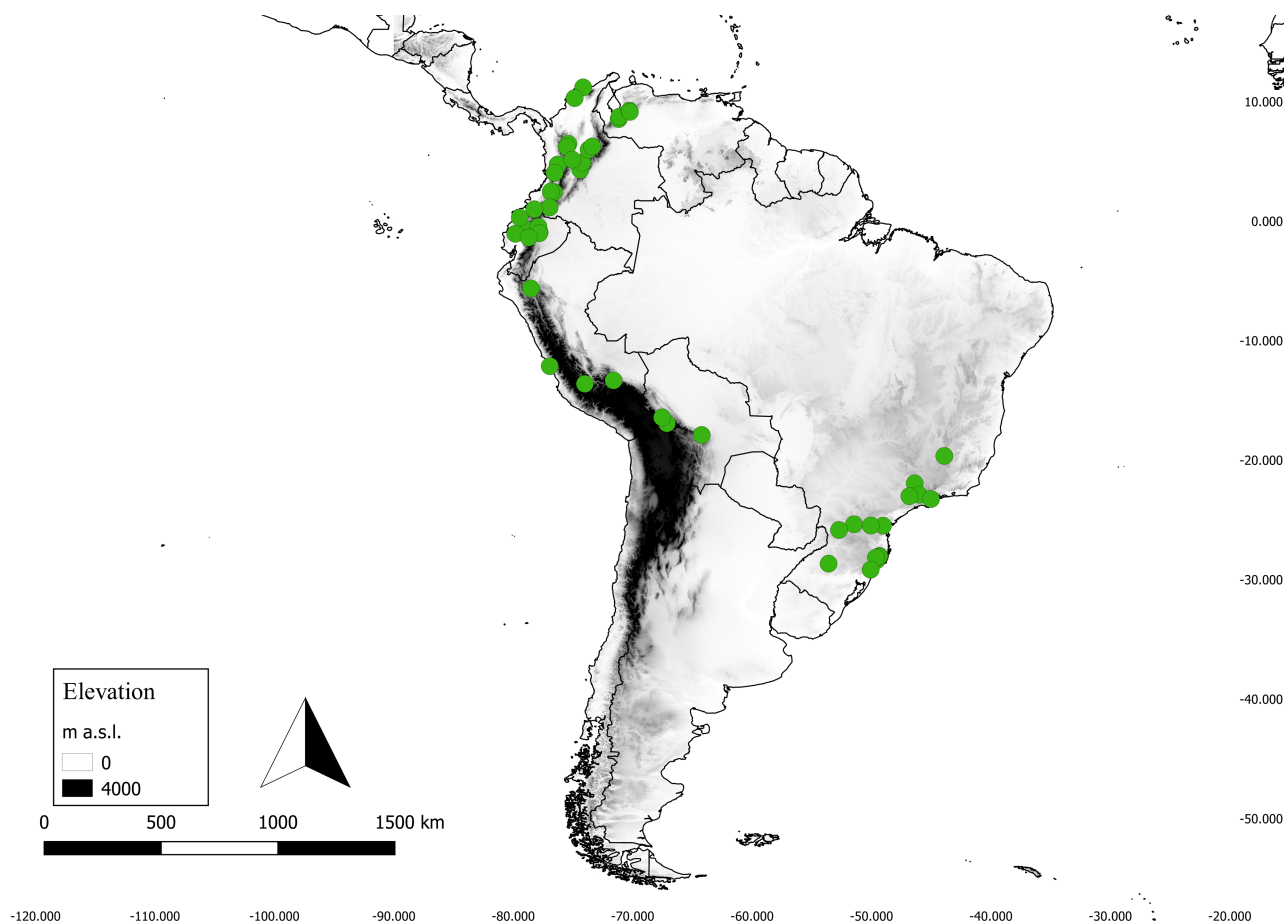


FIGURE 4. Distribution map of *Erechites petiolatus*.

Material and Methods

We studied specimens of *Erechites* kept at ASE, C, CGMS, EFC, FURB, FLOR, HTL, JOI and MBM, and images of specimens kept at CRI, ECT, ESA, G, HUEMG, K, MBML, MEXU, NYBG, P, PMSP, RB, RBR, S, U, UEC, US and WAG (herbarium codes according to Thiers 2020+). A thorough revision of the taxonomic literature on the Senecioneae in South America was conducted (in addition to the works referenced in the introduction, also: (Cabrera 1963, 1974, Cabrera & Klein 1975, Cabrera *et al.* 1999). The nomenclature presented here follows the *Shenzhen Code* (Turland *et al.* 2018—hereafter the ICN), and the recommendations of McNeill (2014) regarding holotype designations. Diagnoses are presented for all species treated, as per the recommendations in Hassemer *et al.* (2020). The conservation status assessments followed the IUCN (2012, 2019) criteria. The distribution map was made using Quantum GIS Geographic Information System (2021). Field work was conducted in southern Brazil from 2008 to 2020. All field photographs were taken by L.A. Funez.

Taxonomic treatment

1. Re-establishment of *Erechites petiolatus*

Erechites petiolatus Bentham (1845: 209).

Type:—COLOMBIA. CAUCA: Popayán, 1843, *K.T. Hartweg 1160* (lectotype [designated here] K barcode K000527730! [Figure 1]; isolectotype K barcode K000527729!, LD-1053044!).

= *Cacalia prenanthoides* Kunth (1818: 131) ≡ *Senecio albiflorus* Schultz (1845: 498) ≡ *Senecio lactucoides* Klatt (1888: 125), *nom. superfl. et illeg.* (Art. 52 of the ICN) ≡ *Erechites prenanthoides* (Kunth) Greenm. & Hieron. *in* Hieronymus (1900: 63), *nom. illeg., non Erechites prenanthoides* (A.Rich.) DC. ≡ *Erechites valerianifolius* f. *prenanthoides* (Kunth) Cuatrec. *ex* Belcher (1956: 30).

Type:—MEXICO. *S.d., A.J.A. Bonpland & F.W.H.A. von Humboldt s.n.* (lectotype [designated here] P barcode P00320232! [Figure 2];
 isolectotype P barcode P00320233!).



FIGURE 5. Neotype of *Erechthites valerianifolia* (*Anonymous s.n.*, W barcode W0102102!). Copyright: Naturhistorisches Museum Wien.



FIGURE 6. Field photographs of *Erechites valerianifolius*. A, B, C and E. Capitulescence. D. Stem. F. Leaf blade. G. Habit.

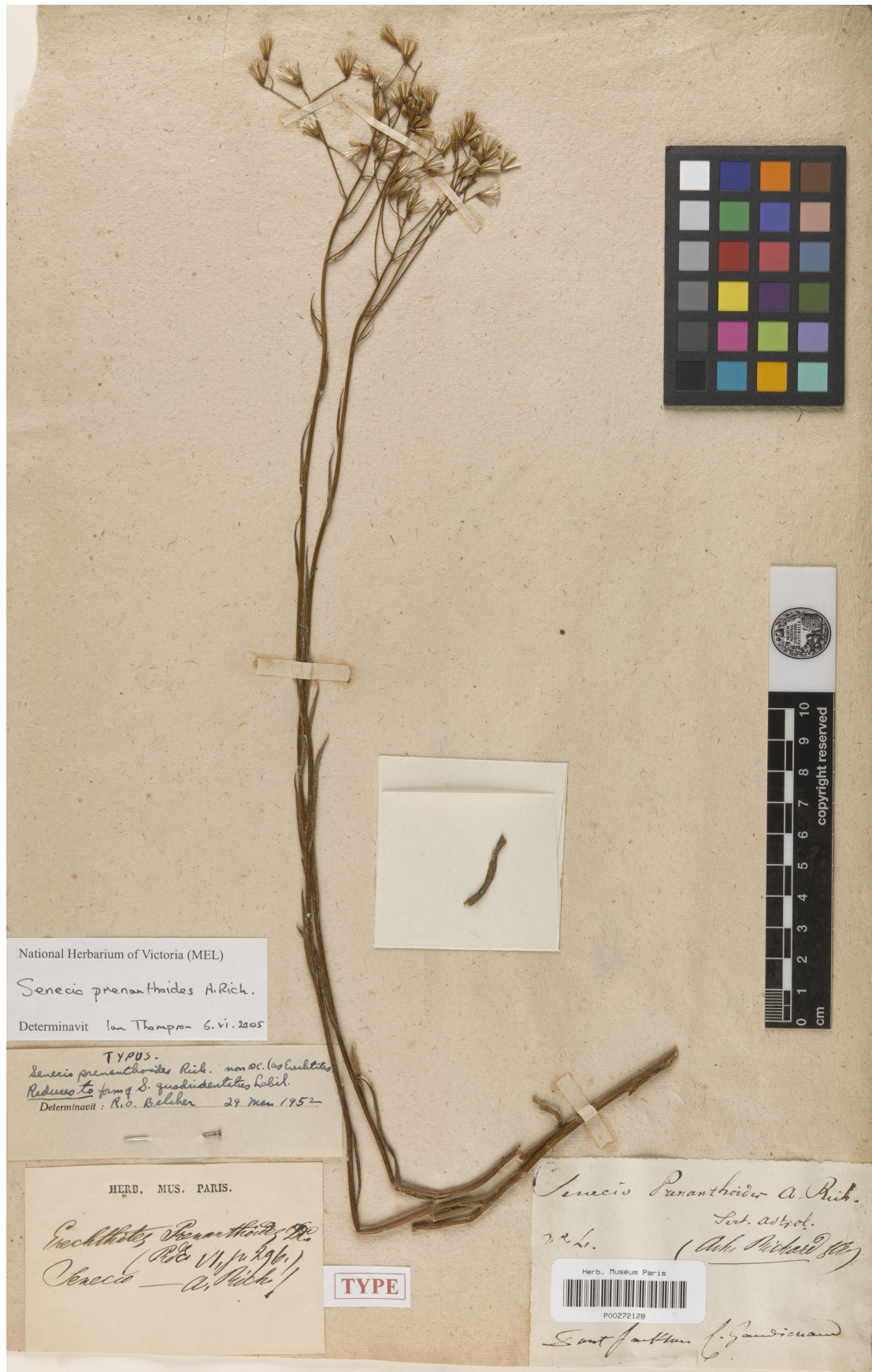


FIGURE 7. Lectotype of *Senecio prenanthoides* (C. Gaudichaud-Beaupré 4, P barcode P00272128). Copyright: Muséum National d'Histoire Naturelle.

Diagnosis:—Annual herbs, petiole inconspicuously winged, marginal pistillate florets uniseriate or sub-biseriate, densely hispid stems, medial leaves entire or lobed, leaves papyraceous, abaxial surface covered by hispid trichomes along the veins and capitula 3.0–5.5 mm diam., florets 70–120.

Description:—Annual; stem herbaceous, subsimple to much branched above, sparsely to densely setose-hispidulous, specially on the younger parts, striate, 0.3–2.0 m (or rarely more) tall. Lowest leaves petiolate, ovate-lanceolate to lanceolate, serrate to irregularly dentate; median leaves similar to the lowest leaves or petiolate with narrowly decurrent wings, pinnatisect, the lobes lanceolate and serrate to irregularly incised-dentate; upper leaves similar to the medial leaves but slightly reduced in size upward, or sometimes abruptly reduced several nodes below the inflorescence, leaf blades papyraceous, slightly discolorous, adaxial surface glabrous, abaxial surface with short hispid hairs along the nervures, margins serrate and dense ciliate. Capitulescence terminal and axillary, forming a rather congested cymose panicle. Capitula pedunculate, peduncle 2–4 mm long, setose-hispid, bracteolate, bracteoles subulate up to 3 mm long; cylindrical, slightly dilated at the basis, at anthesis about 10–12 × 3–5 mm; calycular bracteoles 5–7, 1.0–2.2 mm long, setose-hispid; involucre cylindrical to turbinate 10–16 phyllaries; phyllaries 8–9 × 0.2–2.0 mm, linear or linear-lanceolate, acute to acuminate, with keel flat and 7- or 9-nerved, glabrous; in living plants they are bright pink to lilac, fading to dark green on the basal portion, near the receptacle, in exsiccate generally they still bicolorous, somewhat lilac or stramineous on the apical portion, fading to dark green on basal portion. Marginal florets 25–40 uniseriate or sub-biseriate, pistillate, corolla filiform, tube 7.2–8.4 mm long, with lobes 0.5 × 0.2 mm, apices glandulose-thickened and incurved; style-arm apices shortly conic-appendaged. Disc florets >50 more numerous than the marginal, the outer ones transitional in size and shape, bisexual, corolla infundibuliform, slightly longer and more dilated than the pistillate florets, the inner ones with corolla slightly longer and larger, slender, 7–12 mm long, 5-fid, lobes 0.5 × 0.20–0.35 mm, apex glandulose-thickened; Anther 1.6–2 mm long, anther apical appendage acute-lanceolate, style-arm apices with conical appendage. Cypselae cylindrical, flattened laterally, 2.5–3.5 × 0.2–0.3 mm, with about 12–16 longitudinal pale brown ribs, entirely glabrous to very few or hispidulous in the grooves. Pappus multiseriate, slender, rose-lilac to pale purple, rarely nearly or quite faded to white, subequalling the corolla, exceeding the phyllaries.

Photographs of living specimens:—Figure 3.

Etymology:—The specific epithet makes reference to the petiolate leaves.

Phenology:—Most of the fertile samples (flowers and fruits) from south and southeast regions of Brazil are concentrated in March–April, late summer/early autumn, but there are several samples flowering in winter (June–July) and early summer (January–February) and one in spring (October). The plants from Andean region shows a more variable flowering pattern, with a slightly increase of samples between May and July. Due the wide distribution range of this species, probably this species has different phenology in different latitudes and under different environmental conditions.

Distribution and habitat:—This species is found in Bolivia, Brazil, Colombia, Ecuador, Peru and Venezuela, Mexico and in China according to Belcher (1956), but as we could not analyse these samples from China, we have no sure of it identify. The records are mainly from mountainous regions along the Andean mountain region, about 1,500–2,500 m elevation, and the specimens from Brazil are all from high altitude grasslands or mixed ombrophilous forest edges, at elevations between 800–1,600 m asl., not occurring as a ruderal species, as is very frequently reported for *E. valerianifolius* (Figure 4).

Conservation status:—Least Concern—(LC). Although not so common as *E. valerianifolius*, this species has a wide range of occurrence, ranging from Mexico to southern Brazil, but further studies are needed to better determine the environmental requirements for this species.

Nomenclatural notes:—The protologue of *Cacalia prenanthoides* (Kunth 1818: 131) provided the following information relevant for typifying purposes: “*Crescit in Nova Hispania?*”. We were able to locate two original specimens for this name: P barcode P00320232 and P barcode P00320233. We designate here the best among these specimens, *i.e.* P barcode P00320232 (Figure 2), as lectotype of the name *C. prenanthoides*. Despite this being the oldest name available for the entity being treated here, a combination in *Erechtites* at the species rank is not possible (see discussion below, under *Senecio prenanthoides*). Regarding *E. prenanthoides* (Kunth) Greenm. & Hieron. (*nom. illeg.*), a new combination for *C. prenanthoides*, Belcher (1956: 31) stated “Type, Popayán, *Lehmann 5665* (K!)”. The specimen he cited, *i.e.* K barcode K000527731, is not part of the original material for *C. prenanthoides*. Therefore, his inadvertent neotypification of *C. prenanthoides* is superseded by our lectotypification of this name, because there are extant original specimens for this name (Art. 9.19[a] of the ICN).

The protologue of *Erechtites petiolatus* (Benth 1845: 209) provided the following information relevant for typifying purposes: “Ad rivulos juxta Popayan”. We were able to locate three original specimens for this name: K

barcode K000527729, K barcode K000527730, and LD-1053044. Regarding this name, Belcher (1956: 31) stated “Type: Popayañ, *Hartweg 1160* (K!)”. Because there are two specimens at K matching this information, his typification is effective but can be further narrowed to a single specimen by way of a subsequent typification (Art. 9.17 of the ICN). We designate here the best among these specimens, *i.e.* K barcode K000527730 (Figure 1), as lectotype of the name *E. petiolatus*. This specimen bears the stamp of the “HERBARIUM BENTHAMIANUM”, dated 1854.

Taxonomic notes:—During field works in high altitude grasslands in Santa Catarina state, we found a curious differing morphotype of that initially we thought to be a just a morphology variation related to environmental conditions of the widely distributed *E. valerianifolius*. In March 2020, in Santa Bárbara locality, Urubici municipality, we fortunately found this morphology growing together to the “typical form” of *E. valerianifolius*, on the same environmental conditions, leading us to put our speculation about changes in environment-related morphology in check. Both plants were collected and carefully analysed under a stereomicroscope, along with specimens of *Erechtites* from many herbaria (see above, in Material and Methods).

After a carefully and exhaustive search on the numerous names and synonymies, we conclude that those specimens belong to *E. petiolatus*, which was hitherto considered a synonym of *E. valerianifolius* f. *preanthoides* (*e.g.* Belcher 1956).

According to Belcher (1956), the main morphological difference between *E. valerianifolius* f. *valerianifolius* and *E. valerianifolius* f. *preanthoides* is the foliar morphology, with *E. valerianifolius* f. *preanthoides* presenting the medial and upper leaves subentire, only denteate on the margins. Another feature pointed by Belcher (1956) is the presence of setaceous-hispid hairs on the stems and a more or less scurfy pubescence on the veins of abaxial surface of *E. valerianifolius* f. *preanthoides*. All these characteristics and the analysis of the type specimens of *Cacalia preanthoides* (the basionym of *E. valerianifolius* f. *preanthoides*) and *E. petiolatus* (Figure 1) convinced us of the need for re-establishing this entity at the species rank.

Observation of specimens of *E. petiolatus* and *E. valerianifolius* growing both sympatrically and allopatrically evidenced that there is no morphological intermediates between these two taxa. In addition to the above-mentioned differences in the vegetative morphology, which is normally considerably variable in *Erechtites*, we provide here reproductive characters that allow distinguishing both species, such as the number of florets per capitula, the diameter of the capitula and shape of the cypselae. Nonetheless, Belcher (1956) only used differences in foliar morphology to distinguish *E. valerianifolius* f. *preanthoides* from typical *E. valerianifolius*.

So, we can recognize *E. petiolatus* due the stems covered by densely setaceous-hispid trichomes *vs.* glabrescent to sparsely setaceous-hispid trichomes in *E. valerianifolius*. The foliar characteristics to differ *E. petiolatus* from *E. valerianifolius* are: leaves papyraceous, entire or pinnatifid, when pinnatifid, the lobes are larger on the basal portion, the veins of the abaxial surface are covered by a scurfy pubescence and densely ciliate margins *vs.* leaves membranaceous, generally pinnatifid, rarely entire-dentate, the lobes are larger in medial portion, especially the apical lobe generally is strongly dilated on the medial portion, glabrescent and margins not or very scarcely ciliate. Our field and herbarium observations revealed that the entire leaves are more frequently in smaller plants (up to *ca.* 50 cm tall) while pinnatifid leaves are more frequent on the most robust individuals to *ca.* 2 m tall, rarely collected due the difficult to process in exsiccating.

In addition, we observed that the capitula of *E. petiolatus* are wider, reaching to 3.0–5.5 mm diam., and has a higher number of florets (70–120) *vs.* capitula 1.0–3.5 mm diam., with *ca.* 30–70 florets in *E. valerianifolius*. The cypselae of *E. petiolatus* are pale brown, and presented 12–16 longitudinal ribs, and are completely glabrous or presented very few hairs on the grooves, while the cypselae of *E. valerianifolius* presented darker brown cypselae, with 8–12 longitudinal ribs, and the grooves are densely pilose. This discovery reinforces the importance of field collecting, and even plants considered as common, as well as carefully reviewing each synonym presented to the species, because there are probably still dozens of cryptic species hidden among the pages of ancient protologues as subspecies, varieties, and forms and that need to be found in the field to bring to light new characteristics. Luckily it is not the case of *E. petiolatus*, a widely distributed species, but some of them can be extremely rare and threatened species.

Material examined:—BOLIVIA: LA PAZ: Inquisivi, walk along the road between the Rio Poqueloque Huarctolo turnoff and Entre Ríos, 8–12 km N from Licoma Pampa, 21–22 February 1989, *M.A. Lewis 35267* (US-3188303 barcode 01825659); Yungas, vieille. Route de Chulumania, 6 April 1987, *A. Fournet 734* (US-3113838); SANTA CRUZ: Caballero Porvince: Amboro National Park, Cerro Bravo Area; *ca.* 10 map km N of Comarapa, near permanent plot, 19 June 1995, *J.R. Abbott 17076* (US-3357430); BRAZIL. MINAS GERAIS: Caldas, 20 April 1874, *H. Mosén 1421* (S-17-18850); Lagoa Santa, *s.d.*, *Warming s.n.* (P barcode P02459810); Monteverde, 7 April 1988, *H.F. Leitão Filho & T.M. Lewinsohn 20195* (UEC-48631); Brejo no caminho para o Parque das Nações, Camanducaia, 24 April 2001, *W. Marcondes-Ferreira 1729* (UEC-123831); Monte Verde, Serra da Mantiqueira, Camanducaia, 22 April 2002, *L.D.*

Meirelles, M. Rocca & R. Belinello 1057 (UEC-127393); Poços de Caldas, 1866 – 1867, *A.F. Regnell I-272* (S-17-18875); March 1875, *A.F. Regnell I-272* (S17-18863; S17-18874); *A.F. Regnell I-272a* (S-17-18882); PARANÁ: Curitiba, Piraquara, estrada a Pinhais, 13km da cidade, 30 March 1952, *G. Tessmann & A. Frezel s.n.* (MBM-6149); Guarapuava, Parque Municipal das Araucárias, 10 March 2006, *V. Luz 54* (MBM-348712); Palmeira, Fazenda Padre Inácio, 1 April 1961, *G.G. Hatschbach 7884* (MBM-44112); São João, 21 March 1910, *P. Dusén 9349* (S17 18670; S17 18671); SÃO PAULO: Cunha, Parque Estadual da Serra do Mar, pedreira e arredores, 30 March 1994, *J.B. Baitello 615* (PMSP-7508); subida para Pedra da Macela, 11 July 2006, *J. Paula-Souza et al. 5779* (ESA-95457); Itatiba, Condomínio Nova Suíça, Km 114 da Rod. D. Pedro I, brejo próximo à estação de captação de água, 25 February 2001, *M.C.E. Amaral & V. Bittrich 2001/40* (UEC-118961); SANTA CATARINA: Bom Jardim da Serra, estrada principal de Bom Jardim da Serra, próximo à subestação da Celesc, 16 March 2018, *L.A. Funez & A.E. Zermiani 7468* (FURB-58083); Urubici, Campo dos Padres, Fazenda da Sra. Munareto, campo próximo à borda Leste do cânion do Espriado, 27 April 2006, *M.L. Souza et al. 1627* (FLOR-34818); campo em frente a casa da Fazenda, 15 March 2007, *M.L. Souza et al. 1874* (FLOR-35919); RPPN Leão da Montanha, 8 March 2010, *M. Verdi et al. 3798* (CRI-15022); Santa Bárbara, Parque Nacional de São Joaquim, próximo ao alojamento, 20 March 2019, *L.A. Funez 8929* (FURB-65090); RIO GRANDE DO SUL: 1 January 1816, *A. Saint-Hilaire C2/2752* (P barcode P02459768); Cambará do Sul, Parque Nacional Aparados da Serra, lago/brejo depois do morro atrás do Alojamento Verde, abandonado, 3 km depois do mirante do Cânion, 20 April 2014, *M. Monge et al. 2907* (UEC-149166); Cruz Alta, 12 April 1893, *G.A. Malme 776* (S-17-18787; S-17-18790); COLOMBIA. ANTIOQUIA: En los alrededores de Don Matias, 26 September 1948, *A. Franco & F.A. Barkley 18A223* (US-2102912 barcode 01825710); La Sierra near Medellin, 26 December 1930; CAUCA: Boyacá, 19 km SE of Moniquira, 23 July 1975, Chisquio, 6 February 1940, *E. Asplund 10610* (US-2224271 barcode 01825712); Cordillera Central; entre Popayan y Purace, Quebrada de El Molino, 10 July 1939, *J. Cuatrecasas 5849* (US-2854063 barcode 01825696); CUNDINAMARCA: Eastern Cordillera, circa km de Fusagasugá, 29 June 1965, *R.M. King & A.E. Guevara 5799* (MBM-53940); Calima, Alta Flor. Calima gorge, 9 September 1962, *D.L. Hugh-Jones 429* (US-2592693A barcode 01825656); Highlands of Popayán, *s.d.*, *F.C. Lehmann 5665* (K barcode K000527731); MAGDALENA: Around San Andres de la Sierra, western slope of Cordillera de Santa Marta, 1-6 June 1906, *H.F. Pittier 1711* (US-600103); Sierra de Perija, eastern of Manaure, Hoya del Rio Manaure: San Antonio, 13 November 1959, *J. Cuatrecasas & R. Romero-Castañeda 25299* (US-2339650); PUTUMAYO: Valle de Sibundoy, 6 kms. SW Sibundoy, 9 May 1963, *M.L. Bristol 988* (US-2579416); Valle de Sibundoy, 5 km s. Sibundoy, 24 January 1963, *B.P.J. Chindoy X45* (US-2579409); Valley of Sibundoy; Portachuelo, 31 May 1946, *R.E. Schultes & M. Villarreal 7726* (US-1986370); SANTANDER: 28 km. n. of Velez, 17 April 1944, *N.C. Fassett 25079* (US-2166146); Este de Bucaramenga, 18 December 1948, *J. Araque Molina & F.A. Barkley 18S413* (US-2103270); Headwaters of Wuebrada Chiriviti mountains west of Galen, 9 September 1944, *N.C. Fassett 25738* (US-2166199); TOLIMA: Central Cordillera. 3 kms northeast of Fresno, 16-17 July 1965; *R.M. King, A.E. Guevara & G.E. Forero 6015* (US-2502433); VALLE DEL CAUCA: Cordillera Occidental, vertiente occidental: Hoya del rio Alban, Quebrada Robada, Alto Bonito, 21 October 1946, *J. Cuatrecasas 22363* (US-3227816); Miraflores, 27 May 1922, *E.P. Killip 6127* (US-1140198); El Cairo, Las Amarillas, frontera valle-Choco, Cordillera Occidental, Serrania de los Paraguas, carretera destapada El Cairo-Rio Blanco a 1 hora en jeeo de El Cairo (Valle), 31 March 1988, *P.A. Silverstone-Sopkin et al. 3867* (US-3221405); Rio Hondo to Popayan, Cauca Valley, 4 July 1922, *E.P. Killip 8249* (US-1141096); ECUADOR: COTOPAXI: Canton Sigchos, Campo Alegre, a ca. 20 Km al noreste de Sigchos, 13 July 2003, *J. Ramos et al. 5961* (US-3490173); ESMERALDAS: Quininde. Bilsa Biological Station. Montanas de Mache, 35 km W of Quininde, 5 km W of Santa Isabela, 9 December 1994, *N. Pitman & M. Bass 1064* (US-3316077); NAPO: Canton Archidona, Carretera Hollin-Loreto, km 25., faldas al sur del Volcan Sumaco, 17 December 1988, *F. Hurtado 1252* (US-3138363); Canton Quijos, Cosanga to the Rio Aliso, ca. 5 km SW of Cosanga, 20 February 1978, *J.H. Kirkbride & H. Chamba R. 4214* (US-2905999); Tena, 30 September 1939, *E. Asplund 8942* (US-2224017); CARCHI: Chical, 4 August 1983, *S.A. Thompson & J.E. Rawlins 965* (US-3185302); PICHINCHA; Estacion Cientifica “Rio Guajalito” Km 59 de la carretera antigua Quito-Sto. Domingo de los Colorados, a 3.5 km al NE de la carretera estribaciones occidentales del Volcan Pichincha, 5 March 1987, *V. Zak 1792* (US-3104915); San Antonio, eastern slope of Tungurahua Volcano, 1924, *G.H.H. Tate 583* (US-1197575); PERU: AMAZONAS: Provincia de Bagua, Valley of Río Marañón above Cascades de Mayasi near Campamento STte. Montenegro (Kms 280–284 of Marañon road), 5 September 1962, *J.J. Wurdack 1874* (US-2373716); CUSCO: Provincia Paucartambo, K’osnipata–San Pedro, 6 August 1956, *C. Vargas-Calderón 11346* (US-2252281); Laguna Pomacocha, 23 January 1965, *J. Soukop 5232* (US-2582189A); Zamora-Chinchiipe; Road Loja-Zamora, app. 5 km E of pass on new road, 1 September 1988, *J.E. Madsen & L. Ellemann 75172* (US-3220397); Zamora Canton. Along road between Loja and Zamora, along Amazonian slope, 20.6 km beyond entrance to Zamora Road in Loja, 4 March 1992, *T.B. Croat 75676A* (US-3240559); VENEZUELA. MÉRIDA: About 3.8 km on side road on left 7.5 km beyond NE entrance to Merida on road to Paramo La Culata, 20

January 1993, *R.M. King, F. Almeda, & M.B. Knowles 10448* (US-3276018); Sierra de la Culata: al norte de Merida: al norte de Monterrey: cabeceras del Rio Mucujun, 2 July 2000, *W. Meier et al. 7398* (US-457746); TRUJILLO; Dto. Bocono, Orillas de la carretera La Laguna-Guaramacal, al este de Bocono, 2 September 1973, *L.A. Teran 9201* (US-2916021); Parque Nacional Guaramacal, sector quebrada Honda de El Santuario, November 2001, *B. Stergios et al. 19366* (US-3431172).

2. Notes on related species

2.1. *Erechtites valerianifolius* (Link ex Spreng.) de Candolle (1838: 295) \equiv *Senecio valerianifolius* Link ex Sprengel (1826: 565) \equiv *Crassocephalum valerianifolium* (Link ex Spreng.) Less. in von Schlechtendal & von Chamisso (1830: 163).

Type:—COUNTRY UNKNOWN. Unknown locality, 1825, *Anonymous s.n.* (neotype [designated by Belcher 1956: 26] W barcode W0102102!) (Figure 5).

= *Erechtites ambiguus* de Candolle (1838: 295).

Type:—BRAZIL. 1831, *F. Sellow s.n.* (holotype G barcode G 00461229!).

Diagnosis:—Annual herbs, petiole inconspicuously winged, marginal pistillate florets uniseriate or sub-biseriate, glabrous to glabrescent stems, medial lobed to pinnatifid, leaves membranaceous, abaxial surface glabrous along the veins and capitula 1.0–3.5 mm diam., 30–70 florets.

Distribution and habitat:—Widely distributed in tropical and subtropical America, and introduced in some places of Old World, as tropical Asia, Pacific Islands and North of Australia (Belcher 1956, Pruski 1997). This species is especially common as a ruderal species, but can be found on natural environments, as forest edges and grasslands.

Photographs of living specimens:—Figure 6.

Etymology:—The specific epithet makes reference to the similarity of the leaves of the species to those of members of the genus *Valeriana* von Linné (1753a: 31).

Notes:—Although indicated as *E. valerianifolius* f. *preanthoides* by Belcher (1956), due the entire leaf blades, with dentate margins and few pinnatifid apical leaves, the holotype of *E. ambiguus*, according to our analysis, belongs instead to *E. valerianifolius*. We disagree with Belcher's determination due the following combination of morphologic characters of this specimen: the capitula are small and thin (*ca.* 2 mm diam.), the stems are glabrescent, and the apical pinnatifid leaves has large lobes, with the medial portion wider than the basal, and widely dilated apical lobes. It also needs to be considered that the specimen is a small plant (*ca.* 30 cm tall), while entire leaves are more common than in the larger specimens for both *E. petiolatus* and *E. valerianifolius* f. *valerianifolius*.

Thus, the absence of hairs, the apical pinnatifid leaves with large lobes, with the medial portion wider than the basal, and widely dilated apical lobes and the small, thin capitula in the holotype of *E. ambiguus*, we conclude that the name *E. ambiguus* must be regarded as a synonym of *E. valerianifolius*.

Material examined:—BRAZIL. BAHIA: Salvador, *s.d.*, *P. Salzamann 2* (K barcode K000053835); CEARÁ: Guaramanga, on a mountain, 23 June 1929, *G. Bolland 39* (K barcode K000054498); ESPÍRITO SANTO: Santa Tereza, Colônia das Irmãs, 7 March 1985, *W.A. Hofmann 63* (MBML-2222); Mata do Goiapaba-Açu, 30 May 1984, *W. Piziolo 116* (MBML-2116); Pátio do Museu de Biologia Mello Leitão, 3 June 1985, *H.Q. Boudet-Fernandes 1204* (MBML-2059); 13 May 1985, *H.Q. Boudet-Fernandes 1395* (MBML-2229); MATO GROSSO DO SUL: Bonito, Mata na área de acesso à Lagoa Azul, 14 December 2000, *G.A. Damasceno Junior et al. 2063* (CGMS-10575); MINAS GERAIS: Viçosa, Campus da UFV, 18 August 1992, *A.F. Carvalho 112* (HUEMG-002650); Estação de Pesquisa, Treinamento e Educação Ambiental Mata do Paraíso (EPTEAMP), Trilha principal, 23 February 2005, *S.C. Ferreira et al. 75* (HUEMG-002617); 3 February 2005, *S.C. Ferreira 58* (HUEMG-002587); idem, *S.C. Ferreira 59* (HUEMG-002618); PARANÁ: Antonina, Rio do Cedro, 20 October 1967, *G.G. Hatschbach 17525* (MBM-007119); Céu Azul, Parque Nacional do Iguaçu - Estrada de chão Céu Azul - Serranópolis do Iguaçu, 28 July 2016, *E.L. Siqueira et al. 1980* (ECT-2911); Paranaguá, Ilha do Mel, Baía de Paranaguá, 11 December 1953, *G. Tessmann s.n.* (MBM-075099); Piraquara, Recreio da Serra, 16 April 2015, *M.L. Brotto 1928* (MBM-396427); SANTA CATARINA: Bombinhas, Área de Relevante Interesse Ecológico (ARIE) Costeira de Zimbros., 29 January 2012, *A. Nuernberg & A.S. Mello 527* (FLOR-54398); Blumenau, RPPN Bugarkopf, 20 September 2012, *L.A. Funez 921* (FURB-39097); Florianópolis, Campus da UFSC, 5 November 2008, *G. Hassemer 46* (FLOR-41026); Jaraguá do Sul, 7 June 2016, *A. Kassner-Filho et al. 707* (FURB-54129); Petrolândia, 25 January 2018, *A. Kassner-Filho et al. 1616* (FURB-56587); São Bento do Sul, Rio Natal. Após

a ponte pênsil para a localidade de Oswaldo Amaral, 21 July 2018, *P. Schwirkowski* 2947 (FURB-61073); SÃO PAULO: Angatuba, ca. 6 Km de Itatinga em direção a Angatuba, 27 April 1996, *J.P. Souza et al.* 551 (ESA-32890); Bertioga, 15 June 1989, *C.S. Zickel et al.* 23453 (UEC-53017); Campinas, Sousas, Mata particular das Três Pontes, 31 October 1990, *P.L.R. Moraes et al.* 23681 (UEC-62320); Jundiaí, ca. 10 km S.W. de Jundiaí, Serra do Japí, 8 October 1976, *H.F. Leitão Filho et al.* 3185 (UEC-2949); RIO DE JANEIRO: Itatiaia, Estrada até Hotel Repouso Itatiaia, 20 May 1985, *T.M. Lewinsohn & R.F. Monteiro* 18156 (UEC-43550); Paraty: Vila Princesa Isabel, 15 December 2019, *D.S. Sanfins & J.A.S. Ferreira* 1 (RBR-46541); Rio de Janeiro, 1832, *L. Riedel* 230 (NYBG barcode 00791758); RIO GRANDE do Sul: Agudo, Morro Agudo, 27 September 1985, *D.B. Falkenberg* 3345 (FLOR-16113); Caxias do Sul, Bairro Nossa Senhora da Saúde, Rua Vereador Remo Marcucci, 18 April 2011, *J. Gaio* 75 (FURB-38063); São Leopoldo, arredores de São Leopoldo, July 1941, *J.E. Leite* 375 (NYBG barcode 01080644).

2.2. *Senecio prenanthoides* Richard (1834: 96–98) ≡ *Erechtites prenanthoides* (A.Rich.) de Candolle (1838: 296).

Type:—AUSTRALIA. NEW SOUTH WALES: Port Jackson, *s.d.*, *C. Gaudichaud-Beaupré* 4 (lectotype [designated here] P barcode P00272128! [Figure 7]; isolectotype G barcode G00461239!).

Distribution and habitat:—This species occurs in Australia, including Tasmania (Thompson 2006, Wapstra *et al.* 2008, Liew *et al.* 2018). This is a widespread and frequent species, growing in sandy and loamy soils in scrub, woodland and forest from sea-level to ca. 1500 m (Wapstra *et al.* 2008).

Notes:—Despite that *Cacalia prenanthoides* is the oldest name available for the entity that we are here calling *E. petiolatus*, a combination at the species rank for *C. prenanthoides* in *Erechtites* is not possible because of the existence of the name *E. prenanthoides* (A.Rich.) DC., which is a legitimate combination for the basionym *Senecio prenanthoides* A.Rich. in the genus *Erechtites*. Thus, the name *E. prenanthoides* (Kunth) Greenm. & Hieron. is an illegitimate later homonym (Art. 53.1 of the ICN).

The protologue of *S. prenanthoides* (Richard 1834: 96–98) provided the following information relevant for typifying purposes: “Crescit in Novæ-Hollandiæ loco dicto *Port-Jackson* ubi collegit amicissimus *Gaudichaud*”. We were able to locate two original specimens for this name: G barcode G00461239 and P barcode P00272128. We designate here the best among these specimens, *i.e.* P barcode P00272128 (Figure 7), as lectotype of the name *S. prenanthoides*.

TABLE 1. Main morphological differences between *Erechtites petiolatus* and *E. valerianifolius*.

	<i>E. petiolatus</i>	<i>E. valerianifolius</i>
Stem indumenta	Densely covered by setose-hispid trichomes, denser on the apical portions	Glabrous, glabrescent or sparsely covered by hispid trichomes on the apical portions
Leaf (consistence and pubescence)	Papyraceous, the veins of the abaxial surface are covered by a scurfy pubescence and densely ciliate margins	Membranaceous, the leaves are glabrous or glabrescent on both surfaces, very scarcely ciliate on the margins
Shape of basal and medial leaves	Generally entire, serrate/dentate or slightly lobed. Lobes lanceolate, larger on the basal portion	Generally, only the most basal ones are entire, the medial leaves are pinnatisect. Lobes broad lanceolate, generally larger on the medial portion, or filiform in <i>E. valerianifolius</i> var. <i>organensis</i>
Capitulescence	Dense aggregate in corymb-like capitulescences	Generally lax corymbs, rarely dense
Capitula	3.0–5.5 mm diam., florets 70–120	1.0–3.5 mm diam., 30–70 florets
Cypselae	Light brown, subcylindric, flattened laterally, 2.5–3.5 × 0.2–0.3 mm, with about 12–16 longitudinal, entirely glabrous to very few or hispidulous in the grooves.	Darker brown, subcylindric, flattened laterally, 2.5–3.5 × 0.2–0.3 mm, with about 8–12 longitudinal, densely hispidulous in the grooves.

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