



Galatella malacitana (Asteraceae): a new species from the peridotitic mountains of southern Spain

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Abstract

A new species of the genus *Galatella* is described, illustrated, and compared with the other three Iberian taxa of the genus, *G. aragonensis*, *G. linosyris*, and *G. sedifolia* subsp. *sedifolia*, and the two morphologically most similar taxa, *G. sedifolia* subsp. *biflora* and *G. regelii*. The new species occurs on peridotitic soils, forming part of the open shrublands in the province of Málaga (southern Spain). In addition, a distribution map, illustrations, and a description of the habitat of the new species are presented. We also propose to use the presence or absence of hairs on the outer surface of the corolla as a diagnostic character in *Galatella*.

Key words: Astereae, Compositae, Iberian Peninsula, taxonomy

Introduction

The genus *Galatella* Cassini (1825: 463) includes between 30 and 45 species distributed mainly throughout Europe, Russia, Iran, and from India to western China (Tzvelev 1959, Ling *et al.* 1985, Nesom & Robinson 2007), its main centre of diversity being Eastern Europe and Russia.

The circumscription of this genus within the tribe Astereae and its relations with the genus *Aster* Linnaeus (1753: 872) are still insufficiently studied. Although main systematic studies of the tribe invariably argued for the independence of the genus *Galatella* with respect to the genus *Aster* (Tzvelev 1959, Ling *et al.* 1985, Nesom 1994a and 1994b, Nesom & Robinson 2007), this viewpoint has had little reception in most of the regional flora guides available in the Iberian Peninsula, which still include the species of *Galatella* in the genus *Aster* (Willkomm 1865, Coutinho 1939, Merxmüller *et al.* 1976, Franco 1984, Bolòs & Vigo 1996, Aedo 2014a). The most recent molecular studies suggest, on the one hand, its clear separation from the genus *Aster*, and, on the other hand, the inclusion of other closely related genera in *Galatella*, such as *Crinitaria* Cassini (1825: 475) [= *Linosyris* Cassini (1825: 460, 476), *nom. illeg.*], and *Tripolium* Nees (1832: 152) (Fiz *et al.* 2002, Brouillet *et al.* 2009, Li *et al.* 2012), this latter often being accepted as a separate genus.

The genus *Galatella* includes biennial to perennial species with stems erect; leaves alternate, linear, oblong to sometimes oblanceolate-spathulate, entire, 1–3-nerved, sessile or the lowermost petiolate; synflorescence corymbose, (1–)2–50(–70)-headed; involucre cylindrical to obconical, with phyllaries 2–9-seriate, herbaceous to subcoriaceous; ray flowers absent or up to 30, usually sterile, rarely pistillate, limbs pinkish or bluish-violet; disc flowers hermaphrodite, yellow or partly pink; anthers not appendiculated at the base; style appendages lanceolate or ovate-triangular; achenes obovate, fusiform to oblong, somewhat compressed, without obvious ribs, strigose-sericeous and gland-dotted; pappus bristles whitish to pinkish, (1–)2–3-seriate, basally somewhat connate, rarely caducous.

In Western Europe, and more specifically in the Iberian Peninsula, only 3 species of *Galatella* are found (Aedo 2014a, sub *Aster*): *G. aragonensis* (Asso 1779: 121) Nees (1832: 167), endemic to the Iberian Peninsula; *G. linosyris* (Linnaeus 1753: 841) Rehb. fil. in Reichenbach (1853: 8), widespread throughout Southern and Central Europe to Central Russia, Western Turkey, and the Caucasus, Algeria, and Morocco; and *G. sedifolia* (Linnaeus 1753: 874) Greuter

References

- Aedo, C. (2014a) *Aster* L. In: Castroviejo, S. (Coord.) *Flora Iberica*. Vol. 16. Real Jardín Botánico, CSIC, Madrid. [in preparation]
- Aedo, C. (2014b) *Nolletia chrysocomoides* (Desf.) Less. (Compositae), especie a excluir de la Flora Europea. *Acta Botanica Malacitana* 39: 320–321.
- Asso, I.J. de (1779) *Synopsis stirpium indigenarum Aragoniae*. Massiliae, 198 pp.
- Baksay, L. (1958) The chromosome numbers of Ponto-Mediterranean plant species. *Annales Historico-Naturales Musei Nationalis Hungarici* 50: 121–125.
- Blanca, G. (1993) Origen de la Flora Andaluza. In: Valdés, B. (Ed.) *Introducción a la Flora Andaluza*. Junta de Andalucía, Sevilla, pp. 19–35.
- Blanca, G. (1997) Origen y Evolución de la Flora Andaluza. In: Rodríguez-Hiraldó, C. (Ed.) *Naturaleza de Andalucía*. Vol. 3. Ediciones Giralda, Sevilla, pp. 77–134.
- Bolòs, O. de & Vigo, J. (1996) *Flora dels Països Catalans*. Vol. 3. Barcino, Barcelona, 1230 pp.
- Brouillett, L., Lowrey, T.K., Urbatsch, L., Karaman-Castro, V., Sancho, G., Wagstaff, S. & Semple, J.C. (2009) Astereae. In: Funk, V.A., Susanna, A., Stuessy, T.F. & Bayer, R.J. (Eds.) *Systematics, Evolution, and Biogeography of Compositae*. IAPT, Vienna, pp. 589–629.
- Cassini, A.H.G. de (1825) Paquerolle, *Bellium*. In: Cuvier, F. (Ed.) *Dictionnaire des sciences naturelles*. Vol. 37. Le Normant, Paris, pp. 454–495.
- Chuksanova, N.A., Svechnikova, L.I. & Alexandrova, T.V. (1968) Data on karyology of the family Compositae Giseke. *Citologija (Moskva & Leningrad)* 10: 198–206.
- Coutinho, A.X.P. (1939) *Flora de Portugal (plantas vasculares)*. 2ª edição. Bertrand, Lisboa, 938 pp.
- Darlington, C.D. & La Cour, L.F. (1969) *The handling of chromosomes*. Allen & Unwin, London, 272 pp.
- Desfontaines, R.L. (1799) *Flora atlantica*. Vol. 2(7–9). L.G. Desgranges, Paris, pp. 161–458.
- Fiz, O., Valcárcel, V. & Vargas, P. (2002) Phylogenetic position of Mediterranean Astereae and character evolution of daisies (*Bellis*, Asteraceae) inferred from nrDNA ITS sequences. *Molecular Phylogenetics and Evolution* 25: 157–171.
[http://dx.doi.org/10.1016/S1055-7903\(02\)00228-2](http://dx.doi.org/10.1016/S1055-7903(02)00228-2)
- Franco, J. do A. (1984) *Nova flora de Portugal (Continente e Açores)*. Vol. 2. Edição do autor, Lisboa, 659 pp.
- Garbari, F. & Tornadore, N. (1972) Numeri cromosomici per la flora italiana: 108–123. *Informatore Botanico Italiano* 4: 60–66.
- García-Antón, M., Gil Romera, G. & Carrión, J.S. (2007) Historia de la vegetación. In: Blanca, G. & Valle, F. (Eds.) *Proyecto Andalucía Naturaleza, XXIV, Botánica V*. Publicaciones Comunitarias, Sevilla, pp. 343–378.
- García-Barruoso, M., Fernández-Castellano, C., Rocha, J., Bernardos, S. & Amich, F. (2012) Conservation study of endemic plants in serpentine landscapes: *Antirrhinum rothmaleri* (Plantaginaceae), a serpentinophyte with a restricted geographic distribution. *Plant Biosystems* 146: 291–301.
<http://dx.doi.org/10.1080/11263504.2011.607194>
- Greuter, W. (2003) The Euro+Med treatment of Astereae (Compositae) – generic concepts and required new names. *Willdenowia* 33: 45–47.
<http://dx.doi.org/10.3372/wi.33.33103>
- Greuter, W. & Raab-Straube, E. von (Eds.) (2006) Euro+Med Notulae, 2. *Willdenowia* 36: 707–717.
<http://dx.doi.org/10.3372/wi.36.36206>
- Hindáková, M. (1970) Index of chromosome numbers of Slovakian Flora (Part 1). *Acta Facultatis Rerum Naturalium Universitatis Comenianae, Botanica* 16: 1–26.
- Javůrková-Jarolímová, V. (1992) *Aster linosyris* (L.) Benth. In: Měsíček, J. & Javůrková-Jarolímová, V. (Eds.) *List of chromosome numbers of the Czech vascular plants*. Academia, Praha, pp. 106–119.
- Kovanda, M. (1984) Chromosome number in selected Angiosperms. 2. *Preslia* 56 (4): 289–301.
- Krasnikov, A.A. & Korolyuk, E.A. (2011) Asteraceae. In: Marhold, K. (Ed.), IAPT/IOPB chromosome data 11. *Taxon* 60 (4): 1220–1223.
- Kruckerberg, A.R. (1992) Plant life of western north American ultramafics. In: Roberts, B.A. & Proctor, J. (Eds.) *The ecology of areas with serpentinized rocks: a world overview*. Kluwer, Dordrecht, The Netherlands, pp. 31–73.
http://dx.doi.org/10.1007/978-94-011-3722-5_3
- Lessing, Ch.F. (1832) *Synopsis generum Compositarum*. Duncker et Humblot, Berlin, 473 pp.
- Li, W.-P., Yang, F.-S., Jivkova, T. & Yin, G.-S. (2012) Phylogenetic relationships and generic delimitation of Eurasian *Aster* (Asteraceae: Astereae) inferred from ITS, ETS and trnL-F sequence data. *Annals of Botany* 109: 1341–1357.
<http://dx.doi.org/10.1093/aob/mcs054>
- Linnaeus, C. (1753) *Species plantarum*. L. Salvius, Stockholm, 1200 pp.

- Ling, R., Chen, Y.L. & Shi, Z. (1985) Astereae. In: Ling, R., Chen, Y.L. & Shi, Z. (Eds.) *Flora Reipublicae Popularis Sinicae. Vol. 74*. Science Press, Beijing, pp. 70–353.
- López González, G. (1975) Contribución al estudio florístico y fitosociológico de Sierra de Aguas. *Acta Botanica Malacitana* 1: 81–205.
- Merxmüller, H., Schreiber, A. & Yeo, P.F. (1976) *Aster* L. In: Tutin, T.G., Heywood, V.H., Burges, N.A., Moore, D.M., Valentine, D.H., Walters, S.M. & Webb, D.A. (Eds.) *Flora Europaea. Vol. 4*. Cambridge University Press, Cambridge, pp. 112–116.
- Monserrat, V.J. & Gavira, O. (2014) A new European species of *Nevrorthus* in the Iberian Peninsula (Insecta, Neuropterida). *Zootaxa* 3796 (2): 349–360.
<http://dx.doi.org/10.11646/zootaxa.3796.2.7>
- Monti, G., Pagni, A.M. & Viegi, L. (1978) Numeri cromosomici per la Flora Italiana: 416–422. *Informatore Botanico Italiano* 10 (1): 101–110.
- Nees von Esenbeck, C.G.D. (1832) *Genera et Species Asterearum*. I.D. Gruson, Vratislaviae, 310 pp.
- Negodi, G. (1938) Cariologia del genere *Aster* L. (Compositae). I. Contributo. *Archivio Botanico (Forlì)* 14: 185–216.
- Nesom, G. (1994a) Subtribal classification of the Astereae (Asteraceae). *Phytologia* 76: 193–274.
- Nesom, G. (1994b) Review of the taxonomy of *Aster* sensu lato (Asteraceae: Astereae), emphasizing the New World species. *Phytologia* 77: 141–297.
- Nesom, G. & Robinson, H. (2007) Tribe Astereae Cass. In: Kadereit, J.W. & Jeffrey, C. (Eds.) *The Families and Genera of Vascular Plants. Vol. 8*. Springer, Leipzig, pp. 284–342.
- Pérez-Latorre, A.V., Hidalgo-Triana, N. & Cabezudo, B. (2013) Composition, ecology and conservation of the south-Iberian serpentine flora in the context of the Mediterranean basin. *Anales del Jardín Botánico de Madrid* 70: 62–71.
<http://dx.doi.org/10.3989/ajbm.2334>
- Reeves, R. & Adigüzel, N. (2004) Rare plants and nickel accumulators from Turkish serpentine soils, with special reference to *Centaurea* species. *Turkish Journal of Botany* 28: 147–153.
- Reichenbach, H.G.L. (1853–1854) *Icones Florae Germanicae et Helveticae. Vol. 16*. Ambrosii Abel, Lipsiae, 86 pp., 150 pl.
- Rivas Goday, S. (1973) Plantas serpentínicas y dolomíticas del sur de España. *Boletim da Sociedade Broteriana, 2a Series 47* (Supplement): 161–178.
- Rivas Goday, S. & Esteve Chueca, F. (1972). Flora serpentínica española. *Anales de la Real Academia de Farmacia* 38: 409–462.
- Safford, H.D., Viers, J.H. & Harrison, S.P. (2005) Serpentine endemism in the California flora: a database of serpentine affinity. *Madroño* 52: 222–257.
[http://dx.doi.org/10.3120/0024-9637\(2005\)52\[222:SEITCF\]2.0.CO;2](http://dx.doi.org/10.3120/0024-9637(2005)52[222:SEITCF]2.0.CO;2)
- Selvi, F. (2007) Diversity, geographic variation and conservation of the serpentine flora of Tuscany (Italy). *Biodiversity and Conservation* 16: 1423–1439.
<http://dx.doi.org/10.1007/s10531-006-6931-x>
- Stevanovič, V., Tan, K. & Iatrou, G. (2003) Distribution of endemic Balkan flora on serpentine. I. Obligate serpentine endemics. *Plant Systematics and Evolution* 242: 149–170.
<http://dx.doi.org/10.1007/s00606-003-0044-8>
- Thornill, J.W., Matta, R.K. & Wood, W.H. (1965) Examining three-dimensional microstructures with the scanning electron microscope. *Grana Palynologica* 6: 3–6.
<http://dx.doi.org/10.1080/00173136509429136>
- Tzvelev, N.N. (1959) *Galatella* Cass. In: Schischkin, B.K. (Ed.) *Flora of the USSR. Vol. 25*. Akademiya Nauk SSSR Publishers, Moscow & Leningrad, pp. 138–172. [English translation: Smithsonian Institution Libraries, Washington D.C., 1999, pp. 128–161]
- Willkomm, M. (1865) Compositae L. In: Willkomm, M. & Lange, J. (Eds.) *Prodromus Florae Hispanicae. Vol. 2*. E. Schweizerbart, Stuttgartiae, pp. 24–273.