



Silene triflora (Bornm.) Bornm. (Caryophyllaceae), a neglected species from the Central Balkans

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Abstract

Status of numerous taxa from *Silene* sect. Saxifragoideae is still taxonomically unresolved, especially in the Balkans. In 1925 Bornmüller described a taxon from northern part of the Republic of Macedonia, first as *S. saxifraga* var. *triflora* and twelve years later as a separate species *S. triflora*. This taxon is listed in the *Flora of the Republic of Macedonia* as a variety of *S. saxifraga*. In other regional Floras regarding the Republic of Macedonia and the Balkans it is not included at any subgeneric level, or as a synonym. Delimitation between *S. triflora* and *S. saxifraga* is discussed on the basis of multivariate analysis of morphometric and meristic characters. The most significant characters for distinguishing these two taxa are stem length, inflorescence length, longest internode length, middle leaf length and the number of flowers. Considering that it was perceived that these two taxa differ significantly only in the number of flowers, addition to the original description of *S. triflora* is given. A specimen designated here as lectotype is deposited in JE. Considering geographic range and the number of locations, as well as the number of mature individuals in the largest population IUCN threatened status vulnerable (VU) is proposed.

Key words: Balkan Peninsula, IUCN, morphometrics, *Silene saxifraga*, *Silene triflora*, taxonomy, typification

Introduction

Silene Linnaeus (1753: 416) is the most numerous genus in the Caryophyllaceae, in broader sense comprising about 700 species (Williams 1896, McNeill 1978, Walters 1989, Rabeler 1992, Greuter 1995a). Recent studies indicate that the genus includes about 650 species and that the diversity centre lies in the Mediterranean (Oxelman *et al.* 2000), particularly in the Balkans with 98 taxa being endemic (Niketić & Stevanović 2012). High endemism rate is also recorded in Turkey (Yildiz & Dadandi 2009) and Iran (Gholipour & Sheidai 2010, Sheidai *et al.* 2010). Oxelman *et al.* (2000) pointed to an urgent need of thorough revision of the genus.

Morphological variability of many *Silene* species makes accurate delimitation very difficult. The number of species belonging to the section Saxifragoideae Willkomm (1854: 73) ranges from 15 to 25 (Greuter 1995a), even up to 35 (Niketić & Stevanović 2012) according to different literature sources. They are distributed in mountain areas of South Europe, from Pyrenees, across the Alps, the Apennines, the Balkan Peninsula and to Asia Minor. The center of diversity of the section covers the mountains of the Balkan Peninsula with approximately 20 species present (Niketić & Stevanović 2012). Some species, like *S. waldsteinii* Grisebach (1843: 179), *S. schmuckeri* Wettstein (1892: 30), *S. multicaulis* Gussone (1826: 172) and *S. linoides* Otth (1824: 384), are taxonomically well-defined (Greuter 1995b). The rest of the section is often referred as *S. saxifraga* group, considered to be “a difficult group of closely related, variable species that requires further revision, especially in the Balkan peninsula” (Chater *et al.* 1993). Greuter (1995b, 1997) clarified the situation focusing on the material from Greece, but he also admitted that all species belonging to the section are in need of further study.

Isolated populations of glacial relicts in canyons and gorges in western and central part of the Balkan Peninsula point to their significance as refugial areas for elements of glacial flora (Blečić & Mayer 1967, Zlatković *et al.* 2004, Stevanović *et al.* 2009) and elevational range shifts of flora during glaciation and postglaciation in the Balkan Peninsula (Stevanović 1996) led to divergence within many relict plant species (Corre *et al.* 1997, Dvořáková *et al.* 2010, Hewitt 1996, 2000, Stevanović *et al.* 2009, Tremblay & Schoen 1999, Vargas 2003). Hence, it can be assumed that the same cause is responsible for the differentiation of the *S. saxifraga* group taxa in the Central Balkan. At the present time, populations of *S. saxifraga* do not grow on higher elevations on mountains in wider surrounding of *S. triflora* populations. In fact, two species from the same section, *S. parnassica* and *S. multicaulis*, inhabit these mountains, but they are not the closest relatives of *S. saxifraga* and *S. triflora*. Therefore, it can be assumed that *S. triflora* has a relict origin and that probably evolved from the populations of *S. saxifraga* group which took refuge in a lower altitude during glaciation and remained there later. Altitudinal differentiations are also documented in *Armeria Willdenow* (1809: 333) as a consequence of glacial-induced migrations (Gutierrez *et al.* 2002).

Our results go in favour of re-establishment of *S. triflora* as a separate species in the *S. saxifraga* group, with the compact three-flowered dichasia. Nevertheless, material for molecular analysis of morphologically analysed populations is collected in order to resolve taxonomic, phylogenetic as well as phylogeographic relationships, especially with transitional gorge populations of *S. saxifraga* and give as precise interpretations as possible.

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