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Cobitis derzhavini sp. Nova—a New Spined Loach Species (Teleostei: Cobitidae) Discovered in the Transcaucasia

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Abstract—The study of spined loaches from the southwestern Caspian Sea basin revealed one new species. *Cobitis derzhavini* sp. nova is described from the lower Kura River drainage in the Ganja-Qazakh region of Azerbaijan. It is distinguished from the most of its congeners distributed in the Caucasus and in the Caspian Sea basin (*C. saniae*, *C. faridpaki*, *C. satunini*, and *C. taenia*) by the absence of an obvious dark spot at the uppermost caudal-fin base, as well as by a combination of other morphological features, none of them unique. In the Agsafa River *Cobitis derzhavini* sp. nova is found sympatrically distributed with *C. saniae*, its closest relatives in our molecular dataset. These species form separate phylogenetic lineages with high support (PP 0.9 for *COI* and 1.0 for *RAG1*). In addition, their reproductive isolation is confirmed by the karyological differences: *C. derzhavini* sp. nova has 8 meta- and 12 submetacentric chromosomes in its karyotype against 6 meta- and 14 submetacentric chromosomes in *C. saniae*. Besides the dark spot at the uppermost caudal-fin base developed in the *C. saniae*, *C. derzhavini* sp. nova differs from this species by having the plate of lamina circularis reaching in front of ⅘ of the third segment of the attached ray, blotches in Z4 smaller than eye diameter, shallow adipose crests on the caudal peduncle, and a shorter caudal peduncle (10–14% *SL*).

Keywords: phylogeny, freshwater fishes, Caucasus, new species, *Cobitis saniae*, *Cobitis derzhavini*
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INTRODUCTION

The spined loaches from the genus *Cobitis* represent a species-rich group of small fishes distributed in Europe, Northern Africa, and Asia, where new species are still discovering (Nakajima, 2016; Vasil'eva et al., 2016; Erk'akan et al., 2017; Eagderi et al., 2017; Chen et al., 2018; Freyhof et al., 2018). However, the only species *Cobitis satunini* Gladkov, 1935 (also treated as *Cobitis taenia* Linnaeus, 1758 or its subspecies) was recognized in Azerbaijan and Georgia (Transcaucasia) until the last years (Barach, 1941; Abdurakhmanov, 1962; Kasymov, 1965; Kazancheev, 1981; Elanidze, 1983; Ninua and Japoshvili, 2008; Naseka, 2010). Recent studies described two new species in the southeastern Caspian Sea basin: *Cobitis amphilekta* Vasil'eva et Vasil'ev, 2012 from the Lankaran region of Azerbaijan, and *C. saniae* Eagderi, Jouladeh-Roudbar, Jalili, Sayyadzadeh et Esmaeili, 2017 from the Guilan province of Iran. Another species, *Cobitis faridpaki* Mousavi-Sabet, Vasil'eva, Vatandoust et Vasil'ev 2011, was described from the southeastern Caspian Sea basin. Besides, *C. melanoleuca* Nichols, 1925 as well as *C. taenia* s.stricto are known from the northern Caspian Sea basin (Vasil'eva, 1998; Kottelat and Freyhof, 2007; Freyhof et al., 2018).

Our intensive sampling in the Caucasus in the last years, as well as preliminary molecular examinations (Vasilyeva et al., 2019), revealed an additional new species, which is described in this study based on morphological and molecular characters.

MATERIALS AND METHODS

After anesthesia, fishes were fixed in 4% formaldehyde, 75% ethanol or directly in 96% ethanol, and further transferred into 75% ethanol for morphological investigation. All measurements were made point to point and recorded with precision of 0.1 mm. Methods for counts and measurements follow Kottelat and Freyhof (2007). The last two branched rays articulating on a single pterygiophore in the dorsal and anal fins are counted as "1½". Similar, the last normal branched and closely related undeveloped unbranched ray in the pectoral and pelvic fins are counted as "1½". The total length (*TL*), standard length (*SL*) and 23 morphometric characters (following Vasil'eva, 1988) were measured for the type specimens of the new spe-

bers: MK506164, MK506165 *COI*, MK506224, MK506225 *RAG1*). – P-24132-AZ:215–216; Azerbaijan; Ganja-Qazakh region: Agstafa River at Qiraq Kesemen (GenBank accession numbers: MK506173 *COI*, MK506234, MK506235 *RAG1*). – P-24134-AZ:205–208; Azerbaijan: Jalilabad region: Bolgarchay River at Shorbachi (GenBank accession numbers: MK506166 – MK506169 *COI*, MK506226 – MK506229 *RAG1*). – IBIW L85–87; Azerbaijan: Jalilabad region: Goytapa River at Goytapa. (GenBank accession numbers: MK506175 – MK506177 *COI*). – IBIW L99; Azerbaijan: Jalilabad region: Bolgarchay River at Shorbachi (GenBank accession number: MK506180 *COI*). – IBIW ML99; Georgia: Kakheti A.R.; Alazan River (Kura River drainage) at Matani, 42°03′32″ N 45°14′03″ E (GenBank accession number: MK506124 *COI*). – IBIW ZR196; Azerbaijan: Azerbaijan; Ganja-Qazakh region: Kurakhchay River at Nadirkend, 40°39′31″ N 46°37′53″ E (GenBank accession number: MK506188 *COI*).

Cobitis saturnini, ZMMU: P-2852, holotype, 74 mm *SL*; Georgia: Adjara A.R.: lower Kintrish River. – P-2313, 2 paratypes, 69–83 mm *SL*; Georgia: Adjara A.R.: lower Kintrish River. – P-2264, 4, 57–59 mm *SL*; Georgia: Adjara A.R.: lower Kintrish River. – P-2851, 1, 54 mm *SL*; Georgia: Adjara A.R.: lower Kintrish River.

Material used in molecular genetic analysis. IBIW ML164; Georgia: Guria A.R.: Skurdumi River at Tsikisperdi 41°56′57″ N 41°55′54″ E (GenBank accession number: MK506181 *COI*). – IBIW ML 172-173; Georgia: Guria A.R.: Supsa River at Akhalsopeli, 41°59′07″ N 41°58′36″ E (GenBank accession numbers: MK506182, MK506183 *COI*). – IBIW ML362-363; Georgia: Imareti A.R.: Gubistskali River (Rioni River drainage) at Ianeti, 42°11′10″ N 41°25′52″ E (GenBank accession numbers: MK506185, MK506186 *COI*). – IBIW ML367; Georgia: Samegrelo-Zemo Svaneti A.R.: stream, a tributary of Khobi River at Bia, 42°21′27″ N 41°55′04″ E (GenBank accession number: MK506187 *COI*).

Cobitis taenia, ZMMU: P-21194, 4, 57–72 mm *SL*; Russia: Penza region: Moksha River at Chernozerye. – P-21445, 18, 51–78 mm *SL*; Russia: Smolensk region: Dnepr River at Bilino, 55°13′28.6″ N 33°29′03.8″ E.

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COMPLIANCE WITH ETHICAL STANDARDS

Conflict of interests. The authors declare that they have no conflict of interest.

Statement on the welfare of animals. All applicable international, national, and/or institutional guidelines for the care and use of animals were followed.

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