

Paraschistura delvarii spec. nov. – a new species of stone loach from the Persian Gulf basin, southern Iran (Teleostei: Nemacheilidae)

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Abstract

Paraschistura delvarii, new species, from the Mond River drainage in the Persian Gulf basin, differs from other species of the genus in Iran by having a combination of the colour pattern consisting of marbled colour pattern without distinct bars on the flank, shallow and elongated body, incomplete lateral line extending to the dorsal-fin base, absence of dorsal adipose crest, bold black spot at base of first dorsal-fin rays, scatter scaled body, short and blunt snout, and suborbital groove in males.

Key words

Loach, Taxonomy, Description of a New Species, Gharaghaj River, Middle East.

Introduction

PROKOFIEV (2009) placed several small loaches, with a dark black spot or stripe at the anterior base of the dorsal fin, and distributed from the upper Tigris River basin in the West, over the interior water bodies of Turkmenistan and Iranian Baluchistan, to the upper reaches of the Indus River in Afghanistan and Pakistan in the East, in the nemacheilid genus *Paraschistura*. According to KOTTELAT (2012), VATANDOUST & EAGDERI (2015), FREYHOF *et al.* (2015), and AZIMI *et al.* (2015) the genus *Paraschistura* contains 21 valid species, which have been described from Afghanistan [*P. alta* (NALBANT & BIANCO, 1998), *P. lindbergi* (BANARESCU & MIRZA, 1965)], Pakistan [*P. alepidota* (MIRZA & BANARESCU, 1970), *P. kessleri* (GÜNTHER, 1889), *P. lepidocaulis* (MIRZA & NALBANT, 1981), *P. microlabra* (MIRZA & NALBANT, 1981), *P. naseeri* (AHMAD & MIRZA, 1963), *P. pakistanica* (MIRZA & BANARESCU, 1969), *P. prashari* (HORA, 1933), *P. punjabensis* (HORA, 1923)], Turkey [*P. chrysicristinae* (NAL-

BANT, 1998)], Turkmenistan [*P. turcmenica* (BERG, 1932), *P. cristata* (BERG, 1898)], and Iran with eight endemic species including *P. abdolii* FREYHOF *et al.*, 2015, *P. aredvii* FREYHOF *et al.*, 2015, *P. bampurensis* (NIKOL'SKII, 1900), *P. hormuzensis* FREYHOF *et al.*, 2015, *P. ilamensis* VATANDOUST & EAGDERI, 2015, *P. naumanni* FREYHOF *et al.*, 2015, *P. nielsenii* (NALBANT & BIANCO, 1998), and *P. susiani* FREYHOF *et al.*, 2015.

In Iran, members of the genus *Paraschistura* are widely distributed, commonly in the southern regions, ranging from the Tigris River basin in the West to the Makran and Mashkid basins in the East (ABDOLI *et al.*, 2011; VATANDOUST & EAGDERI, 2015; FREYHOF *et al.*, 2015) (Fig. 1). The nemacheilid loaches of the genus *Paraschistura* in Iran were reviewed by FREYHOF *et al.* (2015), but given such a mentioned wide distribution of this genus in Iranian waters, not all of its populations have been fully examined; therefore from 2012 to 2014, we collected and

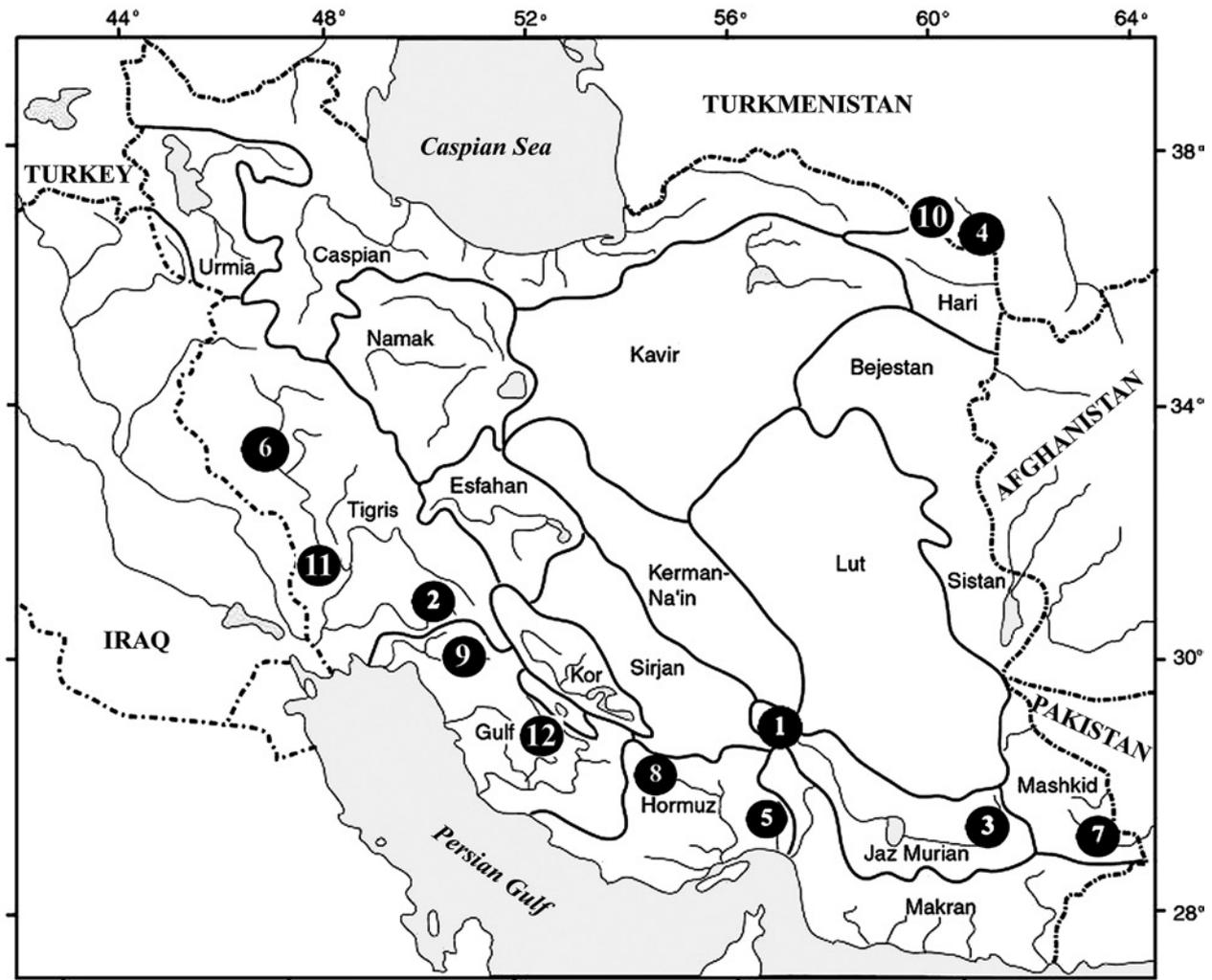


Fig. 1. Records of *Paraschistura* species in Iran; 1: *P. abdolii*, 2: *P. aredvii*, 3: *P. bampurensis*, 4: *P. cristata*, 5: *P. hormuzensis*, 6: *P. ilamensis*, 7: *P. kessleri*, 8: *P. naumanni*, 9: *P. nielseni*, 10: *P. turkmenica*, 11: *P. susiani*, and 12: *P. delvarii* sp. nov.

examined materials of *Paraschistura* throughout southern Iran. Comparing the collected loach from the Persian Gulf basin (Fig. 1) with nominal species based on morphological characters, as well as colour patterns and suggested molecular data by FREYHOF *et al.* (2015), it was revealed that they represent an unnamed species which is described in this publication as new taxon.

Material and Methods

After anaesthesia, all fishes were fixed in 5% formaldehyde and stored in 70% ethanol. The morphological measurements were made by a dial caliper and recorded to the nearest 0.1 mm. All measurements were made point to point, never by projections. Methods for counts and measurements follow KOTTELAT & FREYHOF (2007). Standard length (SL) was measured from the tip of the snout to the end of the hypural notch. The length of the caudal peduncle was measured from behind the base of

the last anal-fin ray to the end of the hypural notch, 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”. In the present study, the *Paraschistura* species from Afghanistan, Pakistan and Turkey are excluded from comparison as: (1) due to the wide geographical separation and morphological differences with regards to the congeners in southern Iran, (2) we had no access to the type specimens or type localities, and (3) based on original descriptions and available literatures (VATANDOUST & EAGDERI, 2015; FREYHOF *et al.*, 2015) they are already superficially very different from the species discussed here. Also in Iranian endemic species, *P. susiani* is compared based on original description.

Abbreviations used: SL, standard length; HL, lateral head length; GUIC, Collection of the Ichthyology Museum, Department of Fisheries Sciences, Faculty of Natural Resources, the University of Guilan, Guilan province, Iran; VMFC, Vatandoust and Mousavi-Sabet Fish Collection, Tehran.

Results

Paraschistura delvarii, new species

Fig.: 2–5

Material examined

Holotype: VMFC PSD1-H: 38.0 mm SL. Iran, Fars prov.: upstream of Mond River, Mond River drainage, the Persian Gulf basin, 29°40'22" N, 52°08'57" E, 13 August 2013, H. Mousavi-Sabet & S. Eagderi.

Paratypes: VMFC PSD1-P1 to VMFC PSD1-P5: 5 specimens, 27.2–42.1 mm SL, same data as holotype. GUIC PSD1-P6 and GUIC PSD1-P7, 2 specimens, 31.1–35.2 mm SL, same data as holotype.

Comparative Material

Paraschistura abdoii: VMFC PSL4: 35 exs., 21.9–60.5 mm SL. Iran, Kerman prov.: Halilroud River, the Hamun-e-Jaz Murian basin, H. Mousavi-Sabet & S. Eagderi.

Paraschistura aredvii: VMFC PSA9: 27 exs., 24.0–55.3 mm SL. Iran, Khouzestan prov.: stream Kheir-Abad at Kheir-Abad, Mohammad Amini.

Paraschistura bampurensis: VMFC PSB-B: 12 exs., 39–43 mm SL, Iran, Sistan-and-Baluchistan prov.: a qanat near Bampour, S. Eagderi and M. Nasri.

Paraschistura cristata: VMFC MSC: 10 exs., 59–68 mm SL, Iran, Khorasan prov.: a stream near Mashhad, Hari River basin, H. Mousavi-Sabet A. Jouladeh and B. Ganjbakhsh.

Paraschistura hormuzensis: VMFC PSH2: 34 exs., 26.2–51.1 mm SL, Iran, Hormozgan prov.: Rudan River, the Hormuz basin, H. Mousavi-Sabet & S. Eagderi.

Paraschistura ilamensis: VMFC PSI3-H: holotype; VMFC PSI3-P: 30 exs., paratypes.

Paraschistura kessleri: VMFC PSK: 9 exs., 33–42 mm SL, Iran, Sistan-and-Baluchistan prov.: Mashkid River, near Sarbaz Town, S. Eagderi.

Paraschistura naumanni: VMFC PSN7: 10 exs., 34.1–49.3 mm SL. Iran, Fars prov.: spring Golabi, near Darab, the Hormuz basin, H. Mousavi-Sabet & S. Eagderi.

Paraschistura nielseni: VMFC PSN: 21 exs., 31–49 mm SL, Iran, Bushehr prov.: Shapur River, S. Eagderi and H. Mousavi-Sabet.

Paraschistura turcmunica: VMFC PST: 11 exs., 41–53 mm SL, Iran, Khorasan prov.: a stream near Dargaz, at the border of Turkmenistan, H. Mousavi-Sabet, A. Jouladeh & B. Ganjbakhsh. MMSU P-57353: 1 ex.; MMSU P.5734: 3 exs.; Syn-types of *Paraschistura turcomana*.

Oxynoemacheilus persa: VMFC OXP: 10 specimens, 59.5–68.7 mm SL, Iran, Fars prov.: upstream of Mond River, Mond River drainage, the Persian Gulf basin, H. Mousavi-Sabet & S. Eagderi.

Diagnosis

Paraschistura delvarii sp. nov. can be distinguished from all known species in Iran by having a combination of the colour pattern consisting of marbled colour pattern without distinct bars on the flank (vs. vertical bars in all *Paraschistura* species, with the exception of *P. turcmunica*), thin and elongated body (vs. stout body in *P. cristata*, *P. bampurensis*, *P. ilamensis* and *P. nielseni*), absence of dorsal adipose keel (vs. presence a deep dorsal adipose

keel with procurent rays in *P. cristata*), an incomplete lateral line, extending to the dorsal-fin base (vs. complete and reaching to caudal-fin base in *P. cristata*, lateral line usually reaching beyond dorsal fin base in *P. hormuzensis* and *P. bampurensis*), scatter scaled body (vs. completely scaleless in *P. kessleri*, and *P. turcmunica*; predorsal flank scaleless in *P. abdoii*), blunt snout (vs. pointed in *P. hormuzensis* and *P. bampurensis*), and suborbital groove in males (vs. without suborbital flap or groove in *P. naumanni* and *P. aredvii*; suborbital flap in *P. bampurensis*, *P. hormuzensis*, *P. susiani*, and *P. ilamensis*).

Description

See Figs. 2–5 for general appearance and Table 1 for morphometric data of holotype and 7 paratypes. Elongated species with short and wide head. Predorsal contour almost flat, prepelvic contour straight. No hump at nape. Body laterally compressed, especially posteriorly. Body deepest at or slightly in front of dorsal-fin base, depth decreasing towards caudal-fin base. Greatest body width at pectoral-fin base, body almost equally wide until dorsal-fin origin. Caudal peduncle strongly compressed laterally. Caudal peduncle relatively shallow (caudal peduncle length 6.3–10.1% SL). Caudal peduncle length 1.8–2.1 times longer than its depth. Lateral line incomplete, extending to the dorsal-fin base, not passes dorsal-fin base. Scales scattered along body, on flank and back. Snout blunt and short, its length 0.8–1.0 times in postorbital length. Eyes located in the middle of head. Suborbital groove in front of eye in males. Mouth well arched. Lips well furrowed and interrupted in middle of lower lip. Processus dentiformis small and pointed. Mouth surrounded by three pairs (two rostral and one maxillo-mandibular) of barbels. Maxillary barbels reaching to the mid of eye, not passes it. Outer mandibular barbels not reaching eye origin. Inner mandibular barbels reaching to maxillary barbels origin. Pelvic-fin origin behind a vertical of dorsal-fin origin. Nostrils proximate to the eyes. Anterior dorsal-fin origin located mid dorsum, or slightly posterior. Pectoral fin reaching approximately 49–57% of distance from pectoral-fin origin to pelvic-fin origin. Ventral fin insertion below a vertical of dorsal fin spines. Movable axillary lobe at the base of pelvic fin. Margin of dorsal and anal fins straight. Caudal fin distinctly emarginated. Dorsal adipose keel absent.

Dorsal fin with 7½ branched rays. Anal fin with 5½ branched rays. Pectoral fin with 8–9 branched rays. Pelvic fin with 7 branched rays. Caudal fin with 8+8 branched rays.

Colouration. In live specimens (Fig. 5) body is cream yellow above lateral line and becomes faint from lateral line to ventral surface, with dark to pale brown marbled pattern on flank and back, without distinct bars at least in the study specimens (less than 52.1 mm in total length). An obvious dark spot at the base of dorsal fin. A thick and obvious black bar at caudal-fin base. Upper part of

Table 1. Morphometric data of *P. delvarii* sp. nov. (n = 7). H, holotype.

Morphometric character	H	min	max	mean	SD
Standard length (mm)	30.0	27.2	42.1		
<i>In percent of standard length</i>					
Head length	24.6	21.7	24.7	23.4	1.4
Body depth at dorsal-fin origin	13.5	12.0	13.5	12.7	0.8
Prepectoral length	26.1	21.0	25.3	22.6	2.0
Predorsal length	51.5	52.5	55.8	54.7	1.8
Postdorsal length	36.0	33.8	35.8	34.6	0.9
Preanal length	80.3	80.4	81.3	80.7	0.4
Prepelvic length	54.8	54.9	56.8	56.2	0.8
Distance between pectoral and pelvic-fin origins	32.4	32.6	35.9	34.4	1.4
Distance between pelvic and anal-fin origins	25.6	24.6	27.2	25.9	1.1
Distance between vent and anal-fin origin	4.3	2.9	4.3	3.6	0.5
Depth of caudal peduncle	10.4	6.3	10.1	8.5	1.7
Length of caudal peduncle	11.0	11.4	15.5	14.1	1.8
Dorsal-fin depth	13.8	13.9	18.4	16.6	2.1
Anal-fin base length	6.3	6.5	9.3	7.4	1.5
Pectoral-fin length	21.0	15.8	20.6	18.4	2.3
Pelvic-fin length	16.9	14.2	16.8	15.2	1.0
<i>In percent of head length</i>					
Head depth at eye	44.0	40.4	44.2	42.8	1.5
Snout length	36.6	37.8	48.2	41.3	4.5
Eye diameter	16.1	16.0	21.1	18.6	2.1
Postorbital distance	43.5	44.2	50.6	46.5	3.2
Maximum head width	51.8	48.4	59.3	53.6	4.6
Interorbital width	27.5	28.2	38.7	31.8	4.5



Fig. 2. *Paraschistura delvarii*, VMFC PSD1-H: 38.0 mm SL; Iran: Mond River drainage, holotype.

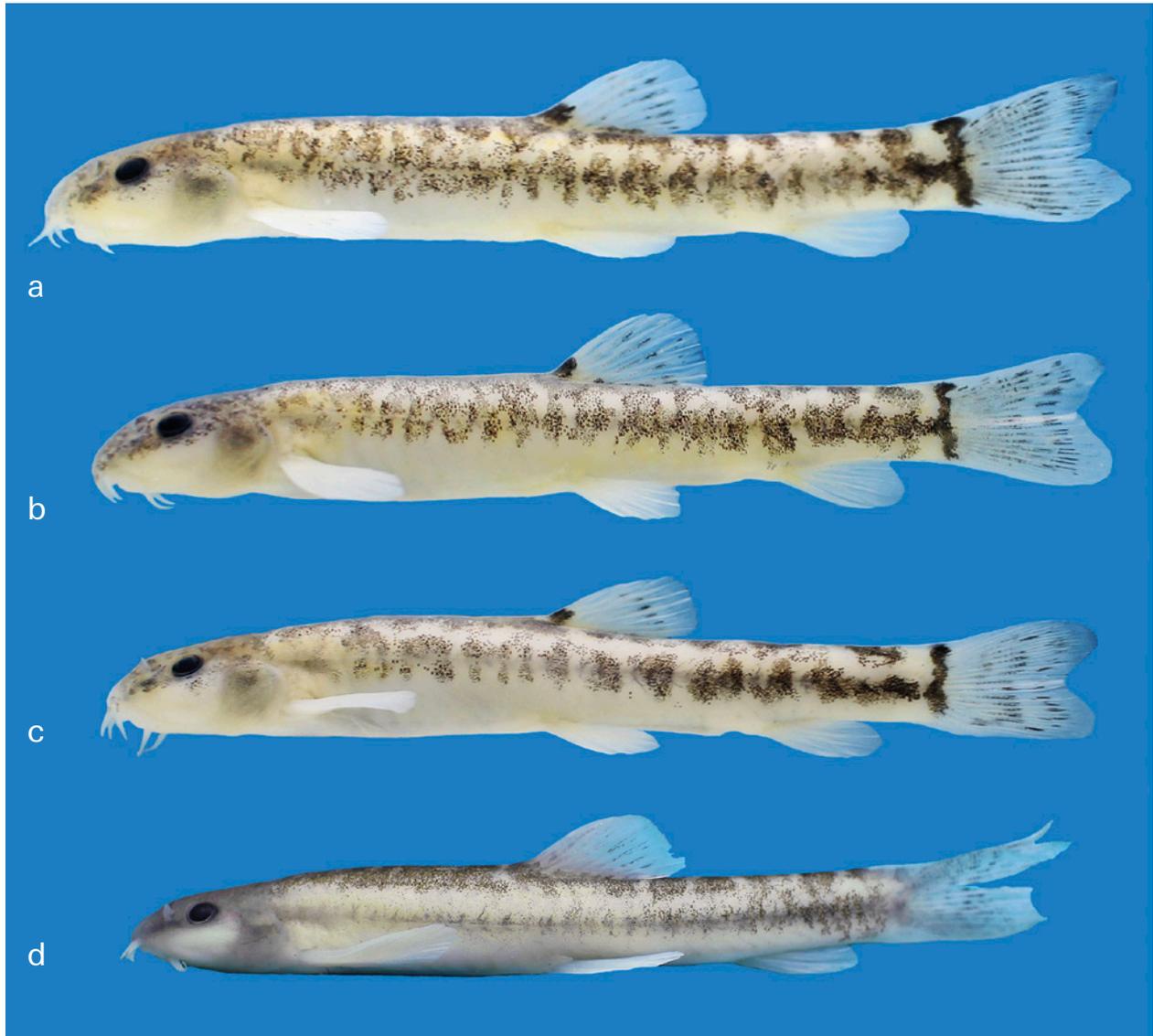


Fig. 3. *Paraschistura delvarii*, VMFC PSD1-P and GUIC PSD1-P: **a:** 38 mm SL; **b:** 36 mm SL; **c:** 35 mm SL, and **d:** 33 mm SL, Iran: Mond River, paratypes.

head, opercula and snout covered by dark brown small blotches. Dorsal and caudal fins with irregular dark spots, except distally so the fin margin is white. The lateral line is light, sometimes in marked contrast to the rest of the flank. In preserved specimens body is whitish with irregular dark brown marbled pigmentation in dorsal and lateral parts. The belly is white, and all fins are hyaline (in preserved specimens).

Distribution. *Paraschistura delvarii* sp. nov., is known from upstream tributaries of Gharaghaj River, Mond River drainage, the Persian Gulf basin, in Fars province, southern Iran.

Etymology. The species name *delvarii* is in honor of “Rais-Ali Delvari” (1882–1915), the anti-colonialism in Bushehr province, the region where the Mond River drainage (type locality of *P. delvarii*) is located. Rais-Ali Delvari now remembered as the national hero of Iran.

Remarks

The presence of *Paraschistura* in the Persian Gulf basin was firstly reported by BANARESCU & NALBANT (1966), who identified it, as *Nemacheilus bampurensis* (*Paraschistura bampurensis*). After that, NALBANT & BIANCO (1998) separated the *Paraschistura* specimens from the Persian Gulf basin as distinct taxa and described them as a new species, *Paraschistura nielsenii*. There are two main drainages in the Persian Gulf basin including Shapour-Dalaki and Gharaghaj-Mond rivers. *Paraschistura delvarii* sp. nov., is described from Gharaghaj-Mond drainage, while *P. nielsenii* is found in Shapour-Dalaki drainage.

Beside color pattern and elongated body, *Paraschistura delvarii* sp. nov., is distinguished from *P. nielsenii* which is described from the same basin, by longer snout and barbels, and caudal fin with irregular dark spots (vs. 3 distinct rows). In the Mond River drainage, *Oxynoemacheilus persa* (Fig. 6) occurs in sympatry with



Fig. 4. *Paraschistura delvarii*, VMFC PSD1-P and GUIC PSD1-P: **a:** 38 mm SL; **b:** 36 mm SL; **c:** 35 mm SL, and **d:** 33 mm SL, Iran: Mond River, paratypes.

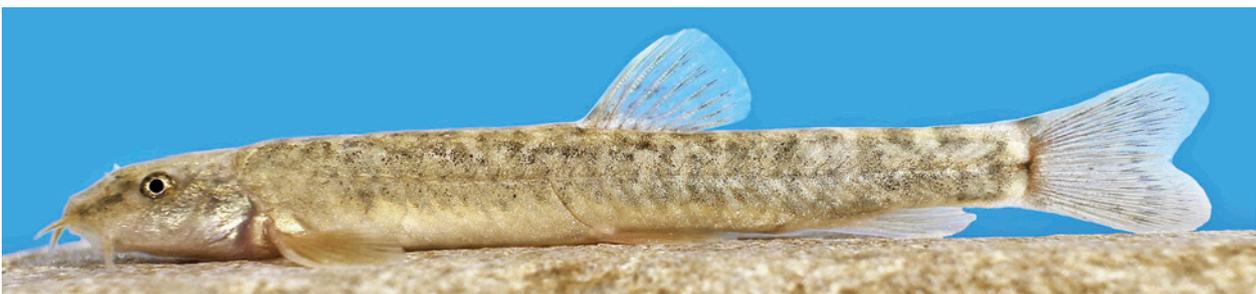


Fig. 5. *Paraschistura delvarii*, VMFC PSD1-H, 38.0 mm SL; Iran: Mond River, holotype.



Fig. 6. *Oxynoemacheilus persa*, VMFC OXP, 45 mm SL; Iran: Mond River.

P. delvarii sp. nov., which is superficially differs from *P. delvari* sp. nov.

Paraschistura delvarii sp. nov., is further distinguished from *P. kessleri* and *P. turcmenica* by scaled body (vs. completely scaleless); from *P. cristata* by incomplete lateral line and absence of dorsal adipose crest (vs. lateral line complete, caudal peduncle with a prominent dorsal adipose crest supported by 22–25 procurrent caudal-fin rays); from *P. abdoli* by suborbital groove in males, scatter scaled body (vs. suborbital flap or groove absent, predorsal flank scaleless, scales present on caudal peduncle); from *P. naumanni* and *P. aredvii* by presence of suborbital groove in male (male without suborbital flap or groove); from *P. bampurensis* and *P. hormuzensis* by suborbital groove in males, shorter lateral line not passes dorsal fin base, and blunt snout (vs. suborbital flap in males, lateral line usually reaching beyond dorsal fin base, and pointed snout); from *P. ilamensis* and *P. susiani* by suborbital groove in males, bold black spot at base of first dorsal-fin rays, shallow caudal peduncle (vs. suborbital flap in males, faint black spot at base of first dorsal-fin rays or spot absent, deep caudal peduncle).

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