

Galatella sedifolia (Asteraceae), a species with questionable occurrence in Bulgarian flora, and remarks on its Balkan distribution

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Abstract. This article is about the first reliable records of the presence of *Galatella sedifolia* (= *Aster sedifolius*) in Bulgarian flora. The species was discovered in the Danubian Plain floristic region (Central Northern Bulgaria), in the Studena River Valley, Hadzhidimitrovo village, Svishtov district. It inhabits steppe grasslands and scrublands on slightly salinized loess soils. This study provides data on distribution, habitats and populations of *G. sedifolia* subsp. *sedifolia* in Bulgaria and its main distinguishing characters.

Key words: Balkan flora, Bulgaria, Compositae, *Galatella*, halophytes, new record.

Introduction

According to the latest taxonomic treatment of the genus *Galatella* Cass. in the Flora of the Republic of Bulgaria, vol. 11, it is represented by three species – *G. linosyris* (L.) Rchb.f., *G. villosa* (L.) Rchb.f. and *G. cana* (Waldst. & Kit.) Nees (Kuzmanov & Ančev, 2012). The latter is an unnumbered taxon because its distribution in Bulgaria needs confirmation. One more species is only mentioned in the supplementary notes at the end of the elaboration for this genus – *G. sedifolia* (L.) Greuter. Data for these two unconfirmed species are rather scarce. *Galatella cana* was reported for the first time by Velenovský (1898) from the area of Lom town (Northwest Bulgaria), but herbarium specimens from this locality were not found so far. *Galatella sedifolia* was firstly indicated to Bulgaria in *Flora Europaea* (Merxmüller & Schreiber, 1976) (as *Aster sedifolius* L.). In this publica-

tion within *A. sedifolius* six subspecies are accepted, including *A. canus* Waldst. & Kit. as one of its subspecies. Peev (1992), probably based on *Flora Europaea* account, also noted *A. sedifolius* for Bulgarian flora, with three subspecies – *A.s.* subsp. *sedifolius*, *A.s.* subsp. *canus* (Waldst. & Kit.) Merxm. and *A.s.* subsp. *illyricus* (Murb.) Merxm. – all of which with questionable status in the country.

The aim of the present article is to report the first reliable findings of *G. sedifolia* subsp. *sedifolia* in Bulgarian flora and to provide some data about the habitats and populations of the species. Some comments on its Balkan distribution are also given.

Materials and Methods

Plant material was gathered from two localities in the Studena River Valley (Danubian Plain floristic region). Morphological features were studied from the personal collec-

tions and compared with the specimens of *Galatella* available in Bulgarian herbaria SO, SOA and SOM (acronyms follow Thiers, 2023+). The collected specimens have been deposited in herbaria SOM and SO. Data for the habitats and populations of the species are based on the authors' observations. Nomenclature of *Galatella* follows Greuter (2006+).

Results and Discussion

A new native species to Bulgaria, *Galatella sedifolia*, was discovered in the late autumn of 2022 in the area of Hadzhidimitrovo village (Svishtov district). This happened during a field survey aimed at identifying more territories for the declaration of new protected sites of the rare plant *Serratula bulgarica*. The finding of *G. sedifolia* appeared to be the first reliable record of the species to Bulgarian flora, the occurrence of which has hitherto been uncertain. While checking the materials of genera *Aster* and *Galatella* available in Bulgarian herbaria, no specimen of *G. sedifolia* (and none of its subspecies) from Bulgaria was found, although it was noted long ago for the country (Merxmüller & Schreiber, 1976; Peev, 1992). This discrepancy is probably due to the fact that *G. cana*, reported for Bulgaria by Velenovský (1898), was subsequently treated within *G. sedifolia*, as a subspecies, and then in *Flora Europaea* it is not specified which of the subspecies occurs in the Bulgarian flora.

Taxonomy

Galatella sedifolia is a very variable taxon, in the circumscription of which four (POWO, 2023) or five subspecies (Greuter, 2006+) are currently accepted. The capitula of the plants of Bulgarian population are characterized by the presence of 5–10 ray florets and 15–25 disc florets and their leaves are mostly acuminate, 3–8 mm wide. These features are typical to the nominate subspecies *G. sedifolia* subsp. *sedifolia* (Fig. 1). Its closest taxon is *G. sedifolia* subsp. *dracunculoides* (Lam.) Greuter, which is distinguished by the smaller number of ray (up to 6 or absent) and disc (6–15) florets, as well as with acute to obtuse leaves. The range of the latter extends from Eastern Europe to Western Siberia and

Central and Southwestern Asia in the south (POWO, 2023). *Galatella sedifolia* subsp. *illyrica* (Murb.) Greuter, confined to the Western Balkans, differs from the two subspecies mentioned above with its wider (usually more than 8 mm), obtuse, 3–5-veined, not gland-dotted leaves.

Galatella sedifolia (L.) Greuter (Willdenowia 33: 47. 2003) subsp. *sedifolia*

Perennial plant with nodose rhizome. Stems 5–15, 30–80 cm, densely foliate, erect, striate, scabrous. Leaves linear-lanceolate to narrowly elliptical, acuminate, subcoriaceous, gland-dotted, scabrous, setulose, 30–50(60) × 3–8 mm, most 3-veined, with serrulate margins. Synflorescence corymbose, dense, with numerous heads. Involucre 3–5 mm long, cylindrical to obconical, phyllaries 2–3 mm long, outer triangular, middle and inner lanceolate to ovate, acute, glabrous, 3-veined, with obvious green midrib, margins scarious. Capitula radiate, with 5–10 ray florets and 15–25 disc florets. Ray florets 8–12 mm long, usually sterile, rarely pistillate, whitish-blue or lilac-pink. Disc florets 5–6.5 mm long, hermaphrodite, yellow, at the end of anthesis purple, surface glabrous, limbs ca. 2 mm. Achenes 3.5–5 mm long, buff-colored, oblong-obovoid, compressed, with unclear ribs, strigose, gland-dotted; pappus 4.5–6.5 mm long, bristles scabrid, pale straw-colored. Flowering VIII–X, fruiting X–XI.

With its 3-veined leaves and the presence of ray florets *G. sedifolia* subsp. *sedifolia* is clearly distinguishable from the two other known species of the genus in Bulgaria, *G. villosa* and *G. linosyris*, whose leaves are one-veined and the capitula are without ray florets (Fig. 2).

Distribution

The range of *G. sedifolia* subsp. *sedifolia* occupies most of Europe, except for its northern parts and many of the Balkan countries (Greuter, 2006+). Data on its distribution in the Balkans are scarce and uncertain so far. Hayek (1931) noted it only for Albania (as *A. punctatus* Waldst. & Kit.), while *Aster illyricus* (Murb.) K. Malý (currently treated as *G.*

sedifolia subsp. *illyrica*) was indicated by him for Dalmatia, Bosnia and Herzegovina, and Montenegro. The latest accounts of the floras of Bosnia and Herzegovina (Bjelčić, 1983; as *A. illyricus*), Croatia (Nikolić, 2015+; as *A. sedifolius* subsp. *illyricus*) and Albania (Barina et al., 2018; as *A. sedifolius* subsp. *illyricus*) confirm the presence only of *G. sedifolia* subsp. *illyrica*. This taxon is nowadays specified for all Western Balkan countries (Greuter, 2006+). The occurrence of *G. sedifolia* subsp. *sedifolia* in Albania (Barina et al., 2018) and Croatia (Nikolić, 2015+) is still questionable, as no herbarium vouchers are available. *Galatella sedifolia* subsp. *sedifolia* is also reported to Serbian flora (Boža & Vasić, 1986; as *A. sedifolius* subsp. *sedifolius*), but its distribution is outside of the Balkans, only in the administrative region of Vojvodina.

In Bulgaria, *G. sedifolia* subsp. *sedifolia* has been found in the Danubian Plain floristic region, in the area of Hadzhidimitrovo village (Svishtov district), in two localities ca. 2.5 km apart (see *Author-collected specimens*). Based on the aforementioned, the Bulgarian population is the only reliable record of that species in the Balkans. Its closest locality is situated about 100 km to the northeast, in Romania, in the Wallachian Plain – territory of Comana Natural Park, Giurgiu County (Morariu & Nyárády, 1964).

Habitats and populations

In Bulgaria, *G. sedifolia* subsp. *sedifolia* occurs in specific slightly saline soils on loess deposits, in meso-xerophile grasslands, on more or less shaded slopes with a northwest exposure (Fig. 3). The species participates mainly in open grassland communities where it forms dense patches of area 10–100 m² which have a few hundred plants in number. The entire area occupied by the subpopulation in Boyadzhiyata locality is about 0.3 ha and includes 800–1000 individuals. In the locality above Hadzhidimitrovo fishponds, *G. sedifolia* grows among scrublands. Due to the high degree of overgrowth with native trees and scrubs, resulting in a reduction of grasslands, this subpopulation is negatively impacted and comes to only 50–70 individuals.

The co-occurring species in the localities of *G. sedifolia* are: *Agropyron cristatum*, *Aster amellus*, *Bromus tectorum*, *Campanula sibirica*, *Centaurea stereophylla*, *Cerinthe minor*, *Clinopodium vulgare*, *Crataegus monogyna*, *Crocus pallasii*, *Crupina vulgaris*, *Dactylis glomerata*, *Dichanthium ischaemum*, *Dorycnium herbaceum*, *Echinops ritro*, *Elymus repens*, *Filipendula vulgaris*, *Genista sessilifolia* subsp. *trifoliata*, *Inula ensifolia*, *Linum corymbulosum*, *L. nervosum*, *Medicago falcata*, *Nepeta parviflora*, *Peucedanum alsaticum*, *Phlomis herba-venti* subsp. *pungens*, *P. tuberosa*, *Phragmites australis*, *Plantago media*, *Salvia nemorosa*, *Scabiosa ochroleuca*, *Scorzonera hispanica*, *Stachys recta*, *Tanacetum corymbosum*, *Teucrium chamaedrys*, *Thalictrum aquilegifolium*, *Rosa gallica*, including species of the ecological group of subhalophytes (on salinized marls) such as *Artemisia santonicum*, *Astragalus corniculatus*, *Galatella linosyris*, *G. villosa*, *Limonium bulgaricum*, *Serratula bulgarica* and *Tanacetum millefolium*.

The Studena River Valley is characterized by the soil salinization processes, both on the riverside terraces and on the slopes. It is one of the few inland places of Bulgaria, outside the Black Sea coast, where there is halophytic vegetation due to the specific substrates. The vegetation in this area was studied in detail by Tzonev (2002), who has found the presence of relict saline communities, some of which endemic to the country. Such an endemic syntaxon, association *Hedysaro bulgarici-Camphorosmetum monspeliacae* (Tzonev, 2013), he described on the right valley slope of Studena River, northeast of Hadzhidimitrovo village, Delihasan locality. The diagnostic species indicated by the author, the species composition, as well as the characteristics of substrate (saline clayey to sandy-clayey Cretaceous marls), are more or less similar to these in Boyadzhiyata locality (3 km south of Delihasan locality), in which the population of *G. sedifolia* is located.

Galatella sedifolia subsp. *sedifolia* is reported as a halophilous plant also for the floras of Romania and Serbia (Morariu & Nyárády, 1964; Boža & Vasić, 1986). According to the summary classification of the salt tolerant plants of Romania (Grigore, 2012), it is classified in the II category, in which mainly species considered as Facultative halophytes are included.



Fig. 1. *Galatella sedifolia* subsp. *sedifolia* in the wild: A – whole plants, B – stem leaves, C – flowering stem (E of Hadzhidimitrovo village, Svishtov district, Boyadzhiyata locality).



Fig. 2. Comparison of the Bulgarian species of genus *Galatella*: **A** – *G. sedifolia* subsp. *sedifolia*, **B** – *G. villosa*, **C** – *G. linosyris*.



Fig. 3. Habitat of *Galatella sedifolia* subsp. *sedifolia* in the valley of Studena River.

Author-collected specimens

BULGARIA. Danubian Plain. E of Hadzhidimitrovo village, Svishtov district, E of the main road toward Svishtov town, on the right valley slope of Studena River, Boyadzhiyata locality, in open sub-saline grasslands, 90 m, 43.51009°N, 25.50166°E, 28.10.2022, S. Stoyanov & B. Sidjimova (SOM 177716, 177717);
loc. ibid., 43.51041°N, 25.50214°E, 28.10.2022, S. Stoyanov & B. Sidjimova (SOM 177718, SO 108216);

loc. ibid., 80 m, 43.51051°N, 25.50166°E, 04.11.2022, S. Stoyanov & B. Sidjimova (SOM 177719, SO 108215);

SE of Hadzhidimitrovo village, Svishtov district, on the right valley slope of Studena River, above Hadzhidimitrovo fishponds, in scrublands, 95 m, 43.49224°N, 25.48233°E, 04.11.2022, S. Stoyanov & B. Sidjimova (SOM 177720, SO 108217).

Conclusions

Galatella sedifolia subsp. *sedifolia* is a new addition to the halophytic flora of Bulgaria. Its Bulgarian population, being the first reliably recorded in the Balkans, is of high conservation concern. In this regard the Boyadzhiyata locality (near Hadzhidimitrovo village) is proposed to be included in a new protected site for conservation of the species and its specific saline habitat, together with another rare plant - *Serratula bulgarica*.

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