

The Snake-eyed skink, *Ablepharus kitaibelii* Bibron & Bory, 1833 (Reptilia, Squamata: Scincidae) viable population re-discovered in Bosnia and Herzegovina - with morphological, ecological and conservation notes

The snake-eyed skink, *Ablepharus kitaibelii* Bibron & Bory, 1833 is the only representative of its genus in Europe, and the northernmost European species of the Scincidae (Herczeg et al. 2004). In Europe it is known from the southern part of Slovakia, Hungary, most of Serbia, southern and eastern parts of Romania, Bulgaria, Macedonia, Albania, and Greece, including the Aegean and the Ionian Islands, and Turkey (Szövényi & Jelić 2011; Speybroeck et al. 2016). It lives on wide variety of dry habitats with sufficient cover of low vegetation or leaf litter, offering hiding places. Found in meadows, grassy slopes and forest edges (Speybroeck et al. 2016).

The first official data of *A. kitaibelii* from Bosnia and Herzegovina (B&H) was given by Sofradžija (1978) for eastern Bosnia (locality "Ustikolina"). The author collected 16 individuals and some of them are deposited in the National Natural History Museum of B&H. However, Ljubisavljević et al. (2015) mentions a possible second locality, near Bijeljina, for B&H quoting unpublished Bsc thesis of Aleksić (1954), but without any voucher photographs or specimens. None of the localities was ever reconfirmed since the original records and existence of viable population were doubted.

In this paper we describe the re-discovered population given in Sofradžija (1978) in locality Lozje (Cvilin, Ustikolina; 43°34' 18°49'). A total of 21 individuals were observed and 13 of them were caught (Fig. 1; Table 1). All caught individuals were measured with calliper (1 mm) and digital weight (0,01g) and released afterwards at the site of capture. The weather was warm but cloudy (22 °C) and variable windy (from 0 to 2,3 m/s). Humidity was 35,2 % with soil temperature of 9 °C.



Figure 1. Caught individuals of *Ablepharus kitaibelii* – numbers correspond to those in Table 1.



Figure 2. Habitat of *Ablepharus kitaibelii* from Bosnia and Herzegovina during the summer (left) and early spring (right) (photo: A. Zimić).

The vegetation of the snake-eyed skink's habitat in this locality at the time of capture was a meadow with remnants of last year's vegetation in which individuals very skilfully managed to hide (Fig. 1b). The meadow is extremely small (20x15 m) and very steep (45°) with southwestern exposure from 429 to 433 m a.s.l. The habitat of the *A. kitaibelii* is south bordered with an old orchard (plum and cherry), while the north-east borders with light forest dominated by *Quercus cerris* forests with *Fraxinus ornus* (Fig. 1a). The meadow's western border is represented by urban landscapes and cultivated surfaces and the Drina River.

No individuals were found in the nearby areas: (1) where the grass is intensively cut, (2) in the forests or

Table 1. Morphological characteristics of caught individuals.

No	Snout to vent length (mm)	Tail length (mm)	Total length (mm)	Forelimb length (mm)	Hind-limb length (mm)	Inter-limb distance (mm)	Head length (mm)	Head width (mm)	Weight (g)
1	39	26	65	9	11	30	9	6	1,08
2	42	74	116	8	12	28	6	5	1,34
3	42	35	77	9	11	26	7	5	1,26
4	40	59	99	9	12	28	9	5	1,28
5	43	75	118	9	14	26	8	6	1,32
6	47	40	87	9	12	31	9	6	1,24
7	46	24	70	8	11	32	9	5	1,28
8	33	54	87	6	10	20	7	5	0,68
9	29	24	53	6	10	14	5	4	0,38
10	46	68	114	9	11	32	9	5	1,4
11	29,5	34	63,5	6	8,5	19	6	4	0,4
12	30	43	73	6,5	9	17	8	4	0,44
13	34	49	83	8	10	18	6	4	0,56
Average ±SD	38,5±6,6	46,5±18,3	85,0±21,2	7,9±1,3	10,9±1,4	24,7±6,3	7,5±1,5	4,9±0,8	1,0±0,4

orchards, (3) on the agriculture lands, (4) urban areas around houses and (5) macadam roads. In addition to this, we conducted research on some higher altitudes location, with a similar description of the habitat (meadow next to oak forest), but did not find individuals of this species. In terms of altitude, this region is just in-between Ilok and Papuk (two known *A. kitaibelii* localities in Croatia; Szövényi & Jelić 2011). However, there are more similar habitats which should be investigated. Around the meadow where the population was observed, there are grasslands on higher (towards east, max 570 m) and lower (towards west minimum 370 m) altitudes. To the south, east and north there are orchards and meadows where grass is cut by locals for animal husbandry and those areas should also be monitored for expansion of distribution of the snake-eyed skink. In future research it is necessary to investigate habitats south of the Drina River where meadows and orchards exist on same altitude as area where we identified snake-eyed skink.

During this and previous research, six species of reptiles were recorded: *Podarcis muralis*, *Lacerta viridis*, *Anguis fragilis*, *Zamenis logissimus*, *Coronella austriaca*, *Vipera ammodytes*, *Natrix tessellata* and six amphibian species: *Bombina variegata*, *Hyla arborea*, *Bufo bufo*, *Rana temporaria*, *Rana dalmatina* and *Rana graeca*. *L. viridis* (9 juveniles and 3 adults) was the only species found in exactly the same meadow with *A. kitaibelii*. However, *P. muralis* population is located on the borders of: meadow-oak forest and meadow-urban habitats. So these species should be considered syntopic lizard species and one of their main predators (Gruber 1981). According to the local people domestic cats and chicken can also cause mortality of individuals of *A. kitaibelii*. Seven specimens or 47% of caught individuals were with injured (n=4) or regenerated tails (n=3) which confirms that the predation pressure is relatively high for this species in this area.

On the north-western part of its range the species occurs only in isolated localities with suitable forest-steppe habitats (Croatia, Hungary, Serbia, B&H, etc.) and can be assumed that this population could also be genetically isolated (Jovanović Glavaš et al. 2018). Long isolation often leads to a decrease in viability and genetic heterozygosity of the population, we can expect in the case, although the same assumptions should be confirmed by molecular analysis. The population from Ustikolina is extremely isolated. The nearest

known population is located more than 76,35 km and located in Mileševka River Canyon, followed by the 92,6 km from Jagodnja Mt. and Užice by the 93,3 km (Ljubisavljević et al. 2015). The Montenegro population is approximately 114 km to the south-east (Vergilov et al. 2016). From the closest northernmost population (Szövényi & Jelić 2011) in Ilok it is isolated by 189 km and Papuk by 232,2 km.

This population is threatened by the reduction of habitat, pressure from urbanization, followed by intensive grass cutting and illegal trade. The last of mentioned threats, illegal trade of *A. kitaibelii*, was recorded in 2014 on B&H Internet buy and sell portal www.olx.ba. Multiple individuals were offered to be sold as pets. Principle author (A.Z.), reacted to this advert and asked about the origin of animals but the add was taken off the web portal (but as proof we have screenshots).

Since this is the only one existing population from B&H and it has extremely small size of the habitat, it is necessary to explore the possibilities of benign introduction similar to methodology proposed in Croatia (Jovanović Glavaš et al. 2018).

Bosnia and Herzegovina has 29 species of reptiles (excluding migrating marine turtles and allochthon species) and *A. kitaibelii* with one know locality should be considered its rarest reptile species.

Acknowledgments. We owe our highest gratitude to Dr. Avdo Sofradžija who showed us the exact location for his findings of *A. kitaibelii*. The work was financially supported by Federal Ministry of Environment and Tourism in Bosnia and Herzegovina (Number 01-23-1105-IV/16-69-1).

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Article No.: e187502

Received: 07. April 2017 / Accepted: 23. January 2018

Available online: 06. April 2018 / Printed: June 2018

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Key words: skink, distribution, isolation, Balkan, Bosnia and Herzegovina.