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New record of a *Dalmatolacerta oxycephala* (Duméril & Bibron, 1839) population in the northern part of Montenegro

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Abstract

Two previously known northernmost localities of the Sharp-snouted rock lizard in Montenegro were the entrance of the Komarnica Canyon (Nevidio), and the middle part of the Tara River Canyon (village Tepca). It was presumed that Komarnica and Piva canyons were once corridors for the spreading of this species from the Eastern Adriatic sub-Mediterranean area to the Tara River Canyon in the north. However, it had not been hitherto known if there were any other relict populations in the area. In the autumn of 2019 a localized population of *D. oxycephala* was discovered in the middle part of the Komarnica Canyon.

Key Words

Komarnica river canyon, new locality, refugium, Sharp-snouted rock lizard, south-eastern Europe

Introduction

Dalmatolacerta oxycephala, or Sharp-snouted rock lizard, is a lacertid species endemic for Mediterranean and sub-Mediterranean parts of the Balkan Peninsula in Europe (Sillero et al. 2014). Due to suitable orographic and climatic conditions along the gorges and canyons of rivers that enter the Adriatic Sea, this lizard has established viable populations relatively far inland (Crnobrnja-Isailović and Džukić 1997). Previously it was considered that the Sharp-snouted rock lizard inhabits the coastal Adriatic area of Montenegro and steep rocky slopes of the mountains in the hinterland, which are mostly oriented toward the south (see in Džukić 1991). A surprising discovery of a far inland Mediterranean refugium was the finding of an isolated population in 1987, at the entrance of the Komarnica Canyon on the southern slopes of Durmitor Mountain, approximately 80 km to the north from the species core area (Džukić 1991) (Fig. 1). Almost a decade later, Tomović et al. (2001) reported the presence of the Sharp-snouted rock lizard in the middle part of the Tara River Canyon, around 24 km north (straight line distance) from the entrance of the Komarnica Canyon (Fig. 1). Considering orographic conditions of the area it was obvious that this lizard, regardless of its historical route from the Mediterranean rocks to the inland mountain slopes, used suitable parts of Komarnica River and Piva River canyons to enter the Tara River Canyon and to spread upstream toward the village of Tepca.

For a long time, there were no findings that could fill the gap between the population of Sharp-snouted rock lizard at the entrance of Komarnica Canyon and the other one in Tara River Canyon. This is mainly because Komarnica Canyon is not easily reachable along most of the river flow: the riverbed is too shallow for rafting, the riverbanks are too high for walking, and there are just a

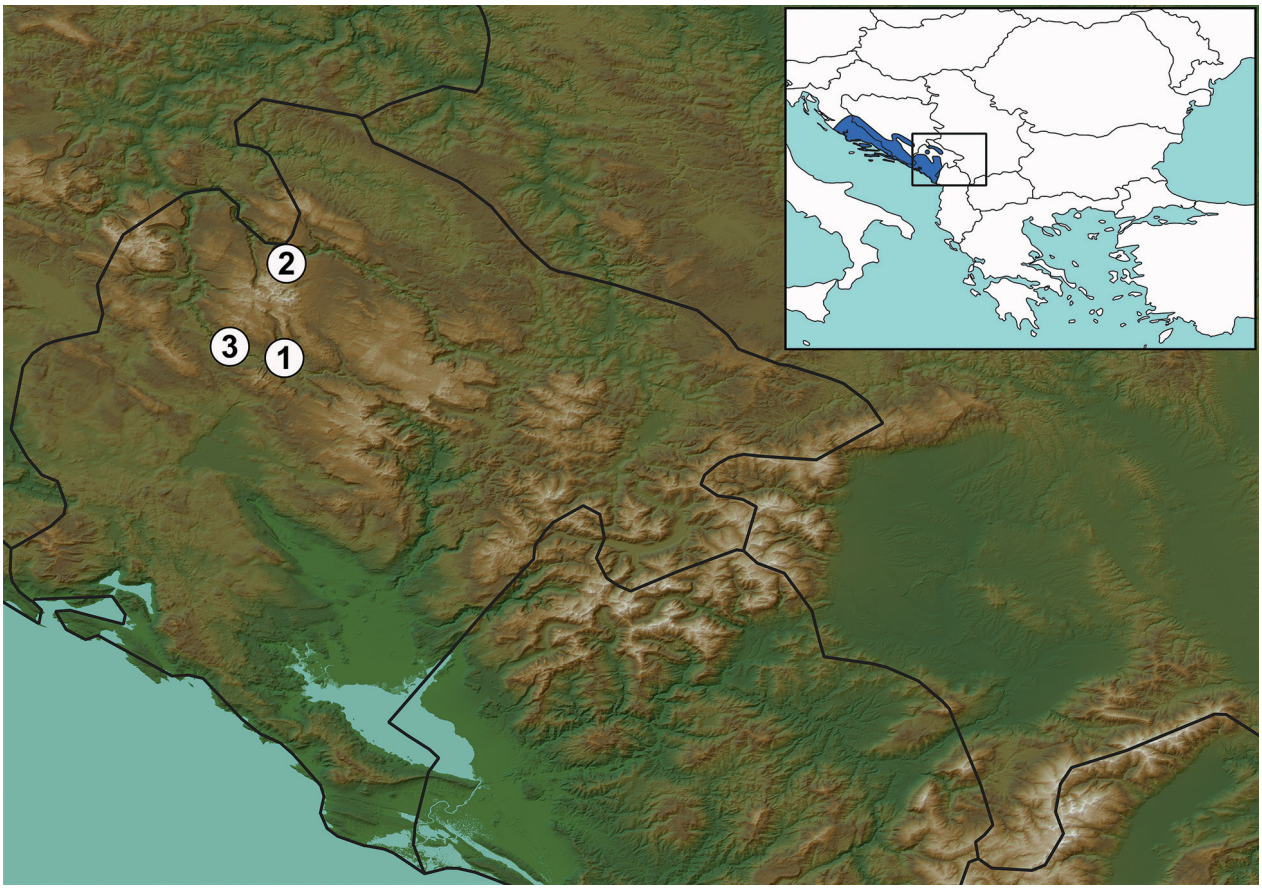

Figure 1. Distribution map of the three northernmost localities of the Sharp-snouted rock lizard (*Dalmatolacerta oxycephala*) in Montenegro: **1** – Entrance of the Komarnica Canyon (Nevidio), **2** – Middle part of the Tara River Canyon (village Tepca), and **3** – New locality in the middle part of the Komarnica Canyon. The small overview map shows the study region and the range of *D. oxycephala* (modified from Crnobrnja-Isailović et al. 2009).

few suitable trails to reach the bottom of the canyon. On the 9th of September 2019 both juvenile and adult individuals of the Sharp-snouted rock lizard (Fig. 2) were spotted on large calcareous rocky outcrops exposed to the south (43°0.64'N, 18°56.31'E, alt. 715 m, Fig. 2); their activity started around noon, when rocks became directly exposed to the sunlight. The surroundings consisted of many very small and a few very big stones on gravelly soil (Fig. 3). The only small lacertid lizard species observed there was *Podarcis muralis*. At 10:00 a.m, when we were approaching the site from the top of the canyon *P. muralis* was already active. The first impression was that Sharp-snouted rock lizards in this part of the Komarnica Canyon had no opportunity to move to the higher areas because of the lack of suitable microhabitats, otherwise they should have been visible there as well. We presume that the very patchy and localised spatial distribution of suitable microhabitats for this species is defined by steepness, exposure and quite diverse directions of the canyon slopes within a relatively small area (the overall length of the canyon is appr. 40 km, from village Pošćenje to the entrance of the Komarnica River into the the Piva Lake).

By its geographic position, this newly recorded local population of the Sharp-snouted rock lizard probably belongs to the mainland genetic clade/south-eastern subclade, described by Podnar et al. (2014). The same authors have reported on the cryptic genetic diversity within this species, as they recognized two highly genetically differentiated clades: "island" and "mainland", but also two subclades within the mainland clade ("north-western" – southern mountain slopes of Dalmatia/Croatia and Herzegovina/Bosnia and Herzegovina and "south-eastern" – southern slopes of Mediterranean refugia in mainland Montenegro). Podnar et al. (2014) further suggested that the conservation status of *D. oxycephala* should be revised and that the described divergent clades should be, at least, assigned as separate ESUs (Evolutionary Significant Units). Present IUCN RL status of the Sharp-snouted rock lizard is Least Concern (Crnobrnja-Isailović et al. 2009), and it seems that the recent climate change would not negatively affect its distribution, on the contrary (Araújo et al. 2006; Garcia-Porta et al. 2019). However, the fecundity of this species is not high, as reported clutch size for sub-Mediterranean populations in Montenegro was 3.5 eggs per female on average (range from 2 to 6 eggs), with a remark that females can produce two or, rarely, three clutches per year (Bejaković et al. 1996a). Another study from the same area provided the average clutch size as varying from 3.3 to 3.5 eggs per female and

Figure 2. Sharp-snouted rock lizard (*Dalmatolacerta oxycephala*) from the Komarnica canyon. Photo: J. Crnobrnja-Isailović.

characterized this species as highly specialized regarding habitat choice (Bejaković et al. 1996b). This suggests a lower potential for survival in non-optimal environmental conditions.

Ljubisavljević et al. (2018) mentioned that the rapid urbanization and the increase of touristic infrastructure is a general threat for local coastal populations of endemic lizard species in Montenegro, which includes *D. oxycephala*. We would add that there are similar challenges for the mainland populations of this species as well, particularly for refugial ones scattered in canyons, as it could be the case with this new recorded one in the mid-part of the Komarnica Canyon. An increase in anthropogenic activities that inevitably alter or destroy natural habitats in this part of the Eastern Mediterranean region would jeopardize the stability of local Sharp-snouted rock lizard populations, as well as other endemic, threatened, Natura 2000, or in some other aspect important wild species. According to Böhm et al. (2013), human-induced habitat loss is one of the predominant threats to reptiles, and the distribution and severity of those threats will shape the future fortune of reptiles. Careful and responsible planning of economic development in Northern Montenegro should support ecological tourism as an adequate solution for the increase of living standards, without harming the local wildlife populations by severe anthropogenic alterations of the landscape.

Figure 3. Microhabitat of the Sharp-snouted rock lizard (*Dalmatolacerta oxycephala*) in the middle part of the Komarnica canyon. Photo: J. Crnobrnja-Isailović.

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