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New data on the presence of the Blotched snake (*Elaphe sauromates* Pallas, 1814) in the region of Shumen town (Bulgaria), with emphasis on the negative human attitude toward the species

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Abstract: *In the present study, we report on new localities in Northeastern Bulgaria, where Elaphe sauromates (Pallas, 1814) was recently detected. We registered five Blotched snakes in the region of Shumen town in the period 2018 - 2022. All of the snakes were adults, three were killed by tools impacts and two of them were road kills. To date, the Blotched snake was registered extremely rare and in rather long intervals (of several decades) in the region of Shumen. Our findings indicate that the species currently inhabits the suburban and urban territories near the villages of Ivanski, Radko Dimitrievo and Konyovets. Two of the locations are new for the 10 km grid-system used for standard monitoring of the biodiversity in Bulgaria.*

Keywords: serpentes, distribution, Balkan fauna, eco- psychology, education, road ecology

Introduction

The Blotched snake (*Elaphe sauromates*) is widespread in Southeast Europe and part of Southwest Asia. The range of the species in Europe is limited to the Eastern part of the Balkan Peninsula, Southern Ukraine and parts of Southern Russia [1]. In Bulgaria, the species was found sporadically in the Danube Plain, the Thracian Lowland, Sarnena Sredna Gora, the Eastern Rhodopes, Sakar and Strandja Mountains and along the Black Sea coast [2]. In the legislation of the European Union, the species has a highly protected status - Annex II and IV of the Habitats Directive 92/43/EEC. The Blotched snake is protected by the Biodiversity Act - Appendix II and Appendix III. The species was listed as an "endangered species EN in the Red Book of

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Bulgaria [3]. Therefore, all of the information related to the distribution of the species, as well as the attitude of man toward these snakes should be considered as valuable for its conservation.

Matherial and methods

The first data concerning the presence of the species in the vicinity of Radko Dimitrievo village were delivered in 2018 by non-professional environmentalists to the first author of the study. On the base of that information, we organized monitoring of the Shumen region. We visited the suburban area North of the village in irregular intervals during the active season of the Blotched snake. We collected additional information concerning the presence of the species in the neighboring regions. For photo documentation, we used "Panasonic Lumix DMC-FZ200" (Panasonic Corporation, Kadoma, Osaka, Japan). We registered the position of our findings by the use of hand-held GPS system "Garmin Oregon 600" (Garmin International Inc., Kansas, USA) with datum WGS84. The temperatures were measured using "Therma Elite 221-061" (ETI ltd, Easting Close, Worthing, West Sussex, UK). The distribution map (Figure 1) was generated by the use of QGIS (2022). For identification of the species we used [2].

Results and discussion

The initial data for the presence of the Blotched snake in the region of Radko Dimitrievo village were delivered on 30.06.2018 by local people (pers. comm. with PM). The information was about two adult specimens killed near to the greenhouses north of the village (43.1901°N, 27.0038°E, 106 m a.s.l.). Adjacent to the greenhouses was a pile of stones, among which were found two exuviae of *E. sauromates*. The exuviae were collected by PM on 02.07.2018. The site was surrounded by arable land. On 20.05.2022 at 13:11 a dead adult specimen (see Figure 2) was found on the asphalt road within the village (43.1802°N, 27.0068°E, 101 m a.s.l.). The snake was freshly killed after wild-life vehicle collision. We have to indicate that the traffic at this section of the road is rather intense.

On 06.05.2021 at 19:00 a dead adult specimen was found on the road to the village of Konyovets (43.3189°N, 26.9863°E, 190 m a.s.l.). The asphalt road was surrounded on both sides by grain crops. In contrast to the road, passing through Radko Dimitrievo village, the traffic on the road to Konyovets is rather low. However, this is the second record of road kill *E. sauromates* reported for that region [4].

On 30.06.2021, one adult male specimen was captured and killed by local people in the village of Ivanski (43.1402°N, 27.0386°E, 78 m a.s.l.). The first author was not able to interact on time and arrived at the site shortly after the act of killing. In the vicinity of the spot (at about 300 m.) flows the Stara reka river, which is a left tributary of the Golyama Kamchia river. To the east of the location there were open meadows and cultivated areas.

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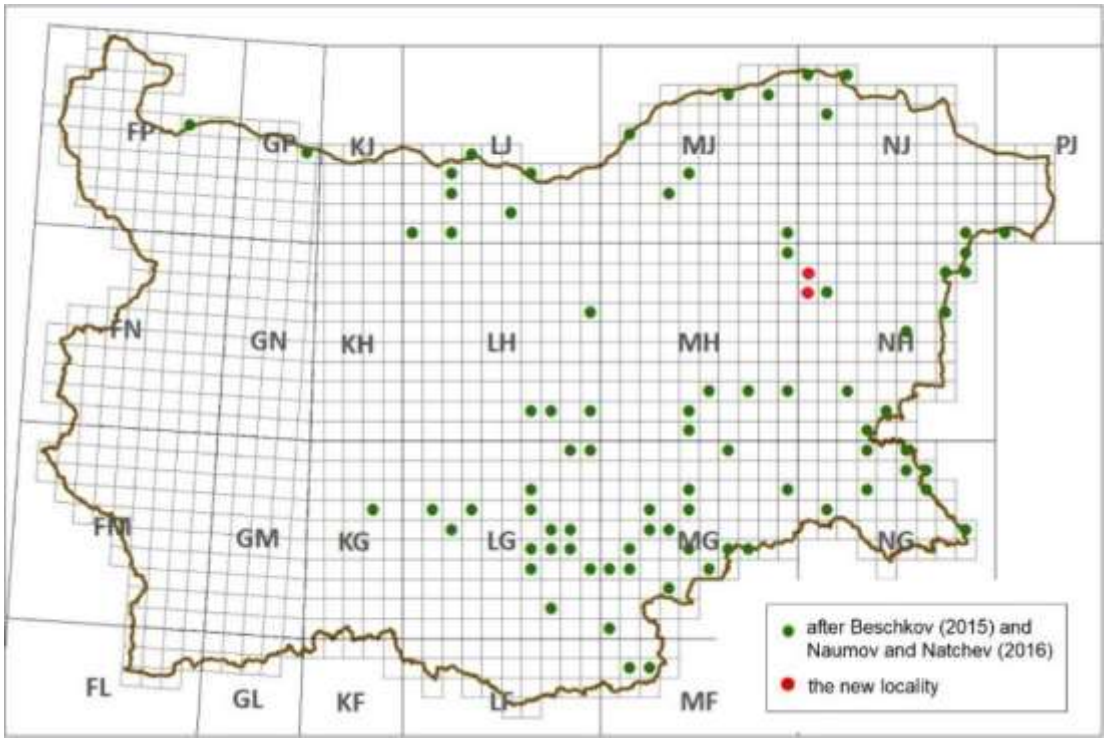


Figure 1. Map of the distribution of *E. sauromates* on the territory of Bulgaria

In Bulgaria, the habitats preferences of the Blotched snake have not been well studied. According to general publications [2, 5], the species inhabits open spaces with steppe vegetation, pastures, bushes, forests and moist areas along riverbanks, and swamps. To date, the Blotched snakes were not recorded in the vicinity of Radko Dimitrievo and Ivanski villages (see Figure 1) [2, 3]. The nearest record spots were about 20 km from the location in the village of Ivanski and were north from the town of Shumen [4]. Before the registration of the species in 2006, there were only two rather old observations of the Blotched snake near Shumen [6, 7]. We propose that it is possible, that the species formed viable and even dense populations, which simply remained undetected for prolonged time due to rather poor detectability of the species [8]. In general, our findings are in line with the data of [8] and [9], that *E. sauromates* often inhabits urbanized areas. The Blotched snakes are presumably attracted there by the availability of food objects (rodents, birds, eggs, etc.). The alarming moment in our research is that the local people react to the appearance of *E. sauromates*, but also other snakes [10] in a rather aggressive manner. According to recent research data [11], there is a clear relation between more tolerant attitude toward snakes and the educational level of the respondents. As snakes are an object, regarded consistently among Western and Asian cultures [12], can be assumed that special education of the local people will also contribute to the improvement of their behavior in contact with serpents. We strongly recommend an immediate revision of the content of the Biology textbooks for the lower

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secondary level of education. This specialized literature has to provide detailed information concerning the Zoology of the vertebrates even in the earliest stages of the Bulgarian educational system.



Figure 2. Dead adult specimen of *E. sauromates* found on the asphalt road (II-73 Shumen-Burgas) in the Radko Dimitrievo village (Shumen, NE Bulgaria)

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