

Original Research

**NEW FINDING SPECIES ABLEPHARUS KITAIBELII BIBRON & BORY, 1833
(REPTILIA: SQUAMATA: SCINCIDAE) IN BOSNIA AND HERZEGOVINA**

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Abstract

On the territory of Bosnia and Herzegovina, 29 species of herpetofauna were recorded, of which 13 species are from the ordo Sauridae, while 15 species of reptiles live on Kozara mountain, of which 12 species and one intraspecies form are in the National Park. Ablepharus kitaibelii was recorded in 2012 at the Benkovac site within the NP Kozara, with four specimens, in sunny weather, on a stony meadow, overgrown with rare herbaceous and shrubby plants. The size of the specimens ranged from 6 to 12 cm. The species is not endangered on a global level, but it is in Bosnia and Herzegovina, because we only have two pieces of data. The find at the Benkovac location is officially the second or third in the territory of Bosnia and Herzegovina, because we have one reliable piece of information from the vicinity of Ustikolina in the Federation of Bosnia and Herzegovina. At the national level, the species is not on the Red List of Flora and Fauna of either the Federation of Bosnia and Herzegovina or the Republic of Srpska. In order for this species to survive, species and habitat monitoring must be established and all research conducted will provide guidelines for active protection, e.g. "in situ" in their habitat or measures to improve conditions through active protection projects.

Keywords: Reptiles, *Ablepharus kitaibelii*, NP: Kozara, Bosnia and Herzegovina.

INTRODUCTION

The genus *Ablepharus* belongs to the family Scincidae and subfamily Eugongylinae, which has 18 species in the world, and one species *Ablepharus kitaibelii* Bibron & Bory, 1833 is present in Europe [1]. According to Jablonski *et al.* [2], the total species diversity of the herpetofauna of Bosnia and Herzegovina is 29 species, of which the ordo *Testudines* has 3 species, and the ordo *Sauridae* and *Serpentes* have 13 species each. Jablonski *et al.* [2] lists the genera from the ordo *Sauridae* for the B&H area: *Algyroides*, *Anguis*, *Dalmatolacerta*, *Dinarolacerta*, *Hemidactylus*, *Lacerta*, *Podarcis*, *Pseudopus*, *Zootoca*, where we note that he does not mention the genus *Ablepharus*. The species *Ablepharus kitaibelii* Bibron & Bory, 1833 (Syn. *Ablepharus pannonicus* Fitzinger, 1824; *A. festae* Peracca, 1894; *Riopa rupellii* Gray, 1839) is the only representative of its genus in Europe, and the northernmost European species of *Scincidae* [3]. The very name of the genus *Ablepharus* originates from the Latin

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word *ablepharia* - the medical name for the lack of eyelids, which is also a characteristic of the genus *Ablepharus* [4]. The species *A. kitaibelii* is a small lizard with a slender cylindrical body up to 12 cm in length. It has a pyramid-shaped head and poorly developed legs. Its body is covered with smooth and shiny small scales, while the skin on the dorsal and ventral sides contains osteoderms. The eyelids are fused and immobile, and the lower eyelid is reduced to a transparent film that is fused with the upper eyelid. They have sexual dimorphism and the female is larger than the male. The dorsal side of the body is brown or bronze in color with usually four narrow double, mostly interrupted darker lines along the sides from the top of the head to the middle of the tail [5]. The ventral side of the body is metallic gray-bluish in color, which usually has orange tones during reproduction in males [6]. This is a polytypic species and we have four described and accepted subspecies in the range: *A. kitaibelii fitzingeri*, *A. kitaibelii stepaneki*, *A. kitaibelii fabichii* and *A. kitaibelii kitaibelii* [5]. The species is terrestrial, digs through the ground and belongs to the group of semifossorial organisms. During the day, there is a morning and afternoon peak of activity [7,8], and hibernation lasts from October to April. Its predators are snakes, lizards (genus *Lacerta*), birds and mammals [9,10]. It feeds on insects and larvae, spiders, centipedes and other invertebrates [11]. It is sexually mature in the second year, the species is oviparous, and mates from April to June, eggs are laid during May and June, and young lizards appear from the end of July to September [11]. It inhabits a wide range of dry habitats covered with low vegetation or leaves. It inhabits meadows, grassy slopes and forest edges [12]. It occurs most often on hilly, slightly inclined slopes of southern exposures covered with low vegetation and rare trees and bushes [8]. It inhabits different types of substrate (sedimentary or volcanic rocks) and the species is highly selective in its selection of microhabitats [13]. In the northern part of the area, it is found in steppe habitats, and going south with increasing altitude, the species is recorded along the edges of open oak forests [14]. According to Jablonski *et al.* [2] the species belongs to the East-Mediterranean element. In Europe, it is present in the south of Slovakia and Hungary, in most of Serbia, the southern and eastern parts of Romania, Bulgaria, Macedonia, Albania and Greece with the Aegean Sea, the Ionian Islands, and Turkey [12,15] and in Montenegro there is an isolated population near Berane [4]. According to Ljubisavljević and Džukić [5], the following threatening factors were identified for the species *A. kitaibelii*: habitat fragmentation, conversion to agricultural or forest land, construction of plantations and industrial zones, afforestation of oak habitats with conifer plantations, livestock grazing, urbanization, i.e. the spread of weekend settlements, picnic areas, peripheral parts of the city, and road infrastructure, the spread of non-native invasive species of plants by overgrowing the open habitats they need, chemical soil pollution with municipal or industrial waste and in agriculture with pesticides, etc. All of the above, with their presence and disturbance, has a direct negative impact on local populations, but also on the limited spread of the species and discontinuous distribution, especially in marginal populations in the area, which reduces the possibility of population renewal, and as a result, we may have their complete disappearance. During the 1990s, localities on the territory of Bosnia and Herzegovina were exposed to the effects of war, which certainly left a negative impact on the populations of both this and many other species. We must not forget natural phenomena such as fires, floods, succession of vegetation in the habitat, which affect the condition and survival of local populations. According to the IUCN classification and

Appendix 1- Red List status of Europe Reptilians (2009) its endangered status is the last concern (Lc) [16]. The species is on the list of the Habitats Directive in Annex IV, and on the list of the Berne Convention in Annex II [17,18].

The National Park has an area of 3,907.54 ha, declared in 1967, located on the edge of the Pannonian basin in the central part of the Kozare mountain. It is characterized by dense complexes of deciduous, coniferous and mixed forests, meadows, rocky fields, ponds-swamps, streams and rivers. Kozara is an island mountain formed by the uplift of the land by orogenic movements during the Alpine Orogeny, at the end of the Mesozoic and the beginning of the Tertiary, while the highest peaks rose from the Pannonian Sea in the middle of the Eocene. The geological composition is diverse, from Paleozoic and volcanic rocks to Mesozoic deposits of limestone, marl, dolomite, sandstone, etc. The hydrographic network is of the radial dendroid type, and consists mainly of permanent and periodic watercourses. Kozara has a moderate climate with a strong continental influence in the northeastern part and moderate-continental in the southwestern part of the park. The whole massif of Kozare vegetation belongs to the forest belt of the Illyrian region *Carpinion betuli illyrico-podolicum* [19]. In the montane zone and in the colder positions of the submontane zone, the *Abieti-Fagetum praepannonicum* community dominates and is widespread in most of the central and northern, colder part of the park, and the specificity of these habitats is that the fir here descends very low (up to 200 m.a.s.l.). On the exposed slopes and steep slopes of the southwestern part of the National Park, there is a forest of ass. *Festuco drymeiae-Quercetum petraeae*, while the southern side of Mrakovica is overgrown with *Quercum-Abietetum* forest, which is actually a vegetation transition between the *Abieti-Fagetum praepannonicum* and *Festuco drymeiae-Quercetum petraeae* communities and is also a specificity of Kozara. Forests of Kozara National Park occupy 90% of the area [19,20]. Such habitat conditions caused a diverse composition of the total fauna, especially the diversity of amphibians and reptiles of the Kozara National Park.

MATERIAL AND WORKING METHODS

Research and inventory of the diversity of the Kozara National Park was carried out in the period 2012–2024 when the inventory of the herpetofauna species diversity of the area was done. Specimens were caught with standard herpetological equipment on site for measurement and then released into nature. Their total body length was measured, they were examined in order to determine the presence of ticks and their overall state of health and condition was assessed on a scale of 1–5, where grade 1 is an individual with numerous visible injuries and scars, severely malnourished, slow and uncoordinated movement and grade 5 is an individual without visible injuries and scars, good overall health condition, good nutrition and movement coordination. The determination of the species in the field was carried out according to the literature [21–24].

Site description: The terrain where the species was found is a stony meadow (Figure 1) with a slope of 20–30%, directly exposed to the sun, overgrown with rare herbaceous vegetation with some low bushes. From the north, the area is bordered by degraded low forest

and from the south by a meadow that is occasionally mowed or used for livestock grazing, and was once a football field.



Figure 1 Habitat of the species *Ablepharus kitaibelii*

RESULTS AND DISCUSSION

The first official data for *A. kitaibelii* in Bosnia and Herzegovina was given by Sofradžija [25] for the locality "Ustikolina" [26]. The author collected 16 specimens and some of them are deposited in the natural history department of the National Museum of Bosnia and Herzegovina in Sarajevo (Figure 2). However, Ljubisavljević *et al.* [27] mention a possible second site for B&H near Bijeljina, citing the unpublished diploma thesis of Aleksić [28], but without any confirmatory photos or specimens. Those localities were not visited for a long time until the publication of the work by Zimić *et al.* [26], where the authors describe the "rediscovered" population mentioned by Sofradžija [25] at the Lozje locality (Cvilin, Ustikolina), with the fact that now a total of 21 individuals have been found, of which 13 were captured for further research and analysis, while the locality near Bijeljina was not the subject of field research. In addition to morphometric data for the species itself, the authors provide detailed data on the habitat (vegetation cover, other reptile species present, temperature and hydrological regime of the terrain and soil (air and soil humidity), etc.).

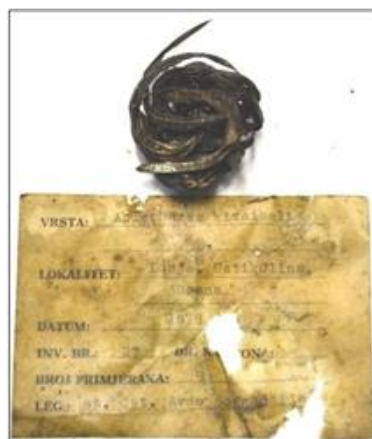


Figure 2 Specimens of the species *Ablepharus kitaibelii* from the herpetological collection of the National Museum in Sarajevo (<https://www.facebook.com/BHHUATRA>)

A total of 15 species of reptiles or 51.7% of the total diversity of B&H were recorded for the Kozara mountain area, of which 12 species (42.8%) and one intraspecies form are present in the Kozara National Park itself [29]. The lizard *Ablepharus kitaibelii* was recorded in 2012 at the Benkovac site (near the stadium) within the Kozara National Park, where four specimens were found [30]. The specimens were found on August 15, 2012, between 10 a.m. and 12 p.m. in a clearing at the edge of a mixed oak forest (Figure 3). The weather was warm, sunny with a temperature of around 28–30°C. First, two specimens were observed on sunlit rocks. Later, two more specimens were found, one at the edge of the forest in fallen leaves, and the other specimen was walking over stones. Of the four specimens, three were in excellent condition, while one individual was generally weakly active, visibly malnourished, part of the tail with signs of regeneration was missing and small scars were present on the back. A complete overview of the measured values of total body length and health status is shown in Table 1.

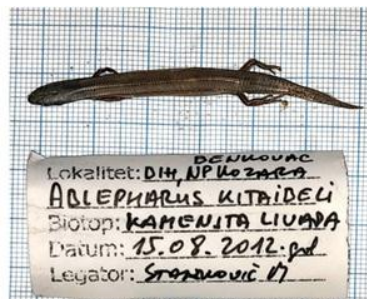


Figure 3 The species *Ablepharus kitaibelii* from the locality Benkovac (Photo: Stanković M.)

Table 1 Measured values of the total body length and estimated general health status and condition of *Ablepharus kitaibelii* in Kozara National Park on Benkovac, 2012

Code	Body length (in cm)	Health and condition*
AK-1	8.6	4
AK-2	11.9	4
AK-3	10.4	5
AK-4	6.4	2

* scale 1 – 5; description is given in the section Materials and working methods

The body size of our specimens ranged from 6–12 cm, which coincides with the data from the Ustikolina site [26].

During a visit to the Benkovac site in 2014, the species was not recorded due to the extremely wet terrain when most of the meadow was under shallow water and the rocks on the slopes that make up the surrounding rock gardens were "soaked" by the water that flowed from them. Then in 2015, during a visit to the site, one specimen, 8.8 cm long, was found, but that year the beginning of the overgrowth of the rock garden-meadow by the nearby forest was observed and tall weedy vegetation. Since 2016, the species has not been recorded in the locality, and the terrain is overgrown with high vegetation with the spread of shrubby and

woody vegetation. The closest localities to ours are in the Papuk Nature Park (southwestern slope of the Turjak ridge) and in the city park in Ilok [31].

In Europe, the species has the status of endangered last concern (Lc) [16], while in Bosnia and Herzegovina *Ablepharus kitaibelii* should have the status of critically endangered species (CR), otherwise, at the national level, the species is not on the Red List of Flora and Fauna of the Federation of Bosnia and Herzegovina, nor on the Red List of Protected Species of Flora and Fauna of the Republic of Srpska, which should be changed in the next amendment or revision.

Endangering factors at the Benkovac site, in addition to the above-mentioned general endangering factors at the site, over the past ten years, the rocky meadow-meadow has been overgrown by high ruderal vegetation and the spread of forest (shrubby and woody) vegetation that was originally on the edge of the slope, and now the vegetation has almost completely overgrown and closed the sunny open parts of the rocky meadow with its structure.

Species protection measures in Bosnia and Herzegovina: According to the currently available data, this is one of the rarest reptile species in Bosnia and Herzegovina, and therefore legally, the species should be on the list of protected species in both entities of Bosnia and Herzegovina. Also, the habitats where the species is found must be officially legally protected, if they are not within an existing protected area such as the Benkovac site within the Kozara National Park, which could be set aside as a specially protected habitat within the park. Population and habitat condition monitoring should be established in all habitats. Work on education and raising the awareness of the population about the importance of protecting and preserving both the species itself and its habitat. We must bear in mind that this species has a cryptic way of life where there is a danger that its habitats will be completely destroyed or devastated before it is established that the species was there, which only indicates the need for further research of all potential habitats of the species in Bosnia and Herzegovina. In order to better protect the species, a detailed investigation of the state of the population and their habitats is necessary, especially those isolated populations exposed to stronger anthropogenic influence. All these population-ecological studies can indicate the need to undertake active protection such as "in situ" in their habitats [5]. Since there are specific cases of the species being the subject of illegal trade, such as the one recorded in 2014 in Bosnia and Herzegovina, when several specimens of *A. kitaibelii* were offered for sale as pets on the internet on the shopping portal (www.olx.ba) and when the ad was responded to and asked about the origin of the animals, the site administrator removed it from the web portal [26]. This example warns us that such situations must not happen in the future and that inspection authorities must monitor such sites and react to such situations. As a measure to protect the species and its habitat specifically at the Benkovac location, it is necessary to carry out remedial measures to clean and illuminate the terrain, which entails the removal of forest and part of the bushy vegetation that has since spread and conquered most of the area where the species was found.

CONCLUSION

The lizard *Ablepharus kitaibelii* was recorded at the Benkovac site (near the stadium) in the Kozara National Park, where four specimens were found in 2012, on a rocky slope at the edge of a mixed oak forest in warm, sunny weather. The species is not endangered on a global level, but it is in Bosnia and Herzegovina, because there are only two data so far. The finding of the species *A. kitaibelii* at the Benkovac locality is officially the second or third data for B&H, because for now we only have one reliable data from the vicinity of Ustikolina in the Federation of B&H, while the other literature data cites the unpublished diploma thesis that mentions another possible locality of this species for B&H, near Bijeljina without specific specimens or photographs. The species must be nationally listed on the Red List of Flora and Fauna of the Federation of Bosnia and Herzegovina, and on the Red List of Protected Species of Flora and Fauna of the Republic of Srpska. In order to preserve and survive this species, monitoring of species and habitats and the need to undertake active protection of their habitats or measures to improve habitat conditions through active protection projects must be established.

REFERENCES

- [1] Uetz P, Freed P, Hošek J. Eugongylineae. The Reptile Database. Retrieved 10 October 2019.
- [2] Jablonski, D., Jandzik, D., Gvoždík, V. North-West. J. Zool. 2012, 8 (2), 324–337.
- [3] Herczeg, G, Tóth, T, Kovács, T, *et al.* Russ. J. Herpet. 2004, 11 (2), 99–105.
- [4] Mićanović A, Muhović I. Vodič kroz svijet gmizavaca Crne Gore. Danilovgrad, Crna Gora: Crnogorsko društvo ekologa; 2023. p. 95.
- [5] Ljubisavljević K, Džukić G. Kratkonogi gušter ((*Ablepharus kitaibelii* (Bibron & Bory, 1833))). In: Tomović Lj, Kalezić M, Džukić G, editors. Crvena knjiga faune Srbije II – Gmizavci. Beograd: Biološki fakultet Univerziteta u Beogradu, Zavod za zaštitu prirode Srbije, Alta nova; 2015.
- [6] Ljubisavljević, K., Džukić, G., Kalezić, M.L. Herpetozoa 2002, 14 (3/4), 107–121.
- [7] Pasuljević G. Glasnik Prirodnjačkog Muzeja u Beogradu, Serija B, 1965, 20, 311–314.
- [8] Pasuljević G. (1966). Prilog poznavanju ekologije *Ablepharus kitaibelii* (Bibron et Bory). *Zbornik Filozofskog Fakulteta u Prištini*, 3, 459–463.
- [9] Gruber U. *Ablepharus kitaibelii* (Bibron und Bory 1833). *Johannisechse*. In: Böhme W, editor. *Handbuch der Reptilien und Amphibien Europas*. Wiesbaden: Akademische Verlag; 1981. pp. 297–302.
- [10] Herczeg, G., Kovács, T., Korsós, Z., *et al.* Biol. 2007, 62 (4), 482–487.
- [11] Pasuljević G., Morfološki varijabiliteti i biogeografsko-ekološki odnosi populacija *Ablepharus kitaibelii* (Reptilia: Squamata: Scincidae), (Bibron et Bory). Doktorska disertacija, PMF Univerziteta u Prištini, Priština, 1973.
- [12] Speybroeck J, Beukema W, Bok B, *et al.* Field Guide to the Amphibians and Reptiles of Britain and Europe, London, UK: Bloomsbury Publishing Plc; 2016.

- [13] Jelić D, Koller K. Nacionalni program za praćenje stanja očuvanosti vrsta u Hrvatskoj – Ivanjski rovaš (*Ablepharus kitaibelli*). Zagreb: Državni zavod za zaštitu prirode R. Hrvatske; 2014. pp. 3–11.
- [14] Pasuljević, G. Acta Biol. Med. Exp. 1976, 1–2, 57–63.
- [15] Szövényi, G, Jelić, D. North-West. J. Zool. 2011, 7 (1), 20–25.
- [16] Cox NA, Temple HJ, European Red List of Reptiles, Luxembourg: Office for Official Publications of the European Communities; 2009.
- [17] Bern Convention on the Conservation of European Wildlife and Natural Habitats.
- [18] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and wild fauna and flora Annex IV - Animal and plant species of Community interest (i.e. endangered, vulnerable, rare or endemic in the European Community) in need of strict protection; Annex II- animal and plant species of community interest whose conservation requires the designation of special areas of conservation; Annex 5 - Animal and plant species of Community interest whose taking in the wild and exploitation may be subject to management measures.
- [19] Bucalo V, Brujić J, Travar J, *et al.* Flora Nacionalnog parka Kozara. Milano, Banja Luka: Šumarski fakultet Univerziteta u Banja Luci i ERSAF Regionalni zavod za upravljanje šumama i agrokulturom Pokrajine Lombardija; 2007.
- [20] Bucalo V, Brujić J, Travar J, *et al.* Šumarstvo, 2006, 4, 11–24.
- [21] Arnold EN, Burton JA. A field guide to the Reptiles and Amphibians of Britain and Europe. London: Collins Grafton Street; 1985.
- [22] Forey PA, Forey PE, Reptiles & Amphibians: Pocket reference guides. Brockhampton: Brockhampton press; 1997.
- [23] Harry G, Borm L. Fauna Evrope – Priručnik za raspoznavanje životinjskih vrsta. Ljubljana: Mladinska knjiga; 1981.
- [24] März R. Gewöll und Ruppungskunde. Berlin: Academie Verlag; 1987.
- [25] Sofradžija A. Glasnik Zemaljskog Muzeja Bosne i Hercegovine 1978, 7, 37–38.
- [26] Zimić A, Pećar D, Jelić D. North-West. J. Zool. 2018, 14 (1), 146–148.
- [27] Ljubisavljević K, Tomović L, Simović A, *et al.* Ecol. Montenegrina 2015, 2, 247–254.
- [28] Aleksić I. Biologija i ekologija panonskog guštera (*Ablepharus pannonicus*). BSc thesis. Biološka grupa, PMF, Beograd; 1954.
- [29] Stanković M, Romčević D, Pjević Beslac N. In: 10. Simpozijum o zaštiti karsta, Akademski speleološko–alpinistički klub; Belgrade, Serbia. 2023. p. 81–85.
- [30] Stanković M. Čovjek i krš 2013, 34, 47.
- [31] Janev-Hutinec B, Kletečki E, Lazar B, *et al.* Crvena knjiga vodozemaca i gmazova Hrvatske. Zagreb: Ministarstvo, kulture R. Hrvatske i Državni zavod za zaštitu prirode. 2006.