

Typification of the name *Senecio pygmaeus* (Asteraceae), with some additional taxonomic and phytogeographic remarks

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Abstract. A thorough research on the scientific activity of Guglielmo Gasparini, Giovanni Gussone and Augustin Pyramus De Candolle allowed the authors to address a research in several European herbaria looking for the type of the name *Senecio pygmaeus* DC. The original specimen sent by Gussone and mentioned in the protologue by Candolle is still kept at G-DC and is designated as the lectotype, whilst three other herbarium sheets, preserved at NAP-GUSS, PAL and PAV herbaria respectively, in all probability belong to the same gathering, and are considered as isolectotypes. The authors provide an updated description of this taxon in order to better point out its diagnostic characters. However, further biosystematic and phytogeographic surveys are needed to ascertain the taxonomic value and the distribution range of *S. pygmaeus*. Indeed, it might represent just a dwarfed, salt-tolerant ecotype of *S. leucanthemifolius* Poir. or *S. vulgaris* L., hence be more widespread than previously reported, counting numerous scattered populations along the rocky shores of central and eastern Mediterranean countries.

Keywords. botanical exploration, herbarium, Mediterranean flora, nomenclatural type, *Senecio leucanthemifolius*, Sicily, taxonomy, vascular flora.

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Introduction

Senecio leucanthemifolius Poir. *sensu stricto*, originally described from Algeria (Annaba region) probably occurs only in North Africa. In its broadest interpretation, this taxon has been reported for almost all the western and central Mediterranean countries (i.e., Albania, Balearic Islands, Corsica, S Iberian Peninsula, Italy, Albania, Croatia, Sardinia, Sicily, Malta and the Aegean Islands) (Chater & Walters, 1976; Greuter, 2006; Strid, 2016; Calvo & Aedo, 2019). This taxon is still poorly understood and shows a remarkable morphological variability and ecological plasticity (Gallego, 1983; Lambinon, 1984; Jeanmonod, 2003). More probably, it forms a species complex affected by repeated events of hybridization and involved in ongoing processes of reticulate evolution, a common feature for many annual *Senecio* species (Comes & Abbott, 2001; Walter *et al.*, 2020). As a consequence, plenty of local eco-morphotypes have been described as narrow endemics, such as *S. crassifolius* Willd. (S France and Liguria), *S. humilis* Desf. (N Africa and doubtfully in SW Sicily according to Pignatti & Guarino, 2019), *S. fradinii* Pomel = *S. mauritanicus*

Pomel (Algeria, Morocco, Sardinia and SW Sicily), *S. rodriguezii* Rodr. (Mallorca and Menorca, Balearic Islands), *S. caroli-malyi* Horvatić (Croatia), *S. cyrenaicus* (Dur. & Baratte) Borzi (Libya), *S. aegadensis* C. Brullo & Brullo (= *S. incrassatus* Guss. 1844 non Lowe 1838, W Sicily), *S. vernus* Biv. (W Sicily), *S. transiens* (Rouy) Jeanm. (Corsica and Sardinia), *S. rosinae* Gamisans and *S. serpentinicola* Jeanm. (inner Corsica), *S. marmorae* Moris (inland Sardinia), *S. pinguiculus* Pomel (Algeria) (Alexander, 1979; Jeanmonod, 2003; Greuter, 2006; Mostari *et al.*, 2020).

In this paper we will focus on another taxon ascribed to the *Senecio leucanthemifolius* group, *S. pygmaeus* DC., considered by some authors (Sommier, 1910; Brullo *et al.*, 2020) to be a narrow-endemic plant only growing on the salt-sprayed shores of SE Sicily, Lampedusa Island and the Maltese Archipelago. *Senecio pygmaeus* was described by Candolle (1838: 341) in his 'Prodromus'; the protologue was based upon a specimen collected along the coast of SE Sicily, sent by Giovanni Gussone, botanist commissioned by the King Ferdinand IV of Bourbon to redact the first comprehensive vascular flora of Sicily and its satellite islets (La Valva, 1993). Due to a misinterpretation of

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Gussone's label, Candolle erroneously reported the species as growing 'in Sicilia propè Capo *Pojato*' instead of 'Capo Passero'. This misspelling was already remarked by Gussone (1844: 471), who also reported some additional information contained in the letter accompanying the material sent to his Swiss colleague, i.e. "Senecio pusillus Guss. in litt. ad DC., non Reich. [misspelling for A. Rich., author of a species described from Australia, Authors' note] = Senecio minimus angustifolius laciniatus crispus Cup. Hort. Cath. p. 200" [actually reported as 'Senecio minimus, angustifolius *laciniatulus*, crispus' in Cupani 1696, Authors' italics]. In the following lines, Gussone (1844: 471) provides additional information on the ecology and the location of *S. pygmaeus* (named 'pigmaeus' by him), writing: "In herbosis arenosis maritimis, et in saxosis Siciliae meridionalis; Capopassaro al porto di Ulisse (Gasparr.)".

Nearly one century later, Lojacono-Pojero (1903: 69) claimed to have seen one of the original specimens collected by Gussone in the herbarium of Palermo and to have observed there the very same plant in a dry specimen from Malta.

As *Senecio pygmaeus* DC. resulted not typified yet (Alexander, 1979; Calvo *et al.*, 2014) and was not considered in the works concerning the loci classici and the types of the "accepted" endemic (Peruzzi *et al.*, 2015) and non-endemic (Peruzzi *et al.*, 2019) vascular plants described from the Italian territory, we decided to carry out a research aimed at designating a suitable type for this name.

Material and Methods

In order to find any Sicilian or Maltese specimen referred to *Senecio pygmaeus*, and paying special attention to the *exsiccata* which could be related to the original material collected by Gasparrini or Gussone at Capo Passero, we consulted the following herbaria (whose acronyms follow Thiers & Ramirez, 2021): G-DC (Sicilian material collected by Gasparrini or Gussone and sent to Candolle); NAP-GUSS (Sicilian material collected by Gasparrini or Gussone); PAL (Sicilian material collected by Gasparrini or Gussone as mentioned by Lojacono-Pojero, 1903; material collected by Lojacono-Pojero or other botanists either in Lampedusa or in Malta); PAV (Sicilian material collected by Gasparrini as mentioned by Gussone, 1843–1844); FI (Sicilian material collected by Gasparrini or Gussone and eventually sent to Parlatores; material collected by other botanists either in Lampedusa or in Malta); BOLO (Sicilian material collected by Gasparrini or Gussone and eventually sent to Bertoloni). Additionally, the section 'Generale Moderno' of CAT was consulted online (<http://www.hortusbotanicuscatinensis.it/herbarium/erbario.aspx>) to study the Sicilian and Maltese specimens collected by S. Brullo and his colleagues during last decades.

The identification of the authors of the labels of the herbarium sheets was supported by some papers providing examples of Gussone's and Gasparrini's handwriting style (Burdet, 1979; Mazzola *et al.*, 1997, 2014; Ferrer-Gallego *et al.*, 2017) and by the peer opinion of some colleagues (namely, A. Santangelo and S. Orsenigo).

Results

Pasquale (1871) did not find any mention of either Capo Passero or any other locality in SE Sicily in Gussone's herbarium, while according to the itinerary of the scientific expeditions described in Gussone's unpublished field reports (Trotter, 1948) he could have visited Capo Passero during his field trips during spring 1819 and/or 1820. Indeed, *Senecio* does not feature either in the 'Prodromus' (Gussone, 1827–1832) or in the 'Supplementum' (Gussone, 1832–1834), and Gussone quoted *S. pygmaeus* only after it was described by Candolle (Gussone, 1844).

Available information on the scientific activity of both Gussone and Gasparrini (Pasquale, 1866, 1871; Trotter, 1948; Pellegrini, 1967; La Valva, 1993; Alippi Cappelletti, 1999), but also the same Gussone (1844) ascribing the record to Gasparrini, suggest that *S. pygmaeus* was collected by Gasparrini between 1828 and 1831 and sent to Gussone (in Naples). In turn, the latter forwarded part of these samples to Candolle, with whom he was in contact since they met in Geneva in the spring of 1829, during Gussone's way back to Italy after a long journey across Europe as accompanying person of the King Francis I of Bourbon (Pasquale, 1871).

In the course of image scanning activities aimed at the digitalization of local collection, the team of the Herbarium of Geneva selected and labelled a sheet of Candolle's Herbarium (G-DC) as the holotype (<http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=328319&base=img&lang=en>) of *S. pygmaeus*. In his monograph, Alexander (1979) stated to have seen a microfiche of the very same *exsiccatum*, but he did not explicitly select it as a type. One of us (DJ) personally checked the herbarium and was able to confirm that this specimen is the only one referred to this name occurring in G-DC. This specimen belongs with no doubt to the original material sent by Gussone, whose writing style is easily recognisable. Additionally, the labels match perfectly with Candolle's protologue and explain very well his misspelling, clearly due to a misinterpretation of Gussone's handwriting. More in detail, in the first label we read "3. Senecio pusillus Guss., m.[isit] Gussone 1834 / Sicilia a Capopassaro", in the second "Senecio pusillus Guss. / vide epist. [ulam] 22 apr.[ili] 1834".

Our researches carried out at NAP-GUSS allowed to find an *exsiccatum* (Figure 1) with 12 individuals of *Senecio pygmaeus* bearing two labels. The first label, written by Gasparrini, reports: "Bellium?? / An Senecio vernus var. radio nullo? / in herbis arenosis maritimis et in scopulosis Siciliae meridionalis / Capo Passaro al Porto d'Ulisse / Fl.[oret] martio", whilst on the second, written by Gussone we read: "2. Senecio pygmaeus Dec. pr. 6 p. 341 (+ note added with the pencil, same handwriting: Guss. Syn. 2, p. 471) / (Senecio) pusillus Guss. in litt. non Rich. / Martio, Aprile (planta annua) / in herbis aridis maritimis". This specimen (lacking any date as the one in G) is probably part of the original gathering which was sent to Candolle, and hence it should be considered a syntype.

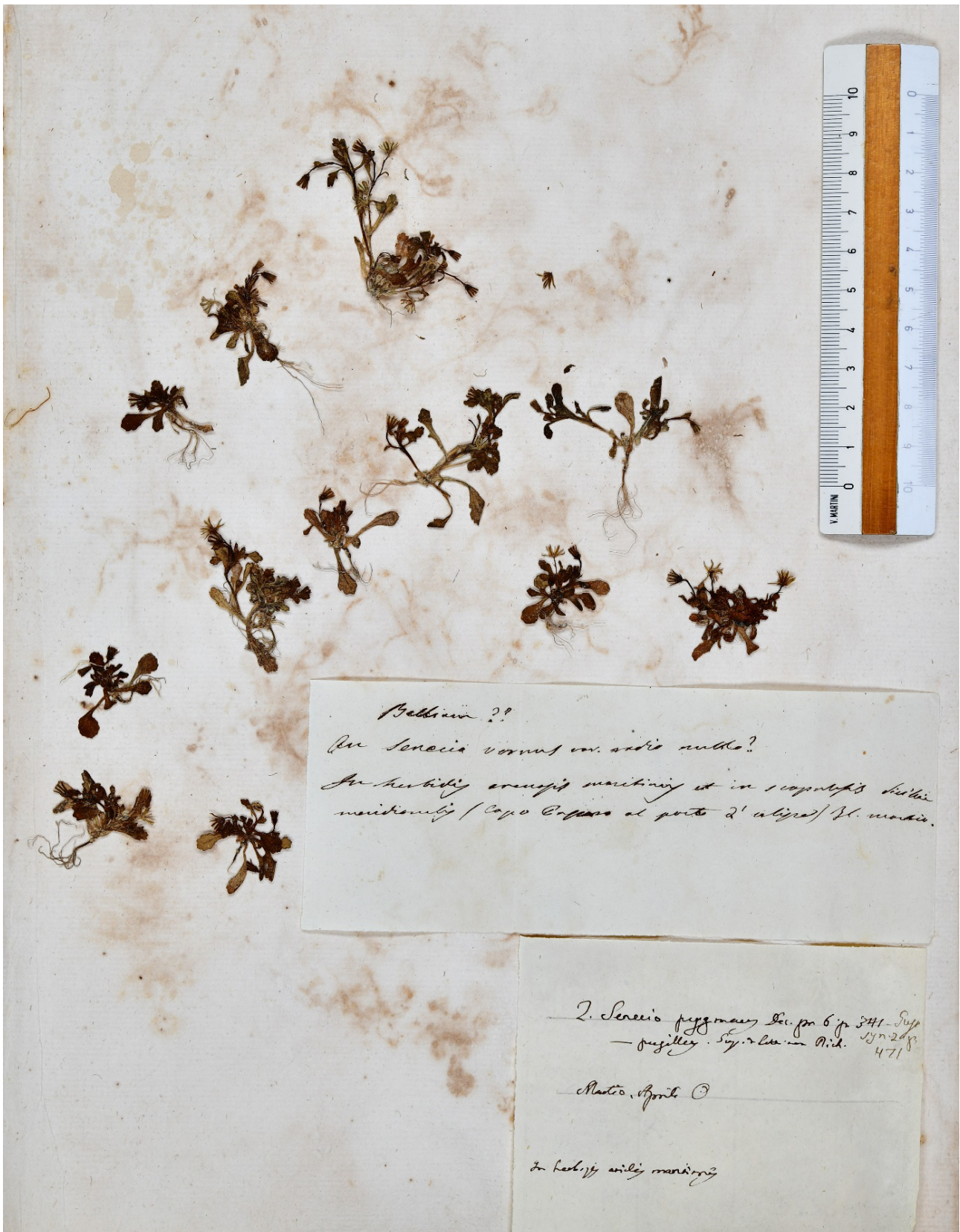


Figure 1. Isolectotype of *Senecio pygmaeus* deposited at NAP-GUSS. Image courtesy of the Herbarium Neapolitanum of the University of Naples.

Regarding the herbarium specimens kept in Palermo, the sheet with the code PAL9666 (http://147.163.105.223/zoomify/view_img.asp?ic=9666) could really belong to the original material collected by Gasparrini at Capo Passero, as argued by Lojacono-Pojero (1903) and hence this specimen should be considered another syntype.

This sheet bears two labels; in the first (written by Gussone) we read “*Senecio pygmaeus* / Capo Passaro”; the second label (probably representing a later remark written by an unidentified scholar studying Gussone’s Herbarium) reports: “Forse sarà una varietà del *Senecio vulgaris* di luoghi sterili / si faccia riflessione a qual

piccolezza si riduce il *S. squalidus*” (= perhaps a variety of *Senecio vulgaris* of [i.e. growing in] sterile places / think about how small *S. squalidus* can be”).

Searching in Gasparrini’s herbarium (PAV), we were able to trace another sheet containing several dry specimens of *S. pygmaeus* that were in all probability collected by Gasparrini at Capo Passero (Figure 2) and hence should be treated as another syntype. In a small piece of paper (a sort of “first glimpse flash memo” written by Gasparrini during his field collection activity) we read: “Bellis? / Capo Passaro / ? (indecipherable)”; on a second label handwritten by Gasparrini we read: “Floret martio. In herbosis maritimis Siciliae meridionalis - Capo passaro” while in his third label Gasparrini wrote “*Senecio pigmaeus* DC. / Floret februario, martio / in arenosis et scopulos maritimis Siciliae meridionalis / Capo Passaro al porto d’Ulisse”. Another label located on the upper left corner of the same sheet refers to a single specimen put just below the label itself (or perhaps to all the four similar specimens in the upper half of the sheet) and reports “*Senecio incrassatus* Guss. - Sicilia al Maretimo / dedit cl.[arus] Gussone”. This single dry specimen is (or the four specimens are) probably part of the original material of *S. incrassatus* Guss., an invalid name recently replaced with *S. aegadensis* by Brullo & Brullo (2009: 44).

According to the scanned images provided by the team of FI, no original material from SE Sicily is kept in the Herbarium of Florence, which hosts many *exsiccata* confirming the occurrence of *S. pygmaeus* on the Maltese islands of Gozo and Comino, as first reported by Duthie (1875) and confirmed by Sommier & Caruana-Gatto (1915), and on the Island of Lampedusa, where it was first reported by Sommier (1908).

As for the *exsiccata* kept at BOLO, no specimen of *Senecio crassifolius* Willd. (the species *S. pygmaeus* was referred to according to Bertoloni, 1853) was found, and they might have been lost, probably during the World War II, like all the others belonging to genus *Senecio* (Mossetti & Cristofolini, 1992).

Typification of the name

***Senecio pygmaeus* DC.**, Prodr. [A. P. de Candolle] 6: 341 (1838)

(≡) *Senecio pusillus* Guss. ex DC., Prodr. [A. P. de Candolle] 6: 341 (1838) nom. nud. (in litt.), non A. Rich., Voy. Astrolabe 2: 99 (1834)

Lectotype (designated here): [Italy, Sicily] “Italy: Sicilia a Capo passero, *s.d.*, *s.c.*” G-DC (barcode G00471446). Image available at <http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=328319&base=img&lang=en>. Isolectotypes: NAP-GUSS (Figure 1), PAV (Figure 2), PAL (PAL9666; image available at http://147.163.105.223/zoomify/view_img.asp?ic=9666).

We chose as lectotype the specimen in G-DC because it is in perfect conditions and it was with no doubt (according to the dates and other information on the label) the specimen (or one of the specimens) used by Candolle to describe the new species. As shown above, we were able to trace other specimens (in NAP, PAV and PAL) apparently belonging

to the same gathering made by Gasparrini (according to Gussone, 1844), i.e. syntypes, but their labels have no dates so we prefer to treat them as isolectotypes. Note that the specimens at PAL and G include a single individual, whereas the specimens in NAP and PAV (hosting the collections of Gussone and Gasparrini, respectively) include several individuals (twelve and nine, respectively).

Discussion

In our opinion, both the distribution range and the taxonomic value of *Senecio pygmaeus* need further investigation. For instance, its past and present presence along the shores of NW Sicily (Pignatti *et al.*, 2018) is not supported by any herbarium specimen, whilst several *exsiccata* testify for its occurrence in other Mediterranean countries and especially on islands, like in the Sardinian satellite islands of La Maddalena (June 1893, Vaccari, FI: Alexander, 1979) and Isola di San Pietro (Arrigoni, 2015), in Crete (Palaiokhora, Davis 1186, E: Alexander, 1979), in Lebanon (Beirut, 12 May 1871, Herb. Postian, E: Alexander, 1979) and probably also in the W Adriatic Islands (Alexander, 1979). Indeed, *S. leucanthemifolius* s.l. grows almost everywhere in the Aegean Islands and some scattered populations also occur in S Greece (Strid, 2016) with both eligulate and ligulate flower-bearing populations, but no other distinctive trait allows to distinguish them from one another (R. Jahn, pers. comm.). As for eligulate populations, one occurs in the SE shores of Karpathos Island and several others are found in Crete and in some of its satellite islets like Gavdos, Paximadia, Dragonada and Elasa (R. Jahn, pers. comm.).

Regarding *Senecio caroli-malyi*, described by Horvatić (1956) and considered as possibly related to *S. pygmaeus* by Alexander (1979), its taxonomic value is very doubtful, and no Croatian botanist has dealt with it in recent times. The only available herbarium specimens come from the islands of Krk and Pag, while according to 4–5 old references it also occurred near Albona in the Istrian Peninsula and in Velebit National Park (T. Nikolić, pers. comm.).

According to several authors (Fiori, 1903; Chater & Walters, 1976; Alexander, 1979; Greuter, 2006; Greuter & Raab-Straube, 2008) *S. pygmaeus* represents just a dwarfed, crassulescent and salt-tolerant ecotype with small capitula and without ligules falling within the wide ecomorphological variability of *S. leucanthemifolius* Poir. Indeed, the type specimen confirms that, distinctly from all the other taxa framed into this polymorphic species complex, *S. pygmaeus* has eligulate flowers, as already highlighted by Kadereit (1984). On the one hand, this trait may remind (and could even depend on past introgression with) *S. vulgaris* L. (see for example works about the ray morphology in hybrids involving *S. vulgaris*; e.g., Weir & Ingram, 1980; Gillies *et al.*, 2002); note that many authors (Gussone, 1844; Lojacono-Pojero, 1903; Pignatti, 1982; Pignatti *et al.*, 2018; Pignatti & Guarino, 2019) consider *S. vulgaris* as being somewhat related to *S. pygmaeus*. On the other hand, one should bear in mind that high variability in the size and presence/absence of ray florets is a widespread phenomenon in many other *Senecio* species groups and is probably controlled by only one or few genes (Ingram & Taylor, 1982).

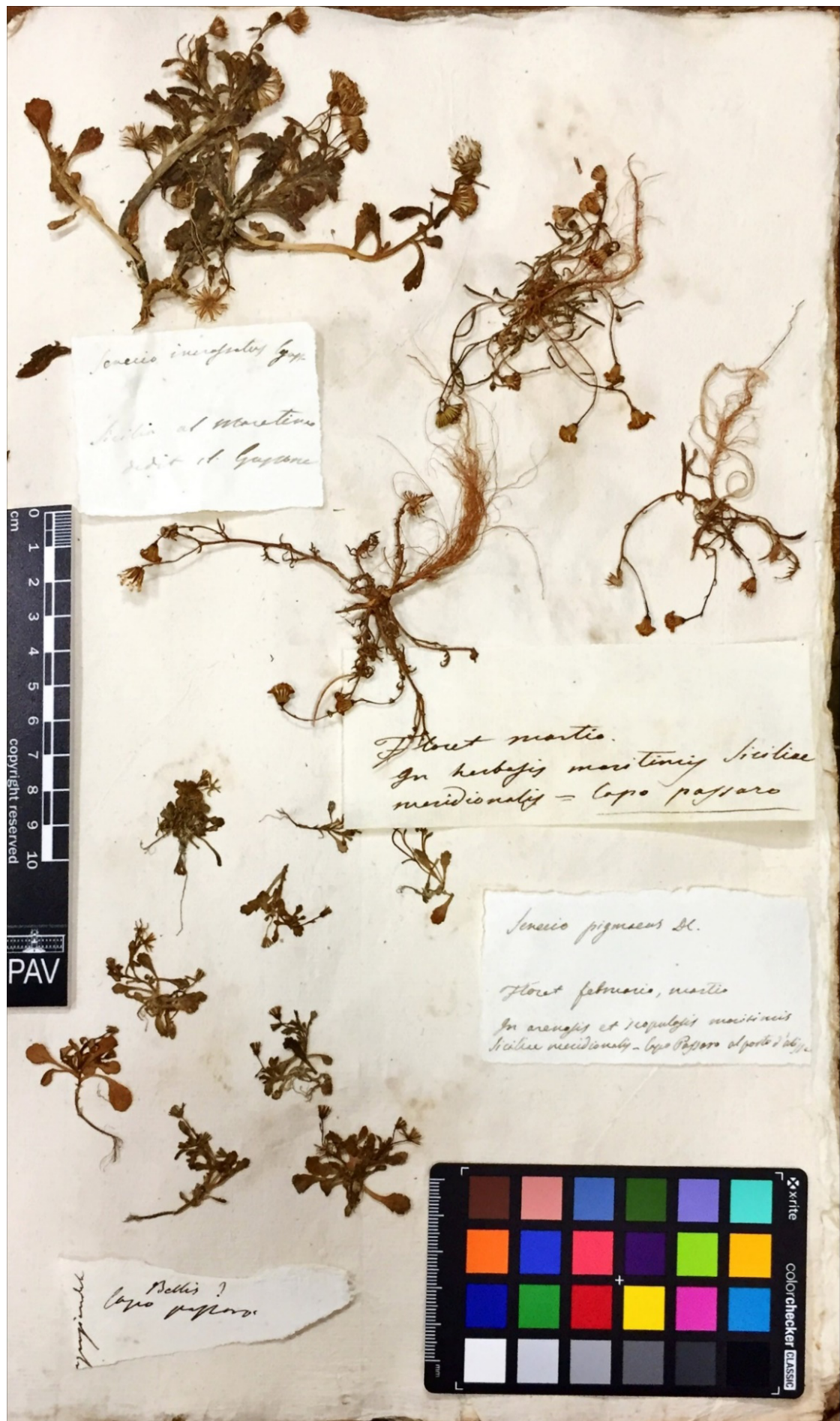


Figure 2. Isolectotype (only the nine small plants with the three labels in the lower part of the sheet) of *Senecio pygmaeus* deposited at PAV (photo: S. Orsenigo). Image courtesy of the Herbarium of the University of Pavia.

According to Pignatti *et al.* (2018) *S. pygmaeus* may be distinguished from *S. vulgaris* by considering the following morphological traits: 1) size of the whole plant (*S. pygmaeus* is usually dwarfed, prostrate and few cm tall, whilst *S. vulgaris* is up to 40 cm tall), 2) size of the involucre of the capitula (2 mm vs. 3–8 mm wide), 3) hairiness (0.5–0.8 mm long sparse hairs cover the leaves and the stem of *S. pygmaeus* whilst *S. vulgaris* is almost glabrous, with 0.3–0.5 mm long sparse hairs on the leaves only), 4) bracts (0.2×1.5 mm acute with an extremely narrow and pale edge in *S. pygmaeus* vs. lanceolate with a black tip or entirely black in *S. vulgaris*).

Specimina visa

Senecio pygmaeus

ITALY. Sicily: Sicilia?, s.d., *s.coll.* (CAT23713), det. S. Brullo; Sampieri, April 1971, *Brullo S. s.n.* (CAT [CAT23708]); Sampieri, 1 May 1978, *Brullo s.n.* (CAT23712); Sampieri (Pisciotta), 4 April 1988, *Bartolo & Brullo s.n.* (CAT23698); Sampieri, Costa del Carro, 20 April 1987, *Brullo s.n.* (CAT23710); Costa del Carro (Sampieri), 31 May 1985, *Brullo s.n.* (CAT23703); propè Capo Passaro, s.d., *s.coll.*, *Gussone* 22 April 1834 [date when the specimen was sent by Gussone, Authors' note] (G-DC, G00471446), **lectotypus**; Capo Passaro al Porto d'Ulisse, March, *s.coll.* [*Gasparrini ?*] (NAP-GUSS), **isolectotypus**; Capopassaro, s.d., *s.coll.* [*Gussone ?*] (PAL9666), **isolectotypus**; Capo Passaro, s.d., [*Gasparrini ?*] (PAV), **isolectotypus**; Capo Passaro, 30 April 1979, *Brullo s.n.* (CAT23711); Lampedusa, 17 March 1984, *Brullo s.n.* (CAT23697); Lampedusa, Punta a Ovest di Cala Madonna, 23 March 1986, *Brullo et al. s.n.* (CAT23709); Insula Lampedusa (olim Lopadusa), inter Cala Croce et Cala Madonna, 11 March 1906, *Sommier s.n.* (FI062070, FI062080, PAL9665).

MALTA. Malta, s.d., *Anon. s.n.* [probably Sommier, Authors' note] (FI062082); Insula Gaulos: In umbrosis maritimis, cala Dueira, 30 March 1874, *Duthie s.n.* (FI062069); Insula Gaulos: In umbrosis maritimis, 15 April 1874, *Duthie s.n.* (FI062067, FI062068); Insula Gaulos: In umbrosis maritimis prope Madonna dela Kala, 15 April 1874, *Duthie s.n.* (FI062064, FI062065, FI062066); Insula Gaulos (hodie Gozo), Cala Dueira, 7 April 1906, *Sommier s.n.* (FI062072); Insula Gaulos (hodie Gozo), Cala Dueira, 13 April 1907, *Sommier s.n.* (FI062071); Insulae Melitenses, Gaulos (hodie Gozo) insula Melitensis altera, in rupestribus et arenosis umbrosis mari proximis, pluribus locis, 10–50 m., solo calcareo, 21 April 1907, *Sommier s.n.* (FI062079); Insula Gaulos (hodie Gozo), Cala Dueira haud procul a mare, 23 April 1907, *Sommier s.n.* (FI062078); Insula Gaulos (hodie Gozo), Marsalforno, 26 April 1907, *Sommier s.n.* (FI062075, FI062076); Insula Gaulos (hodie Gozo), Uied Bingemma - Uied Karrot in rupestribus mari proximis, 28 April 1907, *Riccobono s.n.* (FI062077); Insula Gaulos (hodie Gozo), Ramla, haud procul a mare, 29 April 1907 *Sommier s.n.* (FI062073, FI062081); Ramla Bay (Gozo), 13 April 1984, *Brullo & Ronsisvalle s.n.* (CAT23715); Gozo, Tac-Cawla, 14 April 1987, *Brullo*

et al. s.n. (CAT23720, CAT23721); Insula Comino, 24 April 1907, *Sommier s.n.* (FI062074); Comino, 15 April 1987, *Brullo et al. s.n.* (CAT23717); Mthaleb, 12 April 1984, *Brullo & Ronsisvalle s.n.* (CAT23714); Draganara, 9 April 1984, *Brullo & Ronsisvalle s.n.* (CAT23716); Mithleb, 12 April 1987, *Brullo et al. s.n.* (CAT23729).

Specimina visa not belonging to Senecio pygmaeus

ITALY. Sicily: *Senecio pygmaeus* DC. In saxosis vulcanicis prope Catanam, 21–26 March 1874, *Strobl s.n.* (G), *S. vulgaris* (det. Jeanmonod).

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Authorship contribution

S.P.: Conceptualization, Data curation and Writing (first draft); D.J.: Writing (review); A.T.: Writing (review) and Supervision.

Conflict of interest

None.

References

- Alexander, I.C.M. 1979. The Mediterranean species of *Senecio* sections *Senecio* and *Delphinifolius*. *Notes Roy. Bot. Gard. Edinburgh* 37: 387–428.
- Arrigoni, P.V. 2015. *Senecio* L. (1753). In: *Flora dell'isola di Sardegna*, vol. 5. Pp. 118–134. Carlo Delfino Editore, Sassari.
- Bertoloni, A. 1853. *Senecio*. In: *Flora Italica*, vol. 9. Pp. 211–251. Ex Typographaeo Haeredum Richardi Masi, Bologna.
- Brullo, C. & Brullo, S. 2009. Considerazioni su alcune specie critiche della flora sicula. In: Peccenini S. &

- Domina G. (Eds.). Gruppi Critici della Flora d'Italia. Pp. 43–44. Dipartimento di Scienze Botaniche dell'Università di Palermo, Palermo.
- Brullo, S., Brullo, C., Cambria, S. & Giusso del Galdo, G. 2020. *The Vegetation of the Maltese Islands*. Springer Nature, Cham, Switzerland.
- Calvo, J. & Aedo, C. 2019. *Senecio* L. In: Benedí, C., Buira, A., Rico, E., Crespo, M.B., Quintanar, A. & Aedo, C. (Eds.). *Flora Iberica XVI* (III), Compositae (partim). Pp. 1506–1662. Real Jardín Botánico - CSIC, Madrid.
- Calvo, J., Spencer, M.A. & Aedo, C. 2014. Lectotypification of names of Eurasian-African *Senecio* (Compositae). *Taxon* 63: 423–426. doi: 10.12705/632.13
- Candolle, A. (de) 1838. *Prodromus Systematis naturalis Regni vegetabilis*, vol. 6. *Sumptibus sociorum Treuttel & Würtz*, Paris.
- Chater, A.O. & Walter, S.M. 1976. *Senecio* L. In: Tutin, T.G. & al. (Eds.). *Flora Europaea*, vol. 4: 191–204. Cambridge Univ. Press, Cambridge.
- Comes, H.P. & Abbott, R.J. 2001. Molecular phylogeography, reticulation, and lineage sorting in Mediterranean *Senecio* sect. *Senecio* (Asteraceae). *Evolution* (Lancaster) 55: 1943–1962.
- Cupani, F. 1696. *Hortus Catholicus seu Illustrissimi et Excellentissimi Principis Catholicae Ducis Misilmeris*. Apud Franciscum Benzi, Neapoli [Naples].
- Di Martino, A. 1963. *Flora e vegetazione dell'isola di Pantelleria*. Lav. Ist. Bot. Giard. Colon. Palermo 19: 87–243.
- Duthie, J.F. 1875. On the botany of the Maltese Islands in 1874: Part Two. *J. Bot.* 13: 36–42.
- Ferrer-Gallego, P., Nazzaro, R., Ferrando-Pardo, I. & Laguna, E. 2017. Typification of the Mediterranean endemic conifer *Juniperus turbinata* (Cupressaceae). *Phytotaxa* 302(2): 165–173. doi: 10.11646/phytotaxa.302.2.6
- Fiori, A. 1903. *Senecio* L. In: Fiori, A. & Paoletti, G. (Eds.). *Flora Analitica d'Italia*, vol. 3. Pp. 208–221. Tipografia del Seminario, Padova.
- Gallego, M.J. 1983. Notas taxonómicas y corológicas sobre la Flora de Andalucía Occidental 82. *Senecio leucanthemifolius* Poiret, *Voy. Barb.* 2: 238 (1789). *Lagascalia* 1: 113.
- Gillies, A.C.M., Cubas, P., Coen, E.S. & Abbott R.J. 2002. Making rays in the Asteraceae: genetics and evolution of radiate versus discoid flower heads. In: Cronk, Q.C.B., Bateman, R.M. & Hawkins, J.A. (Eds.). *Developmental Genetics and Plant Evolution*. Pp. 233–246. Taylor & Francis, London.
- Greuter, W. & Raab-Straube (von) E. (Eds.). 2008. *Med-Checklist: A critical inventory of vascular plants of the circum-Mediterranean countries*, vol. 2: *Dicotyledones* (Compositae). OPTIMA, Genève.
- Gussone, G. 1827–1832. *Florae Siculae Prodromus*. 2 Voll. Ex Regia Typographia, Neapoli [Naples].
- Gussone, G. 1832–1834. *Supplementum ad Florae Siculae Prodromum*. Fasciculi 2. Ex Regia Typographia, Neapoli [Naples].
- Gussone, G. 1844. *Senecio*. In: *Florae Siculae Synopsis*, vol. 2, part 1. Pp. 470–479. Ex typis Tramater, Neapoli [Naples].
- Horvatić, S. 1956. *Senecio caroli-malyi* spec. nov. *Biol. Glasn.* 8: 37–47.
- Ingram, T. & Taylor, L. 1982. The genetic control of a non-radiate condition in *Senecio squalidus* L. and some observations on the role of ray florets in the Compositae. *New Phytol.* 91: 749–756.
- Jeanmonod, D. 2003. Le groupe du *Senecio leucanthemifolius* en Corse, avec description d'une nouvelle espèce: *S. serpentinicola* Jeanm. *Candollea* 58: 429–459.
- Kadereit, J.W. 1984. The origin of *Senecio vulgaris* (Asteraceae). *Pl. Syst. Evol.* 145: 135–153.
- La Valva, V. 1993. *La Collezione Gussone Sicilia*. *Webbia* 48: 515–537.
- Lambinon, J. 1984. N°10895. *Senecio leucanthemifolius* Poir. var. *leucanthemifolius* [= *S. crassifolius* Willd.]. *Bull. Soc. Echange Pl. Vasc. Eur. Occid. Bassin Médit.* 19: 80–81.
- Lojacono-Pojero, M. 1903. *Senecio* Lin. In: Lojacono-Pojero, M. *Flora Sicula*, vol. 2, part 1. Pp. 58–69. A. Reber, Palermo.
- Mazzola, P., Castiglia, A. & Geraci, A. 1997. Collections and collectors in the Herbarium Siculum of Palermo. *Bocconea* 5: 417–424.
- Mazzola, P., Raimondo, F.M., Greuter, W. & Troia, A. 2014. Typification of names in *Draba* sect. *Aizopsis* (Cruciferae, Arabideae) based on material from Italy. *Pl. Biosyst.* 148: 483–491. doi: 10.1080/11263504.2013.782903
- Mossetti, U. & Cristofolini, G. 1992. Storia e stato attuale dell'Hortus Siccus di Antonio Bertoloni. *Mem. Accad. Lunigianese Sci.* 60–61: 137–153.
- Mostari, A., Benabdeli, K. & Véla, E. 2020. Le littoral de Mostaganem (Algérie), une “zone importante pour les plantes” (ZIP) autant négligée que menacée. *Fl. Médit.* 30: 207–233. doi: 10.7320/FIMedit30.207
- Pasquale, G.A. 1866. Cenno biografico di Guglielmo Gasparrini. *Ann. R. Univ. Napoli* 1866: 239–246.
- Pasquale, G.A. 1871. Documenti biografici di Giovanni Gussone botanico napoletano tratti dalle sue opere e specialmente dal suo erbario. *Atti Accad. Pontan. Napoli* 10: 99–151.
- Pellegrini, O. 1967. Nel centenario della morte di Guglielmo Gasparrini. *Atti Ist. Bot. Lab. Crittog. Univ. Pavia ser. 6, III*: 219–231.
- Peruzzi, L., Domina, G., Bartolucci, F., Galasso, G., Peccenini, S., Raimondo, F.M., Albano, A., Alessandrini, A., Banfi, E., Barberis, G., Bernardo, L., Bovio, M., Brullo, S., Brundu, G., Brunu, A., Camarda, I., Carta, L., Conti, F., Croce, A., Iamónico, D., Iberite, M., Iiriti, G., Longo, D., Marsili, S., Medagli, P., Pistarino, A., Salmeri, C., Santangelo, A., Scassellati, E., Selvi, F., Soldano, A., Stinca, A., Villani, M., Wagensommer, R.P. & Passalacqua, N.G. 2015. An inventory of the names of vascular plants endemic to Italy, their loci classici and types. *Phytotaxa* 196(1): 1–217. doi: 10.11646/phytotaxa.196.1.1
- Peruzzi, L., Galasso, G., Domina, G., Bartolucci, F., Santangelo, A., Alessandrini, A., Astuti, G., D'Antraccoli, M., Roma-Marzio, F., Ardenghi, N.M.G., Barberis, G., Conti, F., Bernardo, L., Peccenini, S., Stinca, A.,

- Wagensommer, R.P., Bonari, G., Iamónico, D., Iberite, M., Viciani, D., Del Guacchio, E., Gusso del Galdo, G., Lastrucci, L., Villani, M., Brunu, A., Magrini, S., Pistarino, A., Brullo, S., Salmeri, C., Brundu, G., Clementi, M., Carli, E., Vacca, G., Marcucci, R., Banfi, E., Longo, D., Di Pietro, R. & Passalacqua, N.G. 2019. An inventory of the names of native, non-endemic vascular plants described from Italy, their loci classici and types. *Phytotaxa* 410(1): 1–215. doi: 10.11646/phytotaxa.410.1.1
- Pignatti, S. 1982. *Senecio* L. In: *Flora d'Italia*, vol. 3. Pp. 117–136. Edagricole, Bologna.
- Pignatti, S. & Guarino, R. 2019. *Senecio*. In: Pignatti, S., Guarino, R. & La Rosa, M. (Eds.). *Flora d'Italia*, vol. 4 (2nd ed.). Pp. 189–190, 877–879. Edagricole, Bologna.
- Pignatti, S., Guarino, R. & La Rosa, M. 2018. *Senecio* L. In: Pignatti, S., Guarino, R., La Rosa, M. (Eds.). *Flora d'Italia*, vol. 3 (2nd ed.). Pp. 909–923. Edagricole, Bologna.
- Sommier, S. 1908. *Le Isole Pelagie Lampedusa, Linosa, Lampione, e la loro Flora. Con un elenco completo delle piante di Pantelleria*. Pellas, Firenze.
- Sommier, S. 1910. 1148. *Senecio pygmaeus* DC. In: Fiori, A. & Béguinot, A. (Eds.). *Schedae ad Floram Italicam Exsiccatae. Series II. Centuria XI–XII (continuatio)*. *Nuovo Giorn. Bot. Ital.* n.s. 17: 62–122.
- Sommier, S. 1922. *Flora dell'Isola di Pantelleria*. M. Ricci, Firenze.
- Sommier, S. & Caruana Gatto, A. 1915. *Flora Melitensis Nova*. Pellas, Firenze.
- Strid, A. 2016. *Atlas of the Aegean Flora*. Englera 33, part 2: Maps. Botanischer Garten und Botanisches Museum, Berlin-Dahlem.
- Trotter, A. 1948. *Notizie botaniche storiche e biografiche intorno a Giovanni Gussone ed al suo tempo, desunte da suoi manoscritti inediti*. *Delpinoa* n.s. 1: 75–108.
- Walter, G.M., Abbott, R.J., Brennan, A.C., Bridle, J.R., Chapman, M., Clark, J., Filatov, D., Nevado, B., Ortiz-Barrientos, D. & Hiscock, S.J. 2020. *Senecio* as a model system for integrating studies of genotype, phenotype and fitness. *New Phytol.* 226: 326–344. doi: 10.1111/nph.16434
- Weir, J. & Ingram R. 1980. Ray morphology and cytological investigations of *Senecio cambrensis* Rosser. *New Phytol.* 86: 237–241.

Websites

- Alippi Cappelletti, M. 1999. *Gasparrini, Guglielmo*. In: *Dizionario Biografico degli Italiani* 52. Treccani, Roma. https://www.treccani.it/enciclopedia/guglielmo-gasparrini_%28Dizionario-Biografico%29/ [Accessed 4 June 2022].
- Burdet, H.M. 1979. *Gussone, Giovanni*. In: *Auxilium ad Botanicorum Graphicem. Conservatoire et Jardin botaniques de Genève*. https://www.ville-ge.ch/musinfo/bd/cjb/auxilium/result.php?type_search=simple&criteria=gussone. [Accessed 4 June 2022].
- Greuter, W. 2006. *Compositae (pro parte majore)*. In: Greuter, W. & Raab-Straube (von) E. (Eds.). *Compositae. Euro+Med Plantbase - the information resource for Euro-Mediterranean plant diversity*. <http://ww2.bgbm.org/EuroPlusMed/PTaxonDetail.asp?NameCache=Senecio&PTRefFk=7000000> [Accessed 4 June 2022].
- Thiers, B.M. & Ramirez, J. 2021. *Index Herbariorum API, version 1.0*. <https://sweetgum.nybg.org/science/ih/> [Accessed 4 June 2022].