

# *Scutellaria orientalis* subsp. *pinnatifida* (Lamiaceae): a revision of the distribution of this critically endangered taxon in Bosnia and Herzegovina

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**Abstract.** This paper presents a survey of *Scutellaria orientalis* subsp. *pinnatifida* in Bosnia and Herzegovina and includes distribution data and a map of localities in Bosnia and Herzegovina based on a revision of herbarium specimens from SARA, literature data and in-field observations. After 40 years, the occurrence of *Scutellaria orientalis* subsp. *pinnatifida* in Bosnia and Herzegovina is confirmed and its distribution is extended to a new locality. The paper presents a short morphological description and photographs of the taxon. Besides its precise distribution in Bosnia and Herzegovina, the paper gives information about distribution of this taxon in other Balkan countries and Romania. Given the present occurrence in the area, the taxon should be considered as Critically Endangered (CR) in the updated version of the *Red List of the Federation of B&H*.

**Key words:** Balkans, Bosnia and Herzegovina, distribution, morphology, *Scutellaria orientalis*.

## Introduction

The genus *Scutellaria* L. (Lamiaceae) is a cosmopolitan genus, including about 360 species occurring mainly in temperate regions and tropical mountains (Paton 1990). The genus has manifested the greatest diversity in the Irano-Turanian region, particularly in Central Asia and Afghanistan. The Eastern Mediterranean and Andes are the second centre of its distribution (Paton 1990). Approximately 10 species of genus *Scutellaria* are mentioned for the flora of the Balkans (Hayek 1928–1931), of which only six are recorded in the flora of Bosnia and Herzegovina: *Scutellaria alpina* L., *Scutellaria altissima* L., *Scutellaria columnae* All., *Scutellaria galericulata* L., *Scutellaria hastifolia* L. and *Scutellaria orientalis* subsp. *pinnatifida* J. R. Edm. (Beck-Mannagetta & Malý 1950).

*Scutellaria orientalis* subsp. *pinnatifida* J. R. Edm. in Notes Roy. Bot. Gard. Edinburgh 38: 54. 1980. (Syn.: *S. orientalis* L. var. *pinnatifida* Boiss., Fl. Or. 4:682 (1879) vix Reichb. (1832)., *S. hercego-*

*vinica* Formánek, Oesterr. Bot. Z. 38: 384 1888) belongs to a polymorphic species complex, which extends from Spain and North Africa to Central Asia and W China (Edmondson 1980). According to the Euro-Med plantbase (Euro+Med 2006+), 18 subspecies have been recognized in the Euro+Med coverage area. Only two subspecies are found in Europe: *S. orientalis* subsp. *hispanica* (Boiss.) Greuter & Burdet from the Iberian Peninsula and *Scutellaria orientalis* subsp. *pinnatifida* J. R. Edm, which occurs only in the Balkans (Stevanović 1991). The plants from the Iberian Peninsula differ from those from the Balkans in general habit, size and shape of leaves, bracts and flowers. The strongest difference relates to the indumentum of the corolla, which is formed by eglandular hairs in plants from the Iberian Peninsula and by glandular hairs in those from the Balkans (Stevanović 1991). *S. orientalis* subsp. *pinnatifida* (Fig. 1) is a perennial plant often suffrutescent at base (Fig. 1e). Stems prostrate, 5–15 cm, with numerous lateral branches, mat-forming. Leaves shortly peti-

olate, divided by distinctly short of midrib, lobes  $\pm$  revolute, con-colorous or slightly discolourous, greenish above and beneath. Inflorescence dense, ovoid; bracts lanceolate to broadly ovate, greenish or purple-tinged, up to 15 $\times$ 4 mm, usually tightly imbricate. Corolla yellow, lower lip seldom tinged reddish, 24–30 mm. Fl. 4–8 (Edmondson 1982). Chromosome numbers,  $2n=22$  (Baltisberger 2002).

## Material and methods

This study was carried out during recent field investigations, analysis of herbarium material deposited in the Herbarium of the National Museum of Bosnia and Herzegovina (SARA), and literature data. Digital photographs and GPS coordinates were taken in the field by the author. Nomenclature follows the Euro-Med checklist (EURO+MED 2006). Distribution of the taxon in Bosnia and Herzegovina is shown on the map with standard UTM grid 10 $\times$ 10 km. Decimal degree coordinates in WGS 84 projection, and label of 10 $\times$ 10 km UTM squares are provided. The coordinates are determined using Garmin GPS hand-held device in the field, while the position of localities within B&H is mapped using ARCMap 10.0 software. The estimated Red List category according to IUCN criteria, and categories (IUCN 2001) are given. Localities inferred from literature and herbariums are indicated in black on the map, confirmed records by green, while new data are indicated in red.

## Results and discussion

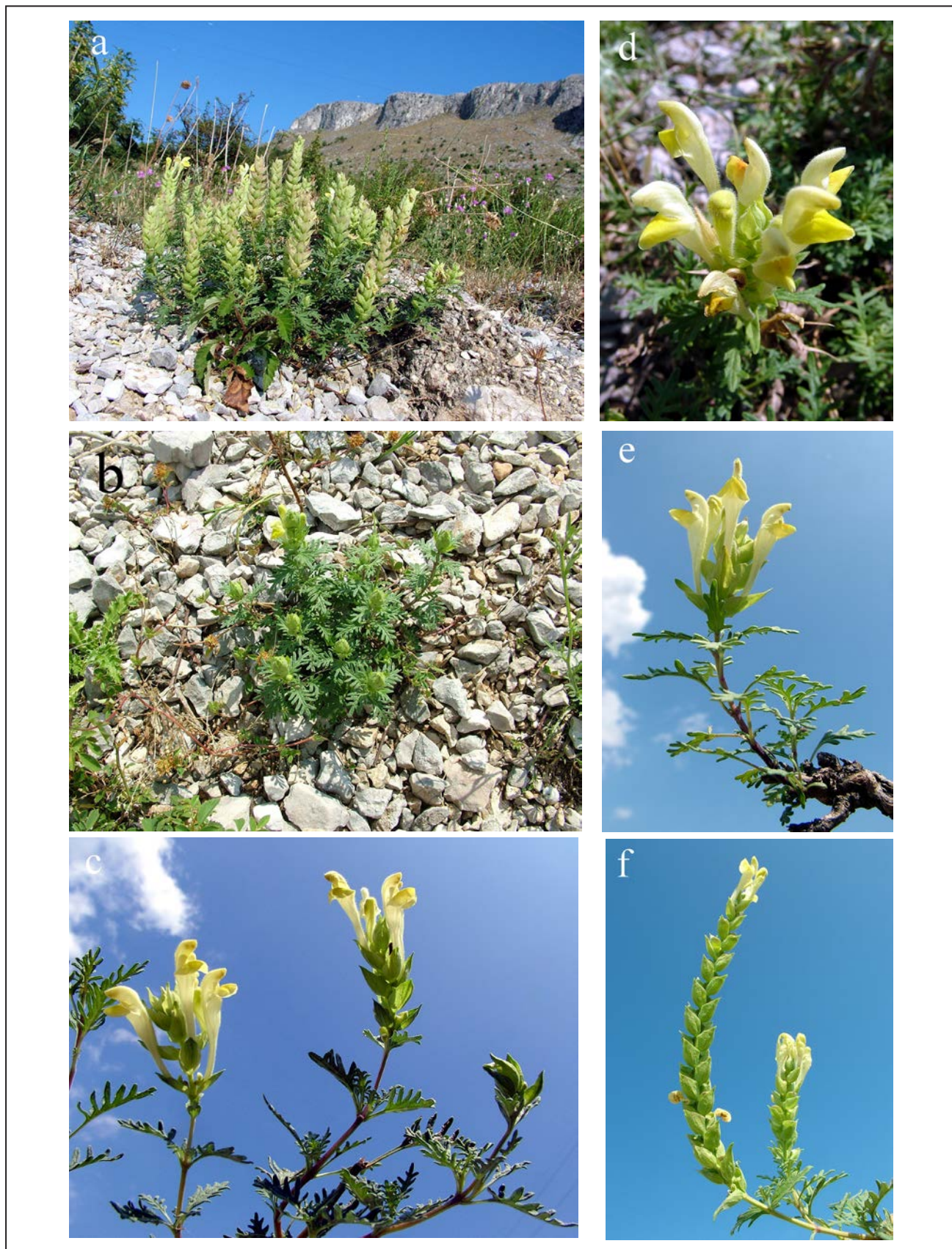
*S. orientalis* subsp. *pinnatifida* belongs to the Pontic-Mediterranean floristic element, and is often found in unstable or degraded habitats, such as stony slopes. According to Edmondson (1980), *S. orientalis* subsp. *pinnatifida* is widespread in Turkey, the Balkans and N Iran. However, according to literature data, it is very rare in some parts of the Balkans, with few occurrences in Albania (Baltisberger 2002), Bosnia and Herzegovina (Beck-Mannagetta & Malý 1950), Croatia (Hirc 1908), Kosovo (Sarić & Diklić 1986), Republic of North Macedonia (Stevanović 1991), and Romania (Săvulescu 1965). It has not been confirmed for Montenegro (Rohlens 1942), Serbia (Sarić & Diklić 1986) and Slovenia (Martinčič & al. 1999). This tax-

on is comparatively widespread in Bulgaria (Assyov & Petrova 2006), and it is also reported in three of the 13 floristic regions of Greece: North Central, Northern Pindos and Sterea Ellas (Dimopoulos & al. 2013).

The occurrence of *S. orientalis* subsp. *pinnatifida* in the flora of Bosnia and Herzegovina was noted for the first time by Formánek (1887), from the material collected on the slopes of Stolac Hill in the city of Mostar. He described the collected specimens as a new species under the scientific name *Scutellaria hercegovinica* (Formánek 1888). Since that time, only a few occurrences of the taxon have been recorded in the same area (Murbeck 1891; Pichler 1898/9; Lindberg 1906; Malý 1908 and Vandas 1909). *S. orientalis* subsp. *pinnatifida* was found by Beck-Mannagetta & Malý (1950) in five localities on the slopes of Stolac and Fortica hills, in the surroundings of the city of Mostar. However, all notes refer to the late 19<sup>th</sup> century and the beginning of the twentieth century. In the Herbarium of the National Museum of Bosnia and Herzegovina (SARA), only twelve specimens of *S. orientalis* subsp. *pinnatifida* are stored. All specimens were collected in the surroundings of the city of Mostar, between 1887 and 1980: Podvelež, Mostar, coll. Formánek 1887 (SARA 31198); Mostar, Herzegovina coll. Vidović (Fiala) 1888 (SARA 31192); Podvelež, Mostar ca 100 m, coll. Beck-Mannagetta 1894 (SARA 31199); Mostar, slopes of Stolac hill, coll. Callier 1895 (SARA 31200); slopes of Stolac Hill ca 250 m, coll. Baenitz 1897 (SARA 31197); slopes of Stolac Hill ca 250 m, coll. Baenitz 1897 (SARA 31202); slopes of Stolac Hill ca 250 m, coll. Baenitz 1898 (SARA 31195); slopes of Stolac Hill ca 250 m, coll. Malý 1903 (SARA 31196); Bijelo polje near Mostar ca 65m, coll. Malý 1908 (SARA 31193); slopes of Stolac Hill, near the old Orthodox Cemetery of Bjelušine, coll. (Tvrtković) Malý 1951 (SARA 31194); slopes of Stolac Hill, coll. Šilić 1965 (SARA 31203); Mostar, slopes of Stolac Hill, coll. Djuran 1980 (SARA 31201).

*S. orientalis* subsp. *pinnatifida* is classified as vulnerable taxon in Bosnia and Herzegovina (Šilić 1990). According to the same author, due to urbanisation (legal and/or illegal) in the area, where this plant was recorded until the end of the twentieth century, it probably subsequently has disappeared (Šilić 2007). Recent field surveys focused on finding the taxon in its historical area of occurrence were successful. The presence of the taxon was confirmed at the end of June 2009 on the rocky slopes of Stolac Hill, in the city





**Fig.1.** *Scutellaria orientalis* subsp. *pinnatifida* on the slopes of Stolac Hill in the city of Mostar. a., b. natural habitat c., d., e., f. flowers (photograph S. Maslo).

quarry Gornje Mazoljice (43.346030 N; 17.822403 E; elevation 221 m.) (Maslo 2014). The observed population covered an area of about 0.5 ha, with uneven spatial structure and numbers exceeding 200 individuals. In this locality, *S. orientalis* subsp. *pinnatifida* was accompanied by *Centaurea deusta* Ten., *Centaurea glaberrima* subsp. *divergens* (Vis.) Hayek, *Cephalaria leucantha* (L.) Roem. & Schult., *Eryngium amethystinum* L., *Eryngium campestre* L., *Galium firmum* Tausch, *Inula spiraeifolia* L., *Juniperus oxycedrus* L. subsp. *oxycedrus*, *Melica ciliata* L. subsp. *ciliata*, *Onosma stellulata* Waldst. & Kit., *Orlaya grandiflora* (L.) Hoffm., *Paliurus spina-christi* Mill., *Plumbago europaea* L., *Rhamnus intermedia* Steud. & Hochst., *Satureja montana* L. subsp. *montana*, *Scrophularia canina* L., and *Trifolium dalmaticum* Vis.

One previously unknown locality was also recorded, in the area of Podvelež, between villages Kružanj and Banjdol (43.287565 N; 17.926016 E; elevation 693 m) (Fig. 2). However, only two mature individuals were found there in 2016, in limestone rocky grasslands.

Populations of *S. orientalis* subsp. *pinnatifida* in Bosnia and Herzegovina have declined and in this field study, no historical records could be confirmed except the one from 2009. Extinctions occurred both in historical and recent times. The latest field investigation in the area confirmed that most of the historical sites disappeared due to resort building. Urbanization, which in the last 40 years has become very intensive in this area, poses a major threat to this taxon. The two remaining populations are very small: one consists only of two individuals. Given the reduced size of the only confirmed populations, *S. orientalis* subsp. *pinnatifida* deserves maximum attention. According to the *Red List of the Federation of Bosnia and Herzegovina* (Đug & al. 2013), the taxon is categorized as Vulnerable (VU). Given the present occurrence of *S. orientalis* subsp. *pinnatifida* in the vascular flora of Bosnia and Herzegovina, its status in the *Red List of the Federation of B&H* (Đug & al. 2013) should be revized. With so few populations of *S. orientalis* subsp. *pinnatifida*, the taxon should

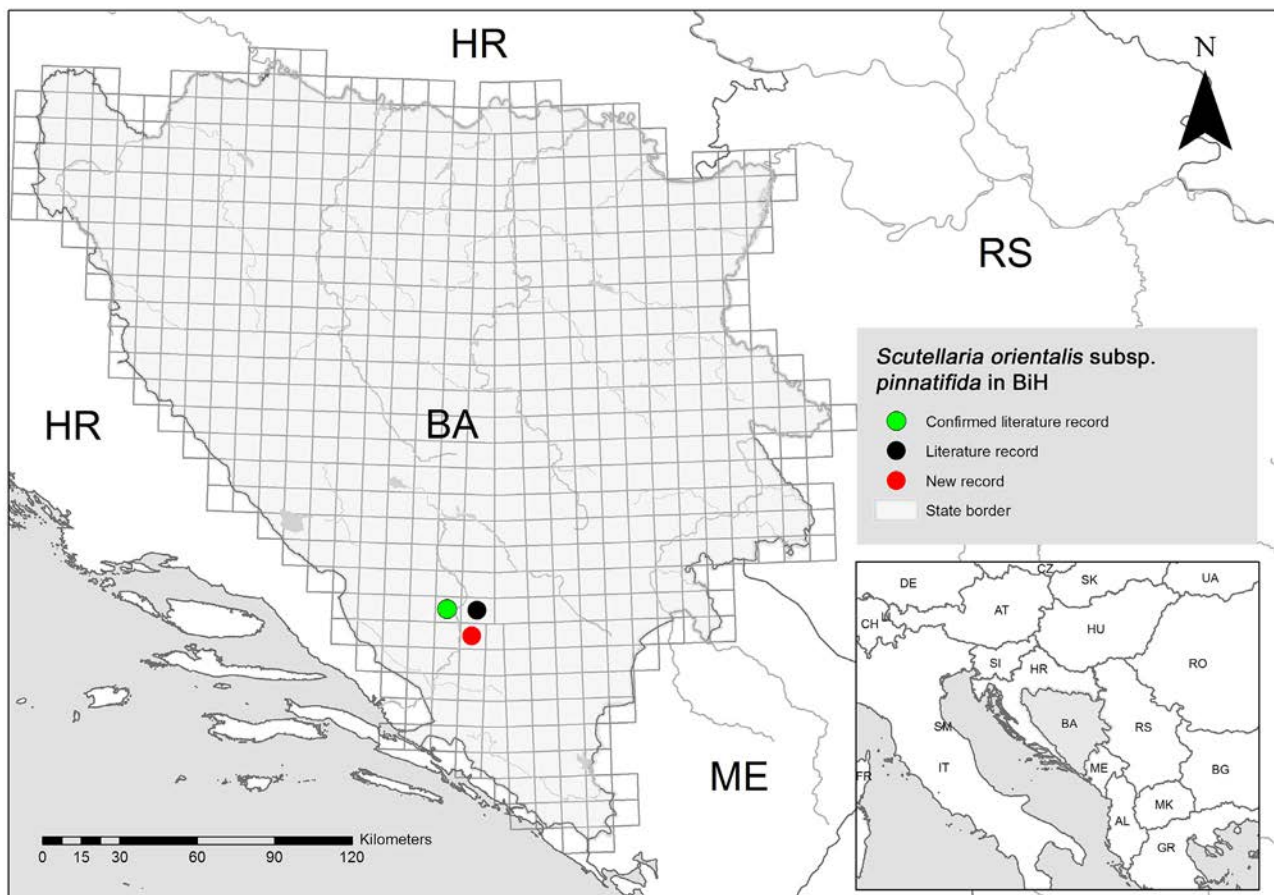


Fig. 2. Distribution of *S. orientalis* subsp. *pinnatifida* in Bosnia and Herzegovina.



be considered Critically Endangered in the updated version of the *Red List of the Federation of B&H*. The existing populations are very small (the first population had only two mature individuals and the second had fewer than 250 mature individuals) in terms of spatial expansion and number of mature individuals. For this reason, this plant is considered Critically Endangered (CR) at regional level (Bosnia and Herzegovina). **IUCN Regional category assessment:** Critically Endangered CR (A3c; B1ab (i, iii, iv); B2ab (i, iii, iv) (IUCN 2001).

*S. orientalis* subsp. *pinnatifida* was recorded in Croatia only along the Adriatic coast. It was mentioned for the first time as rare, between Omiš and Makarska (Petter 1832). According to literature data, it was also recorded from Makarska, Omiš and Trogir (Visiani 1847), from Sv. Vid and Sv. Jelena near Senj (Mihailović 1873), from Senj, Sv. Jelena, Vratnik and from the islands of Krk, Prvić and Rab (Hirc 1908), and from Senj and Lukovo Otočko (Rossi 1924). According to Degen (1937), the taxon is present in Vratnik, Senj, Sv. Vid, Lopice, Sv. Jelena, Medarija, Sv. Juraj, Senjska draga, Punta Tatina (Karlobag), Konjsko, Tribanj, and Moškovci (Obrovac). Thereafter, the taxon has never been reported from Croatia. Only recently, two old localities were confirmed in 2018, in the vicinity of the town of Senj and the island of Krk (pers. comm., Borovečki –Voska, 2019).

In the Republic of North Macedonia, a few old localities were reported: near Sv. Zeum Monastery (1921, near Kočane, in the gorge of river Bela (1927), on Mt Krivolak near river Vardar (1940), and on Mt Vodno near Skopje (1956) (Stevanović 1991). A recent field investigation in the central part of the Republic of North Macedonia (Matevski & al. 2008) showed that this taxon is distributed in three more localities in the triangle between Vales, Štip and Negotino; Karaodžali, Jusuf Korja and Delisinci village. According to the available data, the taxon is recorded only in one locality, both in Kosovo and Albania. From Kosovo, it is known only near the Albanian border on Mt Paštrik (Verbnica and Gorožup) (Sarić & Diklić 1986), and in Albania, between Drenovë and Bostovec, W side of Mt Morava, SE of Korça (Baltisberger 2002).

In the flora of Romania, there are several old records about the presence and distribution of *S. orientalis* subsp. *pinnatifida* (Săvulescu 1965): Stânca Tohani; Tulcea (Niculițel, Piatra Roșie Caugagia, Babadag, Babadag-Codru, Cheia – Măcin, Culmea Pricopan-

lui); and Constanța (Gura Văii, Fântânița-Murfatlar, Cheia-Târgușor, Hagieni, Dumbrăveni, Gura Dobrogei – Palazul Mic).

According to some authors (Edmondson 1980, Stevanović 1991), *S. orientalis* subsp. *pinnatifida* is a widespread taxon in the Balkans. However, according to the available data, it was not confirmed for Montenegro, Serbia (except Kosovo) and Slovenia, while in some other areas it is quite rare. Especially the western populations (i.e. Croatia) are very scattered in distribution, with some disjunct and occasionally punctiform ranges.

Further monitoring and research are recommended, in order to better understand the distribution of the taxon in the Balkans, especially in the area of former Yugoslavia and Albania.

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