

V. Randelović & B. Zlatković

***Campanula calycialata* (series *Saxicolae* Witasek) a new species from Serbia (Yugoslavia)**

Abstract

Randelović, V. & Zlatković, B.: *Campanula calycialata* (series *Saxicolae* Witasek), a new species from Serbia (Yugoslavia). — Fl. Medit. 8: 85-92. 1998. — ISSN 1120-4052.

Campanula calycialata is described as a new species in series *Saxicolae*. It grows in vegetation of the order *Androsacetalia vandellii* in a single locality on the high mountain top of Babin Zub on Mt Stara Planina. It is distinct from other species of the series and genus by the presence of coronoid appendages at the base of the characteristic calyx teeth.

Introduction

Recent investigations on the flora of Mt Stara Planina, situated in eastern Serbia, revealed a population of an unknown species of *Campanula*, occurring just below the summit of Babin Zub at 1700 m, among vegetation in siliceous rocks crevices. Individuals of this population have flowers whose calyx teeth have basal appendages the same colour as the corolla.

Given that this characteristic has not been observed before in *Campanula*, we have concluded that this population represents a new species which we have named *Campanula calycialata*. On the basis of other morphological characteristics, we have assigned this species to series *Saxicolae* Witasek.

According to Witasek (1902) and Podlech (1965) the series *Saxicolae* comprises species mainly distributed in southern Europe.

However, *C. hispanica* Willk. grows in N. Africa (Kovanda 1970), whereas *C. jurjurensis* (Chabert) Witasek (= *C. macrorrhiza* J. Gay var. *jurjurensis* Chabert) is a local endemic of N. Algeria (Podlech 1965).

The series comprises 24 species, of which eight are distributed in the Balkans (Fedorov & Kovanda 1976, Kovanda & Ančev 1989). In Yugoslavia four species of the series *Saxicolae* are recorded: *C. hercegovina* Degen & Fiala (Stevanović 1986), *C. albanica* Witasek (Diklić & Nikolić 1986), *C. crassipes* Heuff. (Obradović 1974) and *C. velebitica* Borb. (Zlatković & al. 1993).

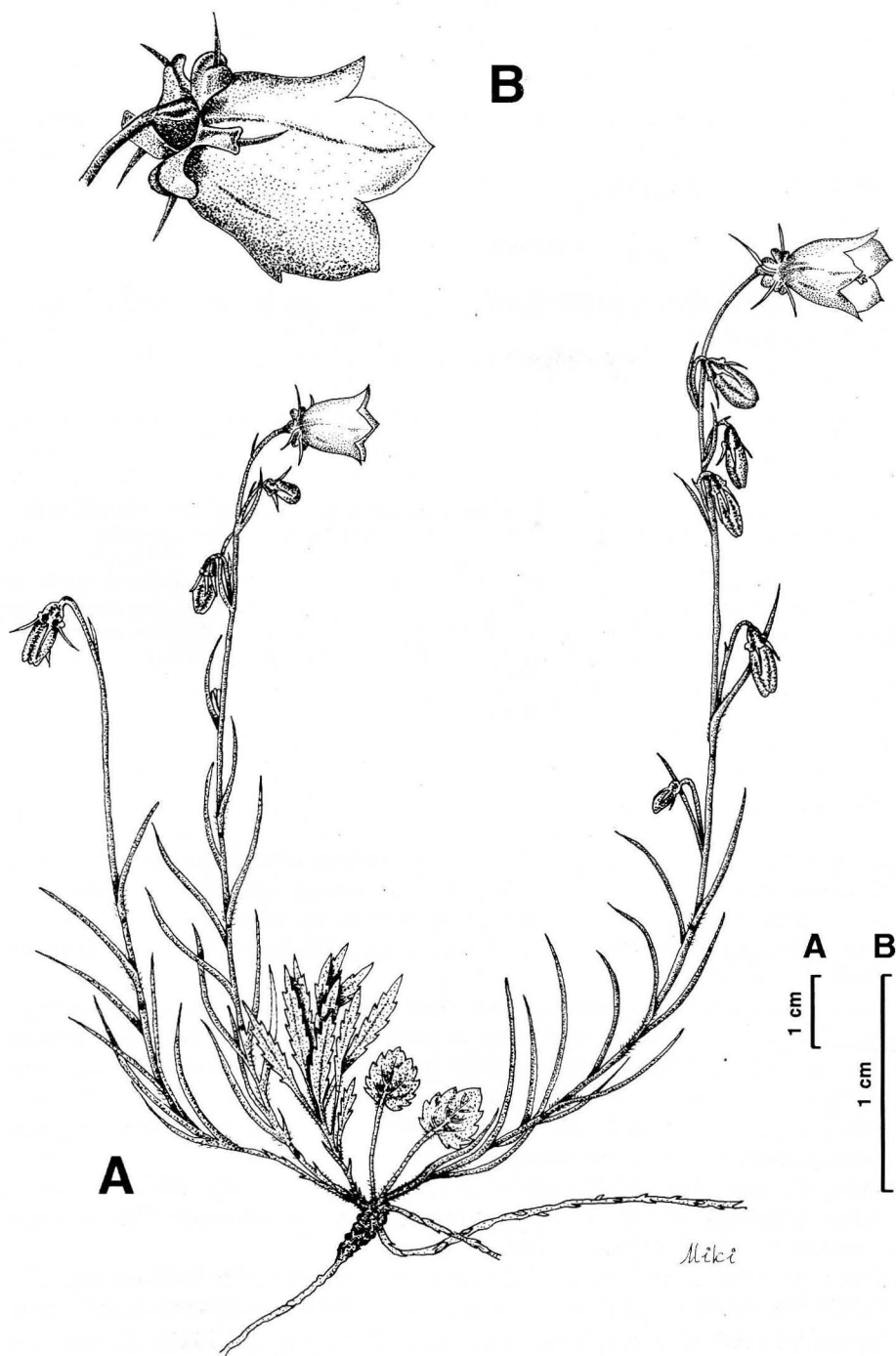


Fig. 1. *Campanula calycialata*. A, flowering plant; B, flower.

Campanula calycialata V. Randelović & B. Zlatković, **sp. nov.** (Fig. 1).

Typus — Yugoslavia, Serbia orientalis, montes Stara planina; in rupibus ad cucumen montis Babin Zub, 1700 m s.m.; 17 Jul 1993. (in floris), V. *Randelović* (holotypus: BEOU; isotypus: HMD), paratypus: 15 Sep 1993. (in fructus), V. *Randelović* & B. *Zlatković* (BEOU).

Planta perennis. Rhizoma breve (c. 2 cm), incrassatum, c. 3 mm in diametro, sine tuberculis, stoloniferum. Stolones c. 1 mm in diametro, subterranei, foliolati, foliola c. 1 mm longa, rariores dispositae. Caules ascendentes, irramosi, 8-15 cm alti, in parte inferiore acutanguli et ciliati, in parte superiore obtusanguli et glabri. Folia basalia longe petiolata, cordato-triangularia grosse dentata, florendi tempore plerumque viridia. Folia caulina sessilia, inferiora anguste lanceolata vel linearia, remote dentata, basi ciliata, superiora linearia, integerrima, glabra. Folia caulina in parte inferiore caulium densiore disposita apicem versus rariores inflorescentiam attingentia. Flores 1-4 (7), in racemum laxum dispositi, patentes vel nutantes, alabastra nutantia. Ovarium glabrum, 1.5-3 (5) mm longum. Calycis lacinae 0.4-0.7 mm longae, reflexae, **basi gibbosae, gibbis alatis coronicoloratis**. Corolla infundibuliformi-campanulata, coerulea usque violaceo-coerulea, 12-15 mm longa. Antherae longae, filamenta plerumque brevissima. Granum pollinarium (34) 37-46 (48.5) mm in diametro, cum 3-4 (5) poris. Stylus ad medium pilosus. Capsulae abconiformes, membranaceae, nutantes, 0.5-0.6 mm longae. Semina 0.9-1 mm longa. Floret: a mense Julio usque ad Septembrem. Fructificat: Septembri.

The specimens of this species were first collected in July 1991 by B. Zlatković from the only known locality on Mt Stara Planina near the top of Babin Zub (eastern Serbia) at the altitude of about 1700 m, UTM FP 03 (Fig. 2). As these specimens were damaged, further material was later collected on July 17th, 1993 for the type specimens. On September 15th, 1991 this material was supplemented by fruiting specimens from the same population.

Description of species

Perennial. Rhizome short (about 2 cm), thickened, about 3 mm across, with stolons but without tubers. Stolons, below ground, about 1 mm across, with sparsely distributed leaves, 1 mm long. Stems ascendant, unbranched, 5-15 cm tall, in the lower part acutely angular and ciliate, and in the upper part obtusely angular and naked. Basal leaves with long petioles, cordate-triangular, with large teeth, present during flowering. Stem leaves sessile, lower narrowly lanceolate to linear, sparsely toothed, ciliate at the base; the upper leaves linear and naked. Stem leaves more densely distributed in the lower part of the stem, increasingly sparse towards the apex, reaching inflorescence. Flowers, 1-4 (-7), are in lax clusters, patent or pendent, buds pendulous. Ovary naked, 1.5-3 (-5) mm long. Calyx teeth 0.4-0.7 mm, deflexed, at the base with winged appendages, coloured as the corolla. The corolla funnel-bell shaped, blue to lilac-blue, 12-15 mm. Anthers longer than filaments. Pollen grains 37-44 µm across, with 3-4 (-5) pores. Style pilose for half of its length. Capsules cone-shaped, membranous, inclined, 0.5-0.6 mm. Seeds 0.9-1 mm. Flowering from mid-July to September. Fruiting in September.

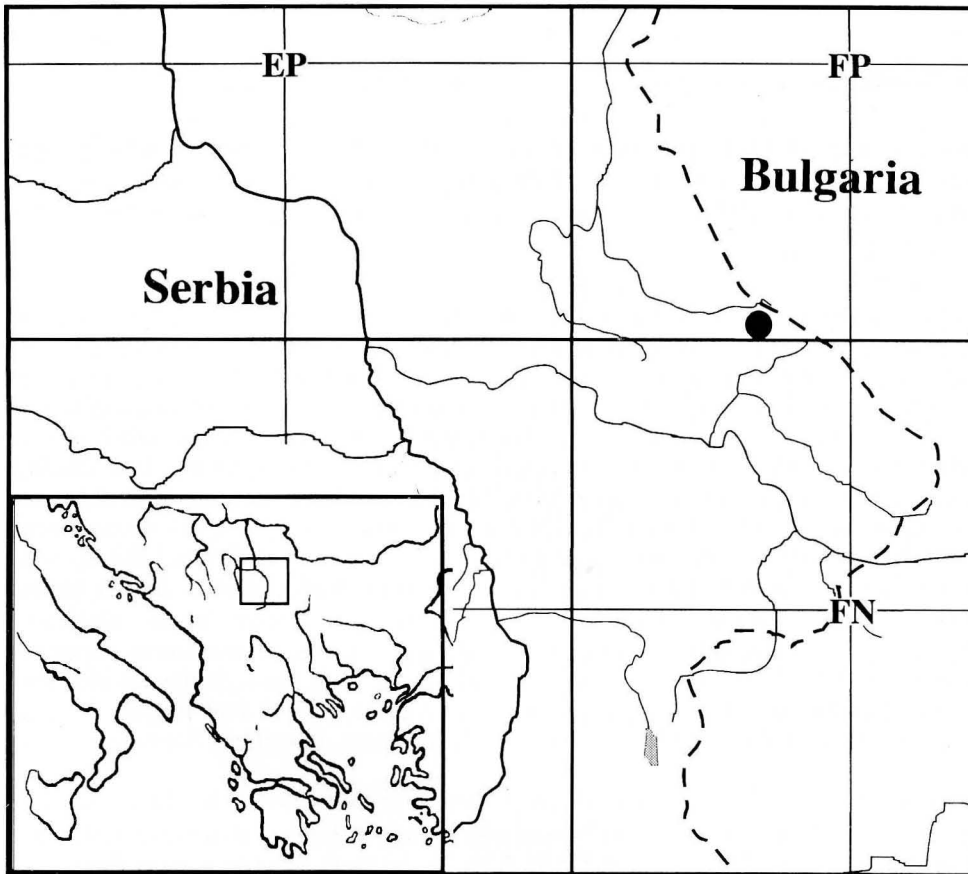


Fig. 2. Distribution of *Campanula calycialata* presented on the UTM map (50 × 50 km). The *locus classicus* is located in 10 × 10 km square FP 03.

Comparison with similar species

Campanula calycialata is morphologically distinct from all other species of the genus *Campanula* by the winged, corolla-coloured, appendages at the base of the calyx teeth. On the basis of other morphological characteristics this species is difficult to assign to any of the series within subsection *Heterophylla*. However, it most closely resembles the series *Saxicolae* (Table 1) in its thickened (3-4 mm), short and knotty rhizome, covered with the remnants of petioles, strongly toothed basal leaves, extremely short stamen filaments and grooved capsules. It differs from most species in the other series by the presence of basal leaves during flowering, angular stems, pendent buds and completely glabrous receptacles (Table 2). At flowering all other representatives of the series lack basal leaves except for *C. jordanovii* Ančev & Kovanda, where the basal leaves are sometimes present at flowering. The species *C. hercegovina* Deg. & Fiala is also characterized by an angular stem, ciliate at the angles. Within the whole series, only two species both alpinic, *C. carnica* Schiede ex Mert. & Koch in Röhl and *C. tanfanii* Podl., have pendent buds.

Table 1. Comparative morphological composition of *Campanula calycialata* and related species of series *Saxicolae* Witasek (l-length in mm, w-width in mm, d-diameter in μm).

	<i>C. calycialata</i>	<i>C. albanica</i>	<i>C. romanica</i>	<i>C. velebitica</i>	<i>C. jordanovii</i>	<i>C. hercegovina</i>
Rhizome (w)	3-5	2	5	3-8		3-5
Stems (l)	80-150	80-240	100-400	150-350	150-400	100-400
Number of flowers	1-4(7)	1-3	many	many	1-few	1-5
Calyx teeth/corolla	0.3-0.5	0.3-0.5	0.2	0.2-0.3		0.2-0.3
Corolla (l)	(10)12-15	14-18(22)	(8)10-15	10-16(20)	(10)12-17	(14)16-20(22)
Anther/Filament ratio		2	2	1.5		2
Pollen grains (d)	(34)37-46(48)	34-38	?	(24)28-34(40)	(25)27-35(38)	31-37
Capsule (l)	5-6	6-7	5-6	5	5-7(8)	?
Seeds (l)	0.9-1	?	?	?	0.7-0.9	?

Table 2. Morphological features of *Campanula calycialata* and related species of series *Saxicolae* Witasek.

	<i>C. calycialata</i>	<i>C. albanica</i>	<i>C. romanica</i>	<i>C. velebitica</i>	<i>C. jordanovii</i>	<i>C. hercegovina</i>
Rhizome	thickened	slender	thickened	slender to thickened	slender	thickened
Basal leaves	present at anthesis	absent at anthesis	absent at anthesis	absent at anthesis	present at anthesis	absent at anthesis
Cauline leaves	linear-lanceolate to linear ciliate at base	narrowly elliptical to linear glabrous	linear-lanceolate to linear ciliate at base	lanceolatae to linear glabrous	lanceolate to linear glabrous	rhombic to ovate glabrous
Stem	angular	terete	terete	terete	terete	angular
Inflorescence	unbranched raceme	unbranched raceme	branched panicle	branched panicle	branched panicle	sometimes branched
Flower buds	pendent	erect	erect	erect	erect	erect
Ovary	smooth	papilose	papilose	papilose	smooth	papilose or smooth
Calyx teeth	linear and winged	linear	linear	linear	setaceous	linear
Position of calyx teeth	patent	appressed	appressed	appressed	patent	appressed
Capsule	membranaceous, pendent	woody, drooping	coriaceous, pendent	woody, drooping	membranaceous, pendent	woody, pendent

A glabrous ovary is also present in *C. jordanovii*, but in other species of the series *Saxicolae* it is very rare. These features make this species close to the series *Lanceolatae* Witsek. Other morphological features occur in some species of the series, but rarely is a particular species characterized by the whole set of these traits. Thickened, short rhizomes, from which elongated leafy stolons extend, occur in *C. romanica* Savul. A characteristic arrangement of the stem leaves, denser in the lower part and well-spaced in the upper was observed in *C. moravica* (Spitz) Kovanda and *C. velebitica* Borb. In addition to *C. calycialata*, ciliae at the base of the stem leaves are also found in *C. romanica*, and very occasionally in *C. jordanovii*. This characteristic makes these two species close to the series *Lanceolatae*. A simple, unbranched inflorescence, composed of one or several flowers characterises the majority of the species within the series, but only three have pendent capsules: *C. albanica*, *C. justiniana* and *C. willkommii*. Deflexed calyx teeth were observed in: *C. carnica*, *C. tanfanii*, *C. praesignis* G. Beck, *C. xylocarpa* Kovanda, *C. sabatia* De Not, *C. forsythii* (Arcang.) Podl. and *C. jordanovii*. Membranous capsules occur in *C. jordanovii*.

Ecology

Campanula calycialata is a chasmophyte, as is the case with the other representatives of the series *Saxicolae*. Unlike the other Balkan species found in the vegetation of the order *Potentilletalia caulescentis* in the crevices of limestone rocks, *C. calycialata* in its only known locality in the crevices of siliceous rocks belongs to the formation of subalpine vegetation in the alliance *Silenion lerchenfeldianae* of the order *Androsacetalia vandellii*. From the series *Saxicolae*, only *C. romanica* occurs on siliceous, exclusively granite rocks, but at a considerably lower altitude (200 m) (Morariu 1964). The habitat is on south-facing gentle slopes.

The species was discovered in two stands, spatially close, which belong to widely distributed Balkan association *Asplenio-Silenetum lerchenfeldianae* Horvat 1936. *Silene lerchenfeldiana* and *Saxifraga paniculata* give the greatest number of plants and greatest vegetation coverage within the stands. Characteristic species with *C. calycialata* were: *Seseli peucedanoides*, *Asplenium septentrionale*, *Minuartia bulgarica*, *Minuartia verna*, *Asplenium trichomanes*, *Silene pusilla* and *Jovibarba heuffelii*. In addition to these, there was recorded a great number of species characteristic of other types of vegetation: *Chamaespartium sagittale*, *Centaurea rhenana*, *Thlaspi avalanum*, *Cotoneaster nebrodensis*, *Vaccinium myrtillus*, *Anthemis triumfetti*, *Campanula trojanensis*, *Aster alpinus*, *Peucedanum carvifolia*, *Achillea lingulata*, *Viola canina* subsp. *montana*, *Symphyandra wanneri*, *Valeriana tripteris*, *Juniperus communis* subsp. *nana*, *Lamium garganicum* subsp. *laevigatum*, *Hypochaeris maculata* subsp. *pelivanovi*ii, *Saxifraga rotundifolia*, *Vaccinium vitis-idaea*, *Centaurea uniflora* subsp. *nervosa* and *Anthemis carpatica*.

Acknowledgements

We are grateful to Dr Vladimir Stevanović, Institute of Botany and Botanical Garden "Jevremovac" (University of Belgrade) for useful suggestions and to Mrs Danka Filipović for translation.

Financial support by the Grant No. 03E08 from the Serbian Science Fund is gratefully acknowledged.

References

- Diklić, N. & Nikolić, V. 1986: *Campanula albanica* Witasek. — In: Sarić, M. (ed.), Flora SR Srbije **10**: 191. — Beograd.
- Fedorov, A. A. & Kovanda, M. 1976: *Campanula* L. — In: Tutin, T. G., Heywood, V. H., Burges, N. A., Moore, D. M., Valentine, D. H., Walters, S. M. & Webb, D. A. (ed.), Flora Europaea **4**: 74-93. — Cambridge University Press.
- Horvat, I., Glavač, V. & Ellenberg, H. 1974: Vegetation Südosteuropas. — Geobotanica Selecta **4**: 1-768. Gustav Fischer Verlag Stuttgart.
- Kovanda, M. 1970: Polyploidy and Variation in the *Campanula rotundifolia* Complex, I. Rozprawy československé akademie věd **80(2)**: 1-96.
- & Ančev, M. 1989: The *Campanula rotundifolia* complex in Bulgaria. — Preslia **61**: 193-207.
- Morariu, I. 1964: Sectia *Lyniphylloides* Schur.. — In: Săvulescu T. & al. (ed.), Flora Republicii Populare Romîne, **9**: 86-111. — Bucuresti.
- Obradović, M. 1974: *Campanula* L. — In: Josifović, M. (ed.), Flora SR Srbije **6**: 529-556. — Beograd.
- Podlech, D. 1965: Revision der europäischen und nordafrikanischen Vertreter der Subsect. *Heterophylla* (Wit.) Fed. der Gattung *Campanula* L. — Feddes Repert. **71**: 50-187.
- Stevanović, V. 1986: *Campanula hercegovina* Deg. et Fiala. — In: Sarić, M. (ed.), Flora SR Srbije **10**: 193. — Beograd.
- Witasek, J. 1902: Ein Beitrag zur Kenntnis der Gattung *Campanula*. — Abh. Zool.-Bot. Ges. Wien **1(3)**: 1-106.
- Zlatković, B., Randelović, V. & Randelović, N. 1993: Građa za floru jugoistočne Srbije. — Zbornik radova sa III Simpozijuma o flori jugoistočne Srbije, Pirot, **1**: 95-110.

Address of the authors:

V. Randelović & B. Zlatković, Faculty of Technology, University of Nish, Bulevar Oslobođenja 124, YU-16000 Leskovac, Yugoslavia.