

***CAMPANULA WALDSTEINIANA* SHULT.
(CAMPANULACEAE): A NEW SPECIES IN THE FLORA
OF SLOVENIA**

CAMPANULA WALDSTEINIANA SHULT. (CAMPANULACEAE):
NOVA VRSTA V FLORI SLOVENIJE

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ABSTRACT

UDC: 582.992:581.96(497.4)

***Campanula waldsteiniana* Shult. (*Campanulaceae*): a new species in the flora of Slovenia**

Until recently, *Campanula waldsteiniana* was known only from the Dinaric Mts of Croatia, and Bosnia and Herzegovina. New recording from Mt. Snežnik (Liburnian karst, SW Slovenia) was reported, and chorology of *C. waldsteiniana* agg. briefly discussed. Mt. Snežnik is the northwesternmost locality in its distribution area.

Key words: *Campanula waldsteiniana* agg., chorology, biogeography, Mt. Snežnik, Liburnian karst, Dinaric Mts, Slovenia.

IZVLEČEK

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***Campanula waldsteiniana* Shult. (*Campanulaceae*): nova vrsta v flori Slovenije**

Do nedavnega je bila vrsta *Campanula waldsteiniana* znana le iz Dinaridov Hrvaške in Bosne in Hercegovine. V prispevku poročamo o njenem pojavljanju tudi v Sloveniji, in sicer na Snežniku (Liburnijski kras, JZ Slovenija). Nahajališče na Snežniku predstavlja tudi najbolj proti severozahodu pomaknjeno nahajališče v arealu te vrste. Kratko je predstavljena tudi horologija agregata *C. waldsteiniana*.

Ključne besede: *Campanula waldsteiniana* agg., horologija, biogeografija, Snežnik, Liburnijski kras, Dinaridi, Slovenija.

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INTRODUCTION

A very diverse and undoubtedly polyphyletic genus *Campanula* L. (Campanulaceae) contains approx. 400 species in the northern hemisphere, out of which 250 species in the Mediterranean region, and 85 species and subspecies in the Western Balkan and amphi-Adriatic region (Kovačić 2004). The genus is divided into many small subsections, complexes, aggregates etc., often endemic to a very restricted area (Kovačić 2006). Among those, a stenoendemic

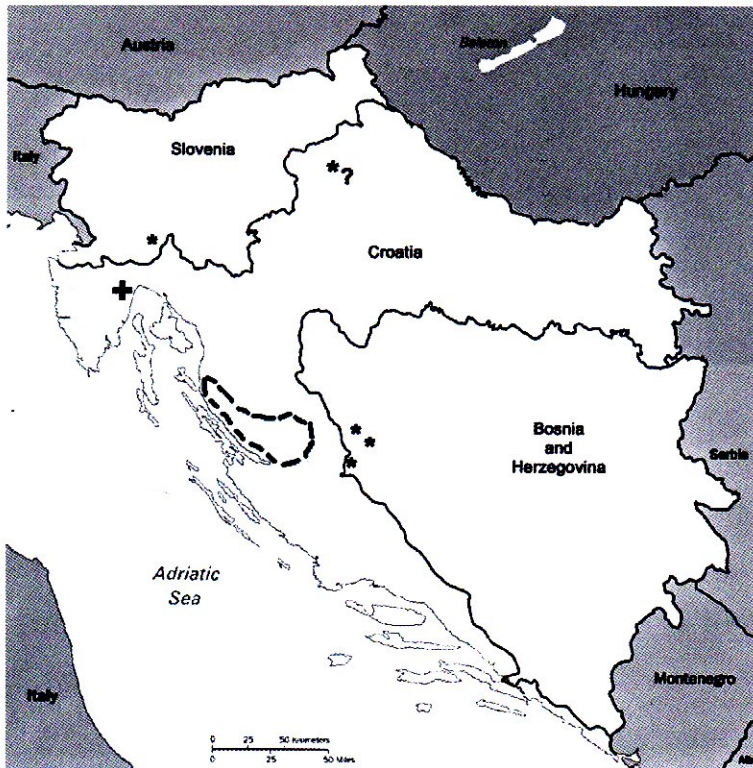


Figure 1. Distribution of *Campanula waldsteiniana* aggregate. *C. tommasiniana*: +. *C. waldsteiniana*: main area —, disjunctive localities * (dubious locality after Hirc 1903 is marked with “*?”).

Campanula waldsteiniana aggregate (*sensu* GESLOT 1984, after DAMBOLDT 1965b), which evolved in the outer (Adriatic) Dinarides from yet unknown ancestor, is considered to be close to both isophyllous (Isophylla-“group” *sensu* DAMBOLDT 1965a) and heterophyllous (*C. rotundifolia* complex *sensu* KOVANDA 1970) lineages of the circum-Adriatic region. That aggregate consists of only two closely related species, which are clearly separated only by their disjunctive area of distribution (Fig. 1), and their corolla shape: *C. waldsteiniana* Schult. (Fig. 2) and *C. tommasiniana* C. Koch (Fig. 3).



Figure 2. *Campanula waldsteiniana*
(left: f. *alba*)

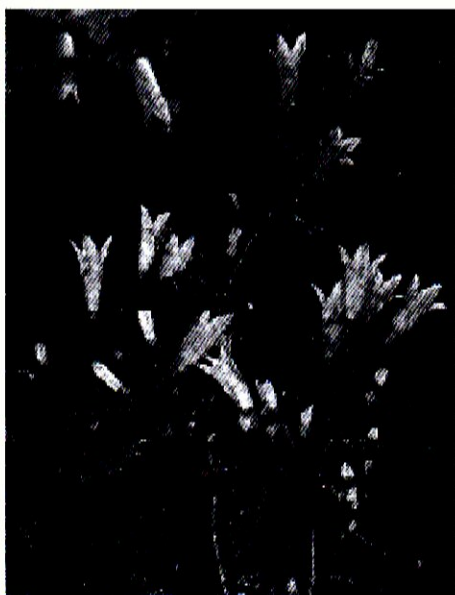


Figure 3. *Campanula tommasiniana*
(left: f. *rosea*).

A stenoendemic species *C. tommasiniana* is centred in Mt. Učka plateau (Istrian peninsula, Croatia) above the Quarnero bay. It is most abundant in stands of endemic rock-crevice association *Campanuletum tommasinianae-justinianae* Horvatić 1963 nom. prov., and inhabits rock-crevices practically from sea cliffs up to 1400 m a.s.l. It is also frequent in rock crevices within montane and subalpine beech stands of the associations *Seslerio autumnalis-Fagetum* (Horvat 1950) M. Wraber (1957) 1960 ex Borhidi 1963 and *Ranunculo platanifolii-Fagetum* Marinček et al. 1993 var. geogr. *Calamintha grandiflora* Marinček 1996. In contrary, *C. waldsteiniana* is more broadly distributed, and inhabits diverse limestone crevices within stands of the Illyrian alliance *Micromerion croaticae* Horvat 1931 (i.e. *Primulo kitaibelianae-Potentilletum clusianae* Horvat 1931), but also screes of the Illyrian alliance *Peltarion alliaceae* Horvatić in Domac 1957, at the altitudes between 700 and 1700 m. It occurs rather abundantly in Croatian mountains of Velebit, Velika Kapela and Gola Plješevica (Map 1). In Bosnia and Herzegovina, ŠOLJAN (2001) quotes three localities: in Mt. Ilica, Mt. Osječenica and one locality near Rodokulje by Drvar. *Campanula waldsteiniana* was recently discovered in south-western Slovenia – at north-western-most extent of species distribution area.

CAMPANULA WALDSTEINIANA ON MT. SNEŽNIK

The second author found *C. waldsteiniana* on SE rocky slope of Mt. Medvedova glavica in Snežnik plateau (Fig. 1). Only 3-4 small cushions were growing in wet rocky fissures. The phytosociological characteristic of site was given by a relevé:

Slovenia, Dinaric Mts, Liburnian karst, Snežnik plateau, Mt. Medvedova glavica (MTB: 0452/2); 1396 m a.s.l., aspect: E, slope: 80°, herb layer (C): 10 %, moss layer (D): 10 %, relevé area: 2 m², date: 23.6.2003, leg. B. Surina.

C	D
<i>Asplenium fissum</i> +.2	<i>Schistidium apocarpum</i> +.3
<i>Campanula waldsteniana</i> +.2	<i>Orthothecium rufescens</i> +
<i>Scrophularia laciniata</i> +.2	
<i>Asplenium viride</i> +	
<i>Cystopteris regia</i> +	
<i>Silene saxifraga</i> +	

Few samples of collected specimen (not in flower) are stored at the Herbarium of the Scientific Research Centre of Slovenian Academy of Sciences and Arts.

POSSIBLE PHYLOGENETIC HISTORY WITHIN THE *CAMPANULA WALDSTENIANA* AGGREGATE

Campanula waldsteiniana agg. is most probably a patroendemic to Adriatic Dinarides, thus evolved *in situ* from yet unknown ancestors which might have been closely related to recently very isolated "isophylloid" species, such as *C. morettiana* Reichenb. or *C. raineri* Perp.

According to the latest molecular-genetic and isoenzyme researches (cp. LIBER et al. 2004, TKALEC et al. 2004), *C. waldsteiniana* agg. could also be much closely related to Illyrian-Balkan/south Italian aggregate *C. pyramidalis* (*C. pyramidalis* L., *C. versicolor* Andrews, *C. secundiflora* Vis. et Pančić), than the morphological data could ever suggest. Only further phylogeographic studies could possibly answer the question whether or not the disjunctive and small Slovenian population is a remnant of once broadly distributed species, or a result of some more recent (post-glacial?) (re)colonisation. Furthermore, there are other Illyrian species, which also occur on Mt. Snežnik, and thus on north-westernmost extent of their distribution area, e.g.: *Cerastium dinaricum* G. Beck & Szysz., *Asperula beckiana* Degen, *Carex kitaibeliana* Degen ex Bech., *Scabiosa silenifolia* Waldst. & Kit., *Seseli malyi* Kerner, and *Festuca bosniaca* Kumm. & Sendt. (see also WRABER 1971, 1995, 1997, 2000).

According to some older literature data (HRC 1903), *C. waldsteniana* was also observed in the continental part of the northern Croatia (Mt. Ivančica), but recent investigations did not confirm those quotations.

There are no indications that the second member of *C. waldsteniana* agg., *C. tommasiniana*, was ever distributed outside the Učka plateau, nor it is known its origin. Possible distant relatives of the *C. waldsteniana* agg. (and the "Isophylloids" in general) could be found in Turkish mountains, Iberian Peninsula and North America, but their true relationships require further thorough phylogenetic studies.

Povzetek

CAMPANULA WALDSTEINIANA SHULT. (CAMPANULACEAE): NOVA VRSTA V FLORI SLOVENIJE

Agregat *Campanula waldsteiniana* obsega dve ozko sorodni vrsti, in sicer *C. waldsteiniana* in *C. tommasiniana*. Razlikujeta se v obliki venca ter razširjenosti. *C. tommasiniana* je stenoendemična vrsta, ki uspeva le na Učki nad Kvarnerskim zalivom (Liburnijski kras, SV Istra, Hrvaška) in je pogosta v skalnih razpokah od morja pa do vrha gore. Nasprotno, areal vrste *C. waldsteiniana*, ki uspeva v skalnih razpokah med približno 700 – 1700 m, je širši in obsega Dinarske planine na Hrvaškem (Velebit, Velika Kapela, Gola Plješivica) in v Bosni in Hercegovini (Ilica, Osječenica, Roduklje pri Drvarju). V tem prispevku kratko poročamo o najdbi vrste *C. waldsteiniana* na Snežniku (Slovenija, Dinaridi, Liburnijski kras). Nekaj primerkov je bilo opaženih v vlažnih skalnih razpokah Medvedove glavice, JV od vrha Snežnika. Uspeva v vrstno ubožanem sestoju vegetacije vlažnih skalnih razpok na nadmorski višini okoli 1390 m.

Filogenetski izvor agregata *C. waldsteiniana* zaenkrat še ni pojasnjen. Po vsej verjetnosti gre za patroendemični vrsti, ki sta evolvirali *in situ*. Najnovejše molekularno-genetske in izocimske raziskave nakazujejo sorodnost vrst tega agregata z vrstami agregata *C. pyramidalis* (*C. pyramidalis*, *C. versicolor*, *C. secundiflora*), kar ne bi mogli sklepati na podlagi morfoloških znakov. Za razrešitev teh sorodstvenih vezi bodo potrebne nadaljnje filogenetske in filogeografske študije. Uspevanje vrste *Campanula waldsteiniana* na Snežniku predstavlja novo (ilirsko) vrsto

v flori Slovenije, hkrati pa pomeni tudi najbolj proti severo-zahodu pomaknjeno nahajališče v njenem arealu.

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