

On the distribution of *Dracocephalum ruyschiana* (*Lamiaceae*) in the Balkan Peninsula

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Abstract. *Dracocephalum ruyschiana* (*Lamiaceae*) was recorded from the Pešter Plateau in SW Serbia for the first time in June 2005. This is the only confirmed locality for the species in the Balkan Peninsula, representing the southwesternmost limit of its distribution range in Europe. The existence of *D. ruyschiana* in the Balkans may be related to the migration of steppe flora during glacial and interglacial periods.

Key words: Balkan Peninsula, distribution, *Dracocephalum ruyschiana*, steppe flora, SW Serbia, threat category

Introduction

The only report of *Dracocephalum ruyschiana* L. in the Balkan Peninsula was from the vicinity of Vlasina Lake in SE Serbia (Adamović 1896, 1901). However, this record had never been substantiated by herbarium material and the existence of the species in the Balkans has never been confirmed. According to the *Red Data Book of Serbia 1* (Diklić 1999) *D. ruyschiana* is considered extinct in the country. A new locality for this species is now reported from the Pešter Plateau in SW Serbia and documented in detail. The distribution is mapped, the ecological habitat and preferences noted and the threat category assessed.

Dracocephalum L. includes ca. 70 species mainly distributed in alpine and steppe regions of temperate Asia, with a few species occurring in Europe and only one in N America (Li & Hedge 1994). The centre of distribution is presumably the alpine steppes of the Pamir Altai and Tian-Shan (Diklić 1999).

Dracocephalum ruyschiana belongs to the oligotypic subgenus *Ruyschiana* (Mill.) Benth. which comprises two other species, *D. argunense* Fischer ex Link (E

Siberia, Manchurija, Korea and Japan) and *D. austriaca* L., distributed in the mountains of C Europe and Caucasus. *Dracocephalum ruyschiana* is the only representative of subgenus *Ruyschiana* in the Balkans. It is closely related to *D. argunense*. Another representative of the genus in the Balkans is *D. thymiflorum* L. (Hayek & Markgraf 1929; Stojanov & Stefanov 1948; Popova 1989). It belongs to subgenus *Dracocephalum*, sect. *Buguldea* Benth., ser. *Nutantia* Schischk. and is recorded from NE Bulgaria which is the southwesternmost limit of its range in European Russia, Siberia, Iran and Caucasus.

General distribution and ecology

In Europe *D. ruyschiana* is distributed in larger or smaller areas from Moldavia and the Baltic countries to the east, S Scandinavia in the north, and the French Pyrenees to the west. This includes Russia (European part), Belarus, Ukraine, Poland, Lithuania, Latvia, Estonia, Norway, Sweden, Germany, France, Austria, Switzerland, Italy, Hungary and Romania. The species

usually inhabits limestone mountain slopes, dry grassland, open pine and mixed forest, *Larix* forest and forest-steppe. It belongs to the Altaian (Hegi 1964) or Eurasian floristic element (Farkas 1999) or more correctly, the Central alpine/mo+cauc/mo+tiensch/mo-mong-daur+(central jacut)-central-middle-(south) sibir-sarm-NW Balt+Central Norv floristic element (Meusel & al. 1978). In brief, it is an Eurasian floristic element extending from the boreal-sub-boreal region to the temperate climatic zone (Fig. 1).

The European localities nearest to the Pešter Plateau in SW Serbia are the Carinthian Alps (Austria), the Carpathians in Hungary (Farkas 1999) and the regions of Cluj, Mures and Bacau in Romania (Ravarut 1963).

In the Carinthian Alps, *D. ruyschiana* is mostly distributed in the upper montane to subalpine zone. It is recorded in several plant communities: *Festucion varia* Braun-Blanq., *Seslerion albicantis* Braun-Blanq., *Festuco-Poetum xerophilae* Braun-Blanq., *Caricion ferrugineae* Braun-Blanq. and *Erico-Pinion* Braun-Blanq. (Käsermann 1999).

In Hungary, it is recorded only in the locality Bukk (Kismezó, Nagymező) where ca. 100 plants have been noted. According to Farkas (1999) *D. ruyschiana* is a calcicole species which prefers a somewhat colder, more continental climate and grows besides sinkholes in a mosaic of dry montane meadows and steppe slopes, e.g., in the steppe meadow alliance *Festucion rupicolae* Soó (Simon 1992).

Records in Serbia

Dracocephalum ruyschiana, though reported from Vlasina Lake in Stratoria, SE Serbia, is believed to be extinct in that locality. Adamović (1896, 1901) re-

ported that he received a specimen collected by M. Dimitrijević from the Vlasina region. The plant was 20 cm tall with narrow leaves, rather atypical. He attributed the differences to climatic effects. However, no herbarium voucher exists in BEOU to document this record. Based on this information and his own field knowledge, Košanin (1910) doubted its occurrence in the locality (Diklić 1999). Since the Vlasina lake region is one of the best floristically investigated areas in Serbia, we can conclude that *D. ruyschiana* is really extinct there, i.e., if the report concerning its discovery towards the end of the 19th century was indeed correct.

The species is presently recorded near the border of Serbia and Montenegro (DN-17): SW Serbia, Pešter Plateau, Duga Dolina, 30.06.2005, coll. P. Lazarević (BEOU-no. 16066) (Fig. 2).

Biogeographically, the Pešter Plateau is part of the SE Illyrian subregion. It is a mostly deforested calcareous plateau at ca. 1200 m above sea level and known as one of the driest areas of the Dinaric karst, with numerous sinkholes and dry river beds. It is characterized by a cold continental climate. The winters are long and very cold (min. temperature -39°C) with much snow, while the summers are hot (+35°C) with great temperature fluctuations during day and night (Lazarević & al. 2003). Pine and spruce vegetation would be a potential climax of this site (alliances *Orno-Ericion* Horvatić, *Vaccinio-Piceion* Braun-Blanq.), but all has been degraded since the 1st century A.D. (Krstić 1961) and converted to pasture and meadow-montane steppe (alliances *Festucion vallesiaca* Klika, *Bromion erecti* Braun-Blanq. and *Chrysopogoni-Danthonion alpinae* Kojić). Shrub vegetation *Coryletum avellanae* Fukarek and forests *Populetum tremulae* prov. are now increasing in the area since cattle farming decreased.

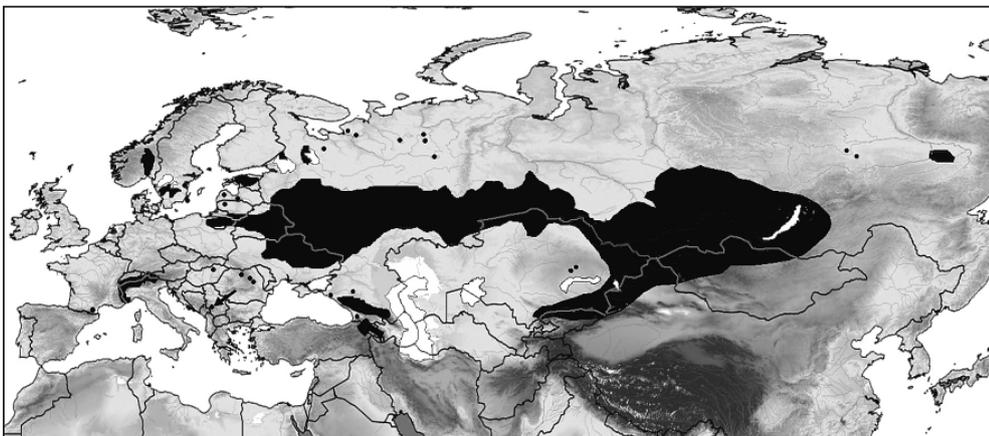


Fig. 1. General distribution of *D. ruyschiana* (compiled from distribution maps in Meusel & al. 1978 and Nosova 1973). The new locality in the Balkans is marked by an arrow.

The locality in Duga Dolina is characterized by dry pastures adjoining sinkholes (Fig. 3). Other species in the area are *Filipendula hexapetala*, *Potentilla alba*, *Populus tremula*, *Trifolium montanum*, *Chamaespartium sagittale*, *Thesium linophyllum*, *Primula veris*, *Orchis tridentata*, *Polygala comosa*, *Silene sendtneri*, etc. The steppic character of the Pešter pastures is confirmed by the presence of following species: *Clematis integrifolia*, *C. recta*, *Lathyrus pannonicus*, *Aster linosyris*, *A. amellus*, *Centaurea arenaria*, *Asyneuma canescens*, *Potentilla arenaria*, *P. inclinata*, *Thymus marschallianus*, *Stipa pulcherrima*, *Astragalus onobrychis*, *Thesium linophyllum*, etc. *Scorzonera purpurea* L. subsp. *purpurea*, a relict and xerothermic steppe species with a similar distribution to *D. ruyschiana*, was also first reported from the Pešter Plateau in 2000 (Lazarević & al. 2003) and this is once again, the only confirmed locality in the Balkan Peninsula. It has been reported in Albania, but without exact indication of locality (Vangjeli & al. 2000).

The locality on the Pešter Plateau in SW Serbia is the most southwestern occurrence of the species range. The nearest populations are ca. 350 km distant, to the Carpathians in the northeast. A population of *D. ruyschiana* may have moved to the Pešter Plateau from the north and northeast during the maximal spread of tundra-steppe and steppe vegetation towards the Balkan Peninsula during the glacial-interglacial periods. The greater part of the Balkan lowland and hill regions southwards to the Mediterranean would have been once covered by this type of vegetation (van der Hammen & al. 1971).

There is no doubt that *D. ruyschiana* is a relict taxon. In the Balkans it is a remnant of glacial steppe flora which has survived in a suitable habitat at Pešter Plateau with similar edaphic and climatic conditions to other parts of its range, i.e., more or less dry and cold mountain steppe-like grasslands. However, there are diverging views about the origin of this species in Europe. Hegi (1964) considered it less likely that the species has migrated to the Alps through the Carpathians, but more probably from the Urals and the area around the East German

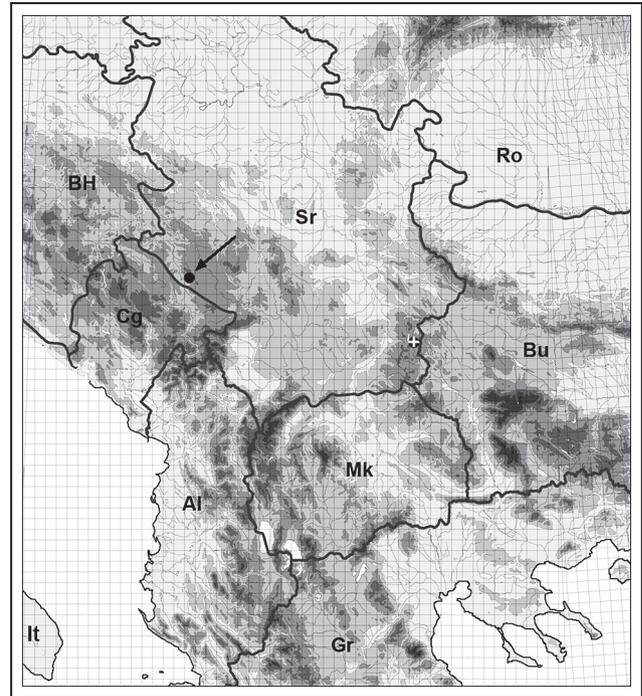


Fig. 2. The new locality of *D. ruyschiana* on Pešter Plateau is indicated by an arrow and the record by Vlasina Lake indicated by + (extinct).

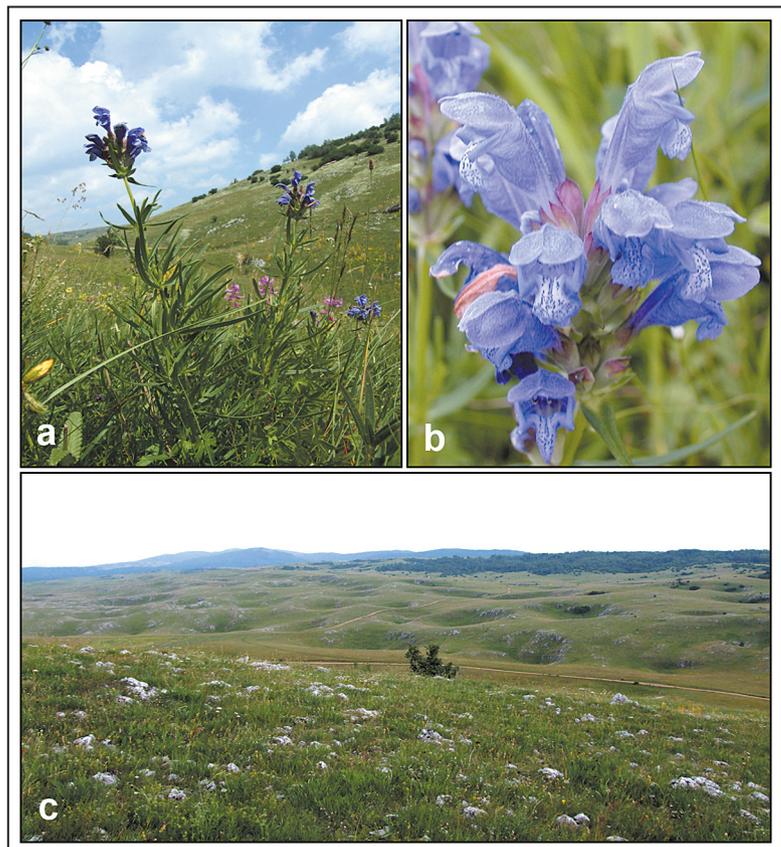


Fig. 3. *Dracocephalum ruyschiana* in natural habitat at Pešter Mt Plateau: a, habitus; b, inflorescence; c, karstic relief covered by mountain steppe-like meadows— natural habitat of the species (photos P. Lazarević).

Sea during the last Ice Age. He concludes that it is not a Pontic but a glacial or late glacial relict. On the other hand, Simon (1992) describes *D. ruyschiana* in Hungary as a boreal relict.

Dracocephalum ruyschiana in the Balkans can be considered an interglacial or xerothermic relict of steppe origin which has migrated from the centres of the steppe flora and vegetation (Russian steppes and Western Asia to SE Europe steppes) during a xerotherm, which is a relatively warm and dry interglacial period. It has also probably migrated during a glacial period.

Dracocephalum ruyschiana is included in the *List of strictly protected plant species* of the Bern Convention (1979). In its single confirmed locality in Serbia it occupies a total area of less than 20 acres. The population has fewer than 200 flowering specimens. According to the IUCN Criteria (2008), the regional threat status of *D. ruyschiana* in Serbia is Critically Endangered [CR B2ab(iii); C2b]. The current threat category in Serbia should likewise be changed from Extinct (EX) to Critically Endangered.

Conclusion

After almost a century of doubt, the existence of *D. ruyschiana* in Serbia and Balkan Peninsula is confirmed. The new and sole confirmed locality of this species in the Balkans is Duga Dolina at Pešter Plateau, SW Serbia. The species is a xerothermic relict species and a remnant of the glacial steppe flora. The newly discovered locality in Serbia represents the southernmost limit of its distribution range in Europe, remarkably disjunct from known localities in the E Alps and Carpathians.

Since the new regional threatened status of *D. ruyschiana* in Serbia is determined as Critically Endangered [CR B2ab(iii); C2b] it can be moved from the list of regionally extinct species in Serbia (Diklić 1999) into the *List of Protected Species* and correspondingly, to the *Red Data List of Vascular Plants in Serbia*. Its relict habitat is presently endangered by the increase in shrub and forest vegetation. A new projected highway through Serbia to Montenegro would pass exactly through this locality. Thus research at the Institute for Nature Conservation of Serbia should focus on the importance of this relict habitat and propose some conservation measures before it is too late.

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