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Loaches of the Genus Cobitis and Related Genera
Biology, Systematics, Genetics, Distribution, Ecology and Conservation

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Stanislav LUSK, Ivana BUJ and Milorad MRAKOVČIĆ
The biology of loaches (in the broader sense of the term) has already been discussed at three international conferences. After two previous meetings (the first in Brno in 1999 and second in Olsztyn in 2002), the third conference took place in Šibenik, Croatia, in 2006. The continuing interest of the some 50 participants from Europe and Asia suggests that the problem of loaches of the genus *Cobitis* and related genera is still interesting and attractive. At each *Cobitis* conference, alongside more experienced scientists that have already accomplished a great deal in revealing the biology of loaches, new, younger researchers were amazed with this group of fish and continue to investigate them. Certainly, one could ask why similar topical activities, such as those pertaining to *Chondrostoma*, *Barbus*, or *Gobio*, ended after one or two meetings. The answer is that the scientific importance of the problem of loaches is distinctly wider, more complex, and far from being exhausted.

In Europe, intense investigations into this topic have been underway for not longer than ten years or so, and the application of genetical and karyological methods has induced substantial changes into the previous taxonomy and systematics of the loaches. The polyploidy of some taxa, the atypical reproduction and the ensuing presence of hybrid complexes within the ranges of ‘pure’ species present an interesting and important ‘natural experimental base’. Inevitably, the emphasized biodiversity conservation, above all NATURA 2000 in Europe, will significantly increase the interest in the genera comprised in the ‘loach circle’.

We have revealed and changed the taxonomic structure of individual genera and described new taxa. We are investigating the phylogeography and evolitional streams, and have partly discovered the reproduction strategy in connection with the polyploidy of some loach groups. On the other hand, we must admit that other segments of the biology of particular species have been investigated only tentatively and are somehow mosaic. Our knowledge is rather patchy as regards the population structures and their general dynamics, their environmental requirements and hence also the unequivocal identification of factors impacting the existence of loach populations. Our knowledge is incomplete even as regards the actual distribution of the loaches.

Yet what are the causes of our decreasing interest in investigative ecological field work? The shift of our research struggle away from the field of ecology and biology may partly be due to the ‘administrative’ priority of evaluations using the ‘impact factor’ and especially the distinctly greater amount of time required for systematic ecological and biological research both in the field and experimental conditions.

The above opinion is well documented by the composition of contributions presented at the 3rd conference in Šibenik, with most related to the taxonomy, genetic diversity and phylogenetic relationships of loaches. However, in Šibenik it was also shown that interest in the ecological investigation of loaches is also significant, although many aspects of the ecology of particular loach species are yet to be discovered.

A question is posed as to the future of ‘loach’ research. Have we already resolved a significant part of the problem of these small fishes showing specific biology? Will there be the will and sufficient interest to organise a 4th conference? The personal experience of persons who organised the past three meetings tends to show that the decisive points can be found in the personal engagement of several individuals in a particular institution engaged in the topic of loach research, plus sufficient interest in an international scientific community. Far from being negligible is the possibility of publishing the conference contribution in
an international scientific journal. In view of the specificity and personal ego of the ‘loach researchers’, one could conclude by expressing a firm conclusion that this series of topical conferences will continue. Without a doubt, there are still so many unanswered questions and secrets in the ‘world of loaches’.

The set on the theme “Loaches of the Genus *Cobitis* and Related Genera” comprises 24 contributions on different subjects of loach biology: their taxonomy, diversity, distribution, phylogeography, genetics and cytogenetics, morphology, life-history strategies and ecology and finally, conservation biology. We would like to express sincere thanks to all members of the Scientific Committee, who conducted the peer reviews on the majority of the submitted manuscripts: Katsutoshi Arai (Japan), Jörg Bohlen (Czech Republic), Alicja Boronów (Poland), Stanislav Lusk (Czech Republic), Milorad Mrakovčić (Croatia), Theodor T. Nalbant (Romania), Anabel Perdices (Spain), Kenji Saitoh (Japan) and Ekaterina Vasileva (Russia). We are also very grateful to other experts that were conducting peer reviews on the manuscripts: Vlastimil Baruš (Czech Republic), Ivana Buj (Croatia), Jörg Freyhof (Germany), Karel Halačka (Czech Republic), Peter Košuth (Slovakia), Jan Kotusz (Poland), Věra Lusková (Czech Republic), Ivo Papoušek (Czech Republic), Karel Pivnička (Czech Republic), Marcin Popiolek (Czech Republic), Meta Povž (Slovenia), Miroslaw Przybylski (Poland) and Snježana Zrnčić (Croatia). We would also like to thank to Linda Zanella for verifying the English of most part of manuscripts.

Stanislav LUSK, Ivana BUJ and Milorad MRAKOVČIĆ
JELEŃ I., BOROŃ A., SZLACHCIK J., JUCHNO J.
Morphology of the karyologically identified spined loach Cobitis taenia (Teleostei, Cobitidae) from a diploid population .............................................................. 131

BOHLEN J.
First report on the spawning behaviour of a golden spined loach, Sabanejewia vallachica (Teleostei: Cobitidae) ................................................................. 139

VALLADOLID M., PRZYBYLSKI M.
Life history traits of the endangered Iberian loach Cobitis calderoni in the River Lozoya, Central Spain ................................................................. 147

BOROŃ A., JELEŃ I., JUCHNO D., PRZYBYLSKI M., BORZUCHOWSKA E.
Age and growth of the karyologically identified spined loach Cobitis taenia (Teleostei, Cobitidae) from a diploid population ........................................ 155

ZANELLA D., MRAKOVČIĆ M., MUSTAFIĆ P., ĆALETA M., BUJ I., MARČIĆ Z., ZRNČIĆ S., RAZLOG-GRLICA J.
Age and growth of Sabanejewia balcanica in the Rijeka River, central Croatia ...... 162

BOHLEN J.
Spawning marks in spined loaches (Cobitis taenia, Cobitidae, Teleostei) ............ 168

PEKÁRIK L., KOŠČO J., KOŠUTHOVÁ L., KOŠUTH P.
Coeological and habitat affinities of Cobitis elongatoides, Sabanejewia balcanica and Misgurnus fossilis in Slovakia ...................................................... 172

MIČETIĆ V., BUČAR M., IVKOVIĆ M., PIRIA P., KRULIK I., MIHOCI I., DELIĆ A., KUČINIĆ M.
Feeding ecology of Sabanejewia balcanica and Cobitis elongata in Croatia .......... 181

BOHLEN J., FREYHOF J., NOLTE A.
Sex ratio and body size in Cobitis elongatoides and Sabanejewia balcanica (Cypriniformes, Cobitidae) from a thermal spring ........................................... 191

Instructions to Authors ........................................................................................................... 198
First record of *Cobitis puncticulata* from Europe with comments on its conservation status (Teleostei: Cobitidae)

Jörg FREYHOF¹, Björn STELBIRNK¹, Müfit ÖZULUG² and Panos S. ECONOMIDIS³

¹ Leibniz-Institute of Freshwater Ecology and Inland Fisheries, Department. of Biology and Ecology of Fishes, Mühlgelseedamm 310, 12587 Berlin, Germany; e-mail: Freyhof@igb-berlin.de
² Istanbul University, Faculty of Science, Department of Biology, 34459-Vezneciler, Istanbul, Turkey
³ Karakasi str. 79, 54453 Thessaloniki, Greece

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**Abstract.** *Cobitis puncticulata* is first recorded from Anatolian Lake Ulubat and from Greek lower River Evros drainage.

**Key words:** occurrence, *C. puncticulata*, Greek Thrace

*Cobitis puncticulata* (Fig. 1) was recently described from the Lake Manyas (Kuş) drainage in northwestern Anatolia, Turkey (Erk’akan et al. 1998). It is unusual among the species of *Cobitis* in Europe and Asia Minor as it has one lamina circularis in males, but its colour pattern lacks the lateral row of large dark blotches typical for a monocanestrine *Cobitis*, and is instead composed of very tiny dots which ventrally almost reach the origins of the pectoral fins. This pigmentation pattern is more similar to the pigmentation pattern of *Cobitis* species with two laminae circularis (such as *Cobitis turcica* or *C. punctilineata*) (Erk’akan et al. 1998). *Cobitis puncticulata* was only known from the stream Karadere, the outlet of Lake Manyas and was recently listed as Critically Endangered by Smith & Darwall (2006), due to the small geographic range (a single locality) and the presumed declining habitat quality.

During field surveys in Greek Thrace in 2005 and Western Anatolia in 2006, *C. puncticulata* was found at two additional localities, one far outside its known distribution range. The species was identified by characters given by Erk’akan et al. (1998) and Kottelat & Freyhof (2007). *Cobitis puncticulata* was recorded at the village Lira in a small stream running to the lower River Evros (Greek Thrace, 41°04.348′N; 26°16.034′E) and in the River Ulubat at the road from Bursa to Ulubat (Western Anatolia, the outlet of Lake Apolyont, 40°12.325′N; 28°25.968′E). Also, one individual male paratype from the Department of Biology, Hacettepe University (Ankara) (HUIC) and 10 additional specimens

![Fig. 1. Cobitis puncticulata, Stream at Lira, River Evros drainage, Greece.](image-url)
from the type locality (stream Karadere, 40°13′36.79″N 28°19′59.45″E) in the fish collection of the University Science Faculty Hydrobiology Museum Istanbul (IUSHM) were examined. Fig. 2 shows the known localities of *C. puncticulata*.

The finding of this species in the lower River Evros drainage also suggests the interesting connection of this river to the Marmara Sea basin. The history of communication between the Black Sea, fed by central and northern European drainage systems, the Marmara Sea and the Mediterranean Sea is of fundamental importance in understanding the genesis of the ichthyofauna in this region. The Marmara Sea was first isolated from the more saline Mediterranean water inflow in the Pleistocene and afterwards, temporally becoming a brackish-water lake at the end of glaciations (Yaltırağ et al. 2002). The reconnection of the Marmara and Black Seas to the Mediterranean following the last glaciation (about 16–8,500 BP) has become an issue of intensive study during recent years. Aksu et al. (2004) and Kerey et al. (2004) follow the hypothesis that massive amounts of glacial meltwater from arctic and northern Europe come through the large rivers into the Black and Caspian Seas, while sea levels remained lower worldwide (known as Tschepalyga’s flood 16–8,500 BP; Yaltırağ et al. 2002). They suggest that during Tschepalyga’s flood,
freshwater was discharged from the Black Sea across the Bosporus to the Marmara and Aegean Seas leading to a freshened area in the northern Aegean Sea during this time (Aksu et al. 2004). The biogeographic connection between the Evros and the Marmara fauna should have its basis with this temporal outflow of Black Sea water to the Aegean during the Pleistocene, already postulated as the so-called River Aegeopotamos by Kosswig & Battalgil (1943).

The three locations from which *C. puncticulata* is known can be characterised as slowly flowing streams and rivers. The outlet of Lake Manyas is a medium sized (3–4 m wide), slow flowing (estimated at less than 10 cm/s) and up to 1.1 m deep stream with muddy shores. This habitat was already described by Erek’akan & Ekmekçi (2000).

The stream in the River Evros drainage is about 1–2 m wide and almost standing, with dense underwater vegetation and reed stands. The River Ulubat, about 60 m wide, is quite regulated with a slow current and a mud-sand substrate at the place *C. puncticulata* was recorded. At this place, sheep and perhaps other animals come to drink and therefore, the terrestrial part of the shore was without vegetation. In the water, dense stands of *Potamogeton pectinatus* were present. All habitats are subjectively somewhat untypical for *Cobitis* species, being too muddy and too densely vegetated, more resembling the habitats of *Misgurnus fossilis*. It seems that *C. puncticulata* is not restricted to the typical *Cobitis* habitat of fine sand in moderately flowing streams, but rather is associated with muddy and densely vegetated, slow flowing streams or rivers.

It should be mentioned that in *C. puncticulata*, the barbels are held out straight forward, like in a fish that sneaks through a maze and like in *Misgurnus*, but not like a *Cobitis*, which lies on the sand from which it feeds. This parallel between *C. puncticulata* and *Misgurnus* and could indicate a well-developed specialisation in *C. puncticulata*. Interestingly, *C. puncticulata* occurs in sympatry with *C. fahirae* in Lake Manyas (Erek’akan et al. 1999) and the River Ulubat, and with *C. strumicae* in Evros. A co-occurrence of different species of *Cobitis* is rare (Bohlen & Rab 2001) and indicates niche separation between the species. Because of the two new findings of *C. puncticulata*, the classification of this species as Critically Endangered is no longer needed using the criteria of the IUCN Red List of Threatened Species™. Since the habitat situation in Anatolia is really difficult (e.g. due to the fact that the water level of lakes Manyas and Apolyont are decreasing and both lakes are polluted), a decline of the habitat quality and the loss of habitats might still be suspected.

On the other hand, the habitat situation in the lower River Evros seems not to be critical and a much wider distribution of the species within this drainage could be expected. Small, densely vegetated and deep streams are most likely poorly explored and more findings of *C. puncticulata* may occur in the future. Therefore, we do suggest listing the species as endangered (EN) following the criteria of the IUCN (http://www.iucnredlist.org/info/categories_criteria2001.html#categories), due to suspicions that it occurs at more than five places with independent risk of extinction. *Cobitis puncticulata* should be transferred to a vulnerable conservation status based on the few, small ranges and the declining habitat quality, at least in Turkey (VU B1ab (i,ii,iii,iv) 2ab (i,ii,iii,iv).

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Literature


