

Oxynoemacheilus elsae, a new species from the Urmia Lake basin of Iran (Teleostei: Nemacheilidae)

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Abstract

A new species of nemacheilid fish, *Oxynoemacheilus elsae* sp. n. is described Zarineh River, West Azerbaijan Province, Iran. The species differs from its congeners in the combination of the following characters: flank with elliptical pale brown blotches on the lateral line sometimes fused to posterior saddles or plain brown with mottled pattern; longer dorsal and anal-fin bases; wider caudal peduncle; complete lateral line; 3 central and 4 lateral pores in the supra-temporal canal; lower lip thick with a deep median interruption.

Keywords: Freshwater fish, Taxonomy, Morphology, Loach.

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Introduction

Stone loaches of the family Nemacheilidae are small fishes occurring in fresh waters of Asia, Europe, and northeast Africa (Nelson et al. 2016; Coad 2017). Due to small size and low economic value, they are poorly known group of freshwater fishes (Kottelat 2012; Mafakheri et al. 2015a) and their taxonomic status is still complicated (Prokofiev 2009, 2010; Sayyadzadeh et al. 2016, 2017), especially in the Middle East because of the difficulties in the diagnosis of the genera and the high number of poorly diagnosed species described from this area (Freyhof et al. 2011; Sayyadzadeh et al. 2016). The family Nemacheilidae has about 48 genera and more than 661 species (Nelson et al. 2016), with more expected to be described (Geiger et al. 2014; Freyhof and Geiger 2017). They have a great diversity in Iranian inland waters, with about 45 reported species belonging to the six genera (Esmaeili et al. 2017).

Iran is divided into nineteen drainage basins, including both exorheic and endorheic (Esmaeili et al. 2017). The endorheic Urmia Lake basin and its center international wetland of Urmia Lake are considered as important and valuable ecosystems in northwestern Iran. Fish species of this basin comprise 29 species, including 3 reported nemacheilids (10.3%) viz. *Paracobitis malapterura*, *Oxynoemacheilus bergianus* and *O. brandtii* (Ghasemi et al. 2015; Eagderi and Moradi, 2017). A morphological comparison of different populations of the genus *Oxynoemacheilus* from the Urmia Lake basin revealed that a population from the Zarineh River could not be identified as any described species. Hence, this study aimed to describe this new species of the genus *Oxynoemacheilus* collected from the Zarineh River, West Azerbaijan Province, Iran based on differences found.

Material and Methods

The specimens were collected from the Zarineh River, West Azerbaijan Province, Iran using an electrofishing device. The fish were killed with overdoses of MS222, fixed in 5% buffered formalin, and then stored in 70% ethanol after 48 hours. Measurements follow Kottelat and Freyhof (2007) (Table 1). Standard length (SL) is measured from the tip of the snout to the end of the hypural complex. The length of the caudal peduncle is measured from behind the base of the last anal-fin ray to the end of the hypural complex, at mid-height of the caudal-fin base. The last two branched rays articulating on a single pterygiophore in the dorsal and anal fins are noted as "1½". Measurements were made using a digital caliper to the nearest 0.1 mm.

Abbreviations used: SL, standard length; HL, lateral head length; IMNRFI-UT, Ichthyological Museum of

Natural Resources Faculty, University of Tehran; NHVUIC, Ichthyology Collections of Nevsehir Haci Bektas Veli University, Nevşehir, Turkey.

Results

Oxynoemacheilus elsae, new species

(Figs. 1-4)

Holotype: IMNRF-UT-1404-H, 53.3 mm SL; Iran: west Azerbaijan Prov.: Zarineh River, near Shahin-Dej city, Urmia Lake basin, 36°37'40"N 46°43'30"E, 29 July 2013.

Paratypes: IMNRF-UT-1404-1-5, 5, 39.6-52.5 mm SL; data same as holotype. — IMNRF-UT-3104, 14, 37.4-42.5 mm SL; data same as holotype. Iran: west Azerbaijan Prov.: Saqqez River, Zarineh river drainage, near Saqqez city, Urmia Lake basin, 36°14'18"N 46°16'41"E, 28 July 2013.



Figure 1. *Oxynoemacheilus elsae* n. sp., IMNRF-UT-1404-H, 53.3 mm SL; Iran: West Azerbaijan Prov.: Zarineh River; Urmia Lake basin.



Figure 2. *Oxynoemacheilus elsae* n. sp., paratypes; Iran: West Azerbaijan Prov.: Zarineh River; (A) IMNRF-UT-1404-1, 52.5 mm SL; (B) IMNRF-UT-1404-2, 48.2 mm SL; (C) IMNRF-UT-1404-5, 48.6 mm SL.

Table 1. Morphometric data of *Oxynoemacheilus elsae* n. sp. from Zarineh River, Urmia Lake basin (holotype, IMNRF-UT-1404-H; paratypes, IMNRF-UT-1404-1-5 and IMNRF-UT-3104).

	Holotype	min	max	mean	SD
Standard length (mm)	53.3	37.4	52.5	48.2	
In percent of standard length					
Body depth maximal	16.3	15.1	17.5	16.4	0.8
Caudal peduncle depth	8.4	8.2	9.14	8.5	0.4
Predorsal length	53.3	49.4	52.3	50.7	1.2
Postdorsal length	37.5	33.3	36.2	34.6	1.3
Prepelvic length	52.5	49.0	55.2	52.4	2.3
Preanal length	73.2	70.7	73.9	72.1	1.2
Caudal peduncle length	20.6	16.5	20.2	18.6	1.7
Dorsal-fin base length	15.7	14.4	15.3	14.9	0.3
Dorsal-fin depth	19.3	15.4	19.5	16.9	1.6
Anal-fin base length	8.4	8.3	10.1	9.1	0.7
Anal-fin depth	15.9	12.5	16.8	13.6	1.8
Pectoral-fin length	21.7	15.4	19.5	16.9	1.5
Pelvic-fin length	16.8	11.4	14.4	13.4	1.1
Pectoral – pelvic-fin origin distance	32.3	28.9	32.9	30.9	1.7
Pelvic – anal-fin origin distance	19.9	18.2	20.2	19.1	0.7
Caudal-fin length	19.1	15.3	19.1	17.8	1.4
Body width	14.0	14.0	16.2	15.3	1.0
Caudal peduncle width maximum	6.0	5.1	8.0	6.6	1.3
Head length	21.2	20.9	22.4	22.0	0.6
In percent of Head length					
Snout length	37.2	33.3	36.8	35.3	1.3
Eye horizontal diameter	19.5	17.6	22.2	19.2	1.8
Postorbital distance	45.1	38.9	45.4	42.6	3.2
Head depth at nape	61.4	55.0	60.0	57.0	2.1
Head width	69.9	61.4	70.5	66.4	3.4
Inter Orbital	29.2	28.4	32.8	30.1	1.8
Inter nasal	20.3	13.6	20.0	18.1	2.5
Mouth width	24.7	19.1	24.6	20.9	2.1
Inner rostral barbel	21.2	10.7	20.7	13.9	4.0
Outer rostral barbel	20.3	18.2	30.9	23.3	5.2
Maxillary barbel	26.5	17.4	24.1	20.9	2.9

Diagnosis: *Oxynoemacheilus elsae* is distinguish from *O. cyri* by having an emarginate caudal-fin (vs. truncate), flank with elliptical pale brown blotches on the lateral line sometimes fused to posterior saddles or plain brown with mottled pattern (vs. flank with 10-16 black or dark brown bars rarely interrupted by lateral line), lower body depth (15.1-17.5 vs. 19.0-21.3 %SL), shallower caudal peduncle (8.2-9.1 vs. 11.7-14.7 %SL), longer dorsal-fin base (14.4-15.7 vs. 11.2-13.5 %SL), longer anal-fin base (8.3-10.1 vs. 5.4-8.1 %SL), thinner body (14.0-16.2 vs. 16.5-19.5 %SL), and shorter inter-nasal distance (13.6-20.3 vs. 23.8-31.8 %HL).

Oxynoemacheilus elsae is distinguish from *O. bergianus* by having a deeper caudal peduncle (8.2-9.1 vs. 6.7-7.9 %SL), shorter postdorsal (33.3-37.5 vs. 49.1-51.1 %SL), longer anal-fin base (8.3-10.1 vs. 6.6-6.8 %SL), wider body (14.9-16.2 vs. 12.0-14.2 %SL), and wider caudal peduncle (5.1-8.0 vs. 1.8-2.1 %SL).



Figure 3. *Oxynoemacheilus elsae* n. sp., paratypes; Iran: West Azerbaijan Prov.: Zarineh River; (A) IMNRF-UT-1404-1, 52.5 mm SL; (B) IMNRF-UT-1404-2, 48.2 mm SL; (C) IMNRF-UT-1404-5, 48.6 mm SL.

Oxynoemacheilus elsae is distinguish from *O. brandtii* by having longer dorsal-fin base (14.4-15.7 vs. 12.8-14.3 %SL), longer anal-fin base (8.3-10.1 vs. 6.9-8.2 % SL), lower anal-fin depth (12.5-16.8 vs. 17.3-19.9 %SL), shorter pelvic-fin (11.4-16.8 vs. 17.0-18.1 %SL), shorter caudal fin (15.3-19.1 vs. 19.7-22.1 %SL), wider caudal peduncle (5.1-8.0 vs. 2.4-3.7 %SL), a shorter snout length (33.3-37.2 vs. 41.8-45.7 %HL), larger eye diameter (17.6-22.2 vs. 12.8-15.6 %HL), longer inter-orbital (28.4-32.8 vs. 24.73-27.4 %SL), and shorter maxillary barbel (17.4-26.5 vs. 26.6-37.4 %HL).

Description: For general appearance see Figures 1-4; morphometric characters are listed in Table 1. Specimens with medium size and blunt head. Four lateral and three central pores in the supra-temporal canal. Posterior part of body covered with tiny scales. Lateral line approximately complete not reaching to caudal fin origin. The widest part of body at pectoral-fin origin. Body deepest at anterior to the dorsal-fin origin. Pelvic-fin origin below 2nd or 3rd branched rays of dorsal fin, reaching (in one specimen) or not reaching to anus. Margin of dorsal-fin straight or convex. Anal-fin origin at the anterior part of midline between dorsal-fin insertion and caudal-fin origin. Pelvic-fin rounded with an axillary lobe, attached to body. Caudal peduncle compressed laterally, 2.0-2.4 (mean 2.2) times longer than deep. Caudal fin emarginated. Largest known specimen 53.3 mm SL.

Pointed flap of anterior nostril opening, reaching to end of posterior opening. Presence of a deep groove (or shallow groove in some specimens) anterior to eye. Lips thick with many furrows and a deep interruption in lower lip. Outer rostral barbel reaching or not reaching vertical to anterior margin of eye, inner rostral barbel reaching to middle part of outer one and maxillary barbell reaching vertical to beyond middle part of eye

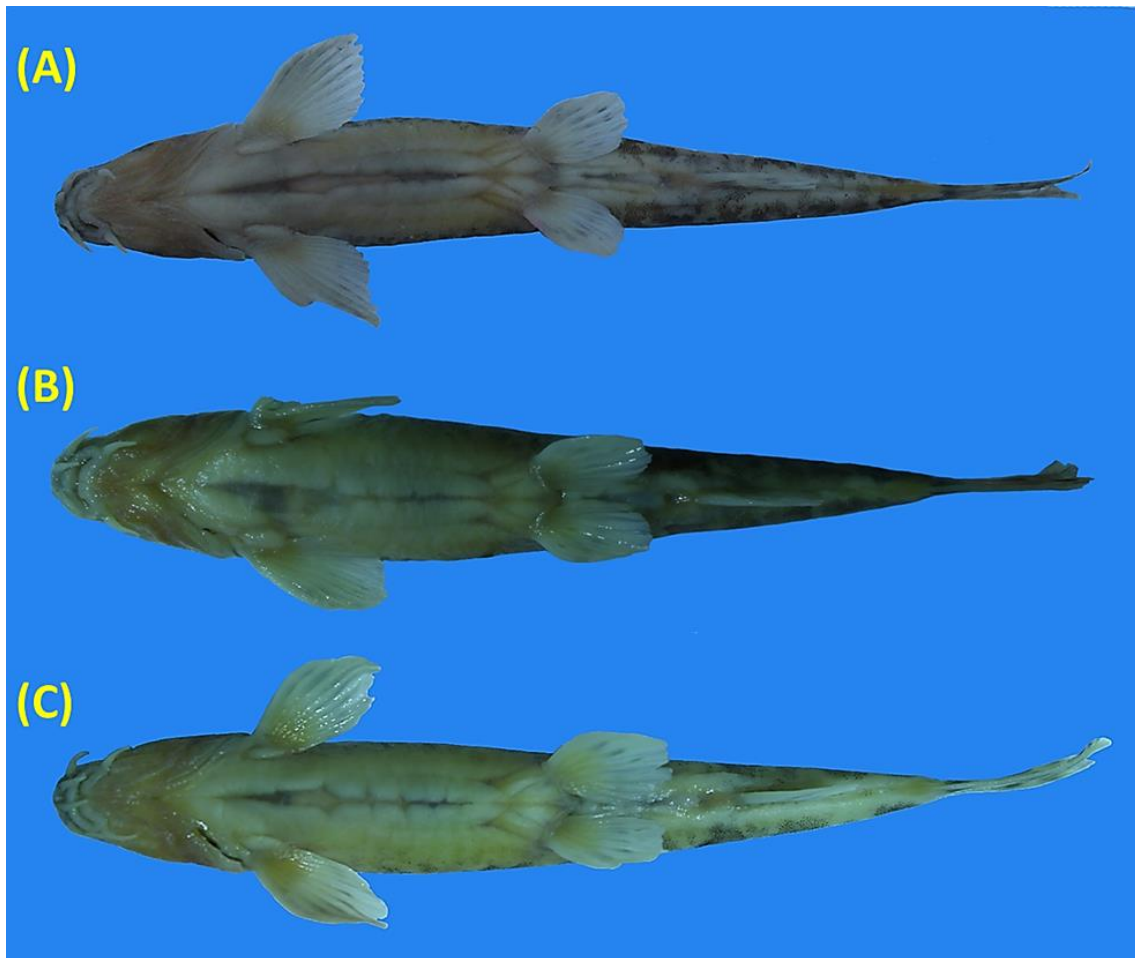


Figure 4. *Oxynoemacheilus elsae* n. sp., paratypes; Iran: West Azerbaijan Prov.: Zarineh River; (A) IMNRF-UT-1404-1, 52.5 mm SL; (B) IMNRF-UT-1404-2, 48.2 mm SL; (C) IMNRF-UT-1404-5, 48.6 mm SL.



Figure 5. Type locality of *Oxynoemacheilus elsae* n. sp., Iran: West Azerbaijan Prov.: Zarineh River, near Shahin-Dej city.

sometimes reaching vertical to anterior margin of eye. Anus almost 0.3-0.6 eye diameter in front of anal-fin origin. Dorsal fin with 3 unbranched and 8½ branched rays. Anal fin with 3 unbranched and 5½ branched rays. Caudal fin with 9+9 and 8+9 branched rays. Pectoral fin with 9-11 and pelvic fin with 8 rays.

Coloration: Body yellowish in life and preserved specimens. Head pale brown dorsally, plain yellow on cheeks with small spots or mottled pattern in one specimen, and without color pattern ventrally. Three or four saddles at the mid-dorsal between origin of dorsal fin and nape, and four blotches at the mid-dorsal between dorsal-fin insertion and caudal-fin origin. The color pattern of flank different among specimens from different habitat and can be classified into two types: type I, flank with elliptical pale brown blotches on lateral line sometimes fused to posterior saddles, and type II, flank with plain brown mottled pattern (or marbled in one specimen). Two dark brown spots on the base of caudal fin often fused forming a bar. Caudal fin with 2-4 bands on rays, dorsal and anal fins with 1 or 2 bands on rays, pectoral fin with dark brown pigments on dorsal margin of rays, pelvic fin with a band on rays (one specimen without marked pattern).

Distribution: *Oxynoemacheilus elsae* n. sp. inhabits the Zarineh-Simineh, Sofi and Mahabad river drainages, Urmia Lake basin. This species mostly found in fast flowing parts of rivers with cobble substance (Fig. 5). *Alburnus atropatenae*, *Barbus cyri*, *Carassius gibelio*, *Capoeta capoeta*, *Hemiculter leucisculus*, *Pseudorasbora parva*, *Rhinogobius similis*, *Rhodeus amarus*, *Romanogobio macropterus* and *Squalius turcicus* co-exist in the type locality with *O. elsae* sp. n.

Etymology: The new species is named to Elsa Eagderi, the daughter of first author, Dr. Soheil Eagderi.

Comparative material: — *Oxynoemacheilus bergianus*: IMNRF 1032, 7, 36.5-61.0 mm SL, Iran: Guilan Prov.: Tutkabon River near Rostam-Abad, Sefid river drainage, Caspian Sea basin, 36°50'53"N 49°36'3"E, 20 June 2014, S. Eagderi. — IMNRF-UT-1040, 4, 37.0-45.0 mm SL, Iran: Guilan prov.: Sefid River near Gisum town, Caspian Sea basin, 37°14'00.0"N 49°51'00.0"E, 20 June 2014, S. Eagderi.

Oxynoemacheilus brandtii: NHVUIC 2017-08-2, 5, 46.2-66.4 mm SL, Turkey: Ardahan Prov.: Kura River, 40°50'32"N 42°48'57.2"E & 41°06'06.1"N 042°39'38.0"E, 2 August 2017, E. Çiçek.

Oxynoemacheilus cyri: NHVUIC 2017-08-1, 15, 40.5-73.7 mm SL, Turkey: Ardahan Prov.: Kura River, 40°50'32"N 42°48'57.2"E. 1 August 2017, E. Çiçek.

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