BioOne COMPLETE

# A newly discovered population of the Balkan spiny loach Sabanejewia balcanica (Karaman, 1922) in the River Jihlava, Czech Republic

Authors: Halačka, Karel, Muška, Milan, Mendel, Jan, and Vetešník, Lukáš

Source: Folia Zoologica, 66(3) : 163-166

Published By: Institute of Vertebrate Biology, Czech Academy of Sciences

URL: https://doi.org/10.25225/fozo.v66.i3.a3.2017

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

Downloaded From: https://bioone.org/journals/Folia-Zoologica on 04 May 2024
Terms of Use: https://bioone.org/terms-of-use

Folia Zool. – 66 (3): 163–166 (2017)

# A newly discovered population of the Balkan spiny loach *Sabanejewia balcanica* (Karaman, 1922) in the River Jihlava, Czech Republic

**Karel HALAČKA[1], Milan MUŠKA[2,3], Jan MENDEL[1] and Lukáš VETEŠNÍK[1]**

[1] *Institute of Vertebrate Biology, Czech Academy of Sciences, Květná 8, 603 65 Brno, Czech Republic; e-mail: halacka@ivb.cz*
[2] *Nature Conservation Agency of the Czech Republic, Kaplanova 1931/1, 148 00 Praha 11 – Chodov, Czech Republic*
[3] *Biology Centre of the Czech Academy of Sciences, Institute of Hydrobiology, Na Sádkách 7, 370 05 České Budějovice, Czech Republic*

Received 21 March 2017; Accepted 8 September 2017

**Abstract.** In the Czech Republic, the Balkan spiny loach *Sabanejewia balcanica* was historically only known from the River Bečva, a left tributary of the River Morava, itself a main tributary of the River Danube. Following its assumed extinction in the Czech Republic, a small population was found in a 1 km stretch of the River Vlára at the Slovak border, with individuals presumably having migrated from Slovakia. In 2016, we recorded six individuals in the downstream stretch of the River Jihlava. Based on present knowledge, this appears to be a population situated wholly outside of its previously known area of distribution, and the only population presently found in the 26000 km$^2$ River Morava drainage basin. The distance of this population from the species' present distribution area and historic findings in the River Bečva clearly indicate a much wider historical distribution of this species in the past.

**Key words:** loaches, rare native species, sequence analysis, NATURA 2000

## Introduction

The Balkan spiny loach *Sabanejewia balcanica* (Karaman, 1922) is a small representative of the family Cobitidae. Commonly found in southeastern Europe, they are mainly found at depths up to 1.5 m in hill streams with few plants, clear water, a sandy or fine gravel bottom and moderate current; though it has also been observed in large rivers (Kottelat & Freyhof 2007). Though classified as of least concern in the European Red list (Freyhof & Kottelat 2008), Balkan spiny loach populations are classed as having an unfavourable and deteriorating conservation status according to the Habitats Directive report for 2007-2012 (ETC 2015). Due to its limited occurrence in the Czech Republic, it is classed among the most heavily endangered vertebrate species in the country, being classed as "critically endangered" under Czech legislation (Decree No. 395/1992 of the Ministry of the Environment).

In the Czech Republic, the Balkan spiny loach was first recorded from the River Bečva, close to the village of Lipník (r.km 24.7; 49°30′36.34″ N, 17°33′46.30″ E), in 1943 (Záleský 1944, Fig. 1). Subsequent investigations from the 1950s and 60s recorded the species all along the River Bečva and into the rivers Bečva Vsetínská and Senice (Oliva 1952, Kux 1957, Bănărescu & Oliva 1966). Regular ichthyological monitoring between 1997 and 1999 failed to record the species (Lusk et al. 2000), and it was therefore thought to have gone extinct (Hanel & Lusk 2005). In 2001, the species was found in a 7 km stretch of the River Vlára close to the Slovak border (Lusk et al. 2002; 49°2′19.32″ N, 18°2′49.93″ E). The River Vlára is a 42.5 km stream arising in the Czech Republic and flowing into the River Váh in Slovakia. Due to the lack of any significant migratory barrier along the River Vlára, the Balkan spiny loach most likely has colonised 7 km of the Czech stretch of the River Vlára from Slovakia, with the centre of the population laying in Slovakia. At present, the Vlára is the only river in Czech Republic that is declared "Locality of European importance" for the Balkan spiny loach under the NATURA 2000 directive (CZ0723434-Vlára).



Downloaded From: https://bioone.org/journals/Folia-Zoologica on 04 May 2024
Terms of Use: https://bioone.org/terms-of-use

This note documents a recent finding of the Balkan spiny loach on the River Jihlava, extending its current geographic range in Central Europe. Since the population in the River Bečva is considered extinct is the only known "population" of the species in the River Morava catchment.

## Material and Methods

Historically, the downstream stretch of the River Jihlava was part of a wide active alluvium created in the west by the rivers Jihlava, Svratka and Dyje, on the east by the rivers Morava and Kyjovka. The alluvium contains the richest ichthyocenosis in the Czech Republic (Halačka et al. 1998, Lusk et al. 2006). The width of the lower stream of the River Jihlava is from 20 to 35 m. In the extravilan, the natural character of the meanders and the high diversity (varying depth up to 2 m), the flow rate and the bottom substrate (from fine sediments to stones, sometimes vegetation macrophytes or submerged strains) are preserved. In intravilan the built-up areas, the trough is stretched in some sections, reinforced with stone pavement and flood dams. The average flow rate is 11.50 m³/s (Q100-390 m³/s). The River Jihlava has undergone considerable anthropogenic modification, particularly habitat fragmentation. Movement along the upper stretch has been interrupted by the construction of two dams, the Dalešice (r.km 66) and Mohelno (r.km 59.2) dams, constructed between 1970 and 1978. These dams also significantly influence flow rate and water temperature of the river, effectively creating a secondary trout zone (Lusk 1977, Losos et al. 1980).

The downstream stretch has been affected by the Nové Mlýny Reservoir system, both as a barrier to natural migration of native rheophilic fish from the rivers Morava and Danube but also as a source of non-native species (e.g. Prussian carp *Carassius gibelio*, stone moroko *Pseudorasbora parva*, grass carp *Ctenopharyngodon idella* and silver carp *Hypophthalmichthys molitrix*). In addition, there are three usually impenetrable weirs along the downstream stretch, at Cvrčovice, Medlov and Dolní Kounice (Fig. 1). Despite these negative factors, the overall quality of the downstream stretch of the River Jihlava remains relatively good, outside town residential area. The river retains a natural character (e.g. meanders, high transverse bottom segmentation and variable flow rate and bed width) and the ichthyofauna includes at least 34 different fish species; native species: brown trout (*Salmo trutta*), northern pike (*Esox lucius*), roach (*Rutilus rutilus*), chub (*Squalius cephalus*), ide (*Leuciscus idus*), common dace (*L. leuciscus*), asp (*L. aspius*), tench (*Tinca tinca*), common nase (*Chondrostoma nasus*), barbel (*Barbus barbus*), common bream (*Abramis brama*), white bream (*Blicca bjoerkna*), gudgeon (*Gobio obtusirostris*), white-finned gudgeon (*Romanogobio vladykovi*), vimba bream (*Vimba vimba*), European bitterling (*Rhodeus amarus*), bleak (*Alburnus alburnus*), spirlin (*Alburnoides bipunctatus*), common carp (*Cyprinus carpio*), burbot (*Lota lota*), stone loach (*Barbatula barbatula*), wels (*Silurus glanis*), perch (*Perca fluviatilis*), zander (*Sander lucioperca*), ruffe (*Gymnocephalus cernua*) and non-native species: rainbow trout (*Oncorhynchus mykiss*), brook trout (*Salvelinus fontinalis*), grass carp (*Ctenopharyngodon idella*), Prussian carp (*Carassius gibelio*), stone moroko (*Pseudorasbora parva*), silver carp (*Hypophthalmichthys molitrix*), bighead carp (*Hypophthalmichthys nobilis*), European eel (*Anguilla anguilla*), tubenose goby (*Proterorhinus semilunaris*).

The river is a favourite angling spot and populations of the most common species are supported through annual stocking by the local angling organisation (Halačka & Vetešník 2016).

Ichthyological monitoring along the downstream stretch of the River Jihlava was undertaken between July 19 and August 30 2016 using electrofishing equipment (i/ SEN battery-powered (accumulator

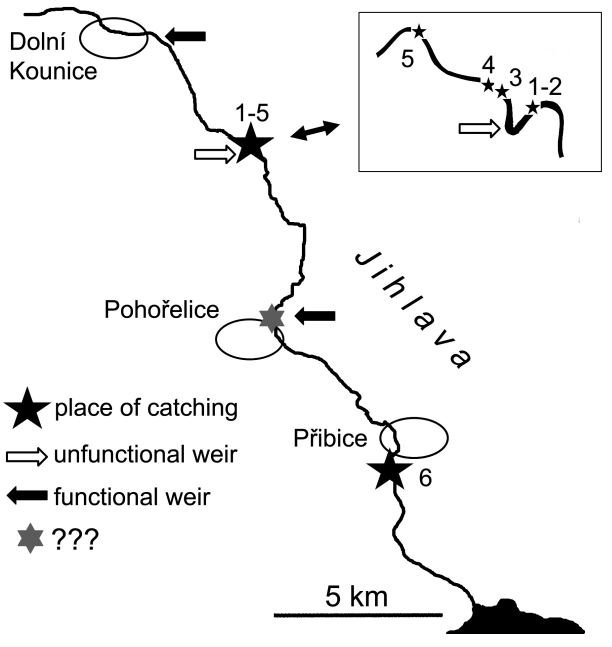


**Fig. 1.** Downstream stretch of the River Jihlava, with sites where Balkan spiny loach were caught in 2016 indicated. Also shown are the positions of migratory barriers in the form of weirs and the unconfirmed site (???) where a loach-shaped fish was reported by sport fishermen sometime after 2005.



Downloaded From: https://bioone.org/journals/Folia-Zoologica on 04 May 2024
Terms of Use: https://bioone.org/terms-of-use


**Fig. 2.** Distribution of the Balkan spiny loach in and around the Czech Republic. Historical distribution = grey, signs indicate positive localities in the Czech Republic: cross = first finding in the River Bečva in 1943, spot = recent finding (2001) in the River Vlára, asterisk = new finding (2016) in the River Jihlava.

12V) backpack electrofishing gear, pulse amplitude: 200 V PDC, frequency 60 Hz; producer Bednár, Czech Republic; ii/ fishing set – Honda Electric Generator 2 kW, output 230 VAC with control panel BMA PLUS, output voltage (peak level): 300-600V, frequency: 50 Hz; producer Bednár, Czech Republic).

Every loach caught was photographed, measured (standard length, SL) and a finclip removed for molecular genetic analysis. The fish was then returned to the river alive. Species identification was verified in each case through sequence analysis of the nuclear and mitochondrial markers, it is the first intron S7 r-protein (RP1) and cytochrome *c* oxidase I (*COI*), respectively.

## Results

The first specimen of Balkan spiny loach in the River Jihlava was caught on 19 July 2016 below the Medlov weir. The same individual (identified by photo) was caught a second time on 30 July 2016 at the same site, together with a second specimen. Further individuals have been caught since then under this weir and at one spot close to the village Přibice (Fig. 1). All fish were adults ranging from 55 to 78 mm SL (Table 1). The nuclear and mitochondrial sequences (RP1 and *COI*) were compared with GenBank and BoLD databases and results obtained in the framework of the project "Molecular biodiversity inventory of the ichthyofauna of the Czech Republic" (Mendel et al. 2012). Both nuclear and mitochondrial haplotypes matched those of Balkan spiny loach caught in the Váh River basin (the River Vlára).

## Discussion

The finding of Balkan spiny loach in the River Jihlava is relatively surprising as the river is completely isolated from the species traditional distribution range further to the east (Fig. 2). The downstream stretch of the River Jihlava has been monitored regularly for some time now due to the recent occurrence of another rare species, the Danubian whitefin gudgeon *Romanogobio vladykovi*. The middle stretch of the Jihlava, along with its main tributaries the rivers Oslava and Rokytná, has also been the subject of ichthyological research since the 1970s, with the 44.5-87.5 r.km section of the River Jihlava surveyed between 1971 and 73 (Lusk 1977), and both the rivers Rokytná (r.km 5.6, Humpl & Lusk 2006) and Oslava (r.km 40, Lusková & Lusk 1995; 15.3-86.7 r.km, Spurný et al. 2016) were surveyed between 1968 and 2004.

While the number of individuals caught in the River Jihlava was rather low, we believe the actual population is relatively numerous, stable and widespread, not least due to the relatively large distance between findings (r.km 7.4 to 24.0). Furthermore, repeated findings of the same individual at the same site after more than two months suggests minimal migratory activity. Any migration along this stretch will be hampered by the

**Table 1.** Number, standard length (SL) and coordinates for Balkan spiny loach caught on the River Jihlava in 2016.

| Date | No. ind. | SL (mm) | r.km | Coordinates |
|---|---|---|---|---|
| 19 July 2016 | 1 | 72 | 23.2 | 49°2′20.332″ N 16°30′36.849″ E |
| 30 September 2016 | 1, 2 | 72, 73 | 23.2 | 49°2′20.332″ N 16°30′36.849″ E |
| 30 September 2016 | 3 | 71 | 23.5 | 49°2′22.503″ N 16°30′29.738″ E |
| 30 September 2016 | 4 | 55 | 23.6 | 49°2′23.516″ N 16°30′28.212″ E |
| 30 September 2016 | 5 | 78 | 24.0 | 49°2′31.436″ N 16°30′10.237″ E |
| 30 September 2016 | 6 | 63 | 7.4 | 49°2′53.528″ N 16°30′34.437″ E |



Downloaded From: https://bioone.org/journals/Folia-Zoologica on 04 May 2024
Terms of Use: https://bioone.org/terms-of-use

presence of weirs (Cvrčovice – r.km 15.3, Medlov – r.km 23.3); hence, it is likely that the population has been present at this site for a considerable period. This hypothesis is partly confirmed by information obtained from sports fishermen, who claim to have seen an unusual fish described as a possible "*Cobitis*" approximately ten years previously under the weir in the village of Cvrčovice (Fig. 2).

These findings highlight the possibility of recording previously unmapped occurrence of loaches (*Sabanejewia*, *Cobitis*), even in relatively well-surveyed rivers. Such findings will certainly necessitate a revision of the ichthyofauna in the Morava basin. The isolation of the Jihlava population between functioning weirs suggests that it may represent a relict of a previously more widespread population. The distance of the new locality from the nearest historical location on the River Bečva, however, suggests that the Balkan spiny loach may have vanished from the intervening sites before they could be mapped. At present, the main threats to this species are water pollution, gravel excavation and stream canalisation. Future findings will be of great importance as regards the preservation of this species in the Morava basin.

## Acknowledgements

*This study was supported through the Grant Agency of the Czech Republic, Grant No. GACR P506/13-12580S. We recognise the support of the Nature Conservation Agency of the Czech Republic and thank Dr. K. Roche for help with English language correction.*

## Literature

Bănărescu P. & Oliva O. 1966: A note on *Gobio kessleri* Dybowski, 1862, and *Gobio abipinnatus* Lukasch, 1933 (Cyprinidae, Osteichtyes) from the River Bečva. *Věst. Čs. Spol. Zool. 30: 1–4.*

Freyhof J. & Kottelat M. 2008: *Sabanejewia balcanica*. The IUCN Red List of Threatened Species. *www.iucnredlist.org*

Halačka K., Lusk S. & Lusková V. 1998: Fish communities in artificial pools in the floodplain along the lower reaches of the River Dyje. *Folia Zool. 47: 125–134.*

Halačka K. & Vetešník L. 2016: Mapping Danubian whitefin gudgeon (*Romanogobio vladykovi*) in the SCI Meanders in Jihlava and Mušovský luh. *Research reports NCA CR. (in Czech)*

Hanel L. & Lusk S. 2005: Fishes and lampreys of the Czech Republic: distribution and conservation. *ČSOP, Vlašim.*

Humpl M. & Lusk S. 2006: Effect of multiple electro-fishing on determining the structure of fish communities in small streams. *Folia Zool. 55: 315–322.*

Kottelat M. & J. Freyhof 2007: Handbook of European freshwater fishes. *Publications Kottelat, Cornol and Freyhof, Berlin.*

Kux Z. 1957: Contribution to the knowledge of ichthyofauna of the Danube basin in Czechoslovakia. *Acta Mus. Moraviae 42: 67–84. (in Czech)*

Losos B., Peňáz M. & Kubíčková J. 1980: Food and growth of fishes of the Jihlava River. *Acta Sc. Nat. Brno 14: 1–46.*

Lusk S. 1977: The ichtyofauna of the middle course of the Jihlava river in relation to the water reservoir at Dalešice. *Folia Zool. 26: 255–269.*

Lusk S., Lusková V. & Halačka K. 2000: On the occurrence of populations of the genera *Cobitis* and *Sabanejewia* (Pisces, Cobitidae) in the Czech Republic. *Folia Zool. 49: 97–106.*

Lusk S., Lusková V., Lojkásek B. et al. 2006: On the occurrence of rare and protected lamprey and fish species in the Morava River drainage area. *Biodiverzita Ichtyofauny ČR 6: 87–94. (in Czech)*

Lusk S., Májský J., Lusková V. & Halačka K. 2002: Occurrence of the Balkan spiny loach and mountain *Sabanejewia balcanica* (Karaman, 1922) in the Vlára stream in the Czech Republic and Slovakia. *Biodiverzita Ichtyofauny ČR 4: 121–126. (in Czech)*

Lusková V. & Lusk S. 1995: Enzyme activities in the blood plasma of nase, *Chondrostoma nasus*, during spawning. *Folia Zool. 44: 131–136.*

Mendel J., Papoušek I., Marešová E. et al. 2012: Molecular biodiversity inventory of the ichthyofauna of the Czech Republic. Analysis of genetic variation in animals. *InTech, Janeza Trdine, Rijeka, Croatia: 287–314.*

Oliva O. 1952: Contribution to the knowledge of fish fauna in the Bečva. *Přír. Sb. Ostravského kraje 13 (1–2): 143–149. (in Czech)*

Spurný P., Chára P., Lišková M. et al. 2016: Complete ichtyological investigations of the Oslava River after 40 years. *Folia Univ. Agric. Silvic. Mendelianae Brun. 9: 64. (in Czech)*

Záleský M. 1944: The Balkan sykavec – *Sabanejewia Balcanica* Vlad. – a new Moravian fish. *Rybářský Věstník 24: 37–38. (in Czech)*



Downloaded From: https://bioone.org/journals/Folia-Zoologica on 04 May 2024
Terms of Use: https://bioone.org/terms-of-use