

Range extension of *Barbus sublimus* Coad and Najafpour, 1997 (Actinopterygii: Cyprinidae) and its sympatric species in Southwest of Iran

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Barbus sublimus, described by Coad and Najafpour (1997) as a new species, was retrieved first from the Aala Rood, a river in Khuzestan province, southwestern Iran. In our latest sampling a population of this species was found, for the first time, in Fahlian Rood, a river in a different water basin, in Fars province, Southwest of Iran, where no specimen of the species was collected in previous samplings at this location. The detail of taxonomic work done on the specimens captured, species phylogeny, and the possibilities of its previous absence and then presence are described and discussed.

Key words: Fish fauna, *Barbus sublimus*, range extension, Fahlian, Iran

INTRODUCTION

Order Cypriniformes with six families, 321 genera and some 3268 species (Nelson, 2006) is one of the most widespread and large (specieous) orders of fishes all over the world. Thus cyprinids are, as well, a major element in Iran's ichthyofauna, found in all its major drainage basins. The genus *Barbus* Cavier and Cloquet, 1816 (Cyprinidae, Barbinae), being a member of this group, is a polyphyletic taxon in southwest Asia where one monophyletic clad comprising of six species is reported from the Levant, the Arabian Peninsula, the Tigris-Euphrates basin and neighboring drainages in western Iran (Krupp, 1985). According to Saadati (1977), Coad (1995), Abdoli (2000) and Coad and Najafpour (1997) more than 17 species of *Barbus* have been reported from different basins of Iran. *Barbus sublimus* is a barbel species endemic to southwest Iran and was first described and reported by Coad and Najafpour in 1997 from Khuzestan province. Type locality of this species is in Aala Rood (rood = river) (see map A, Fig. 1) down a bridge called Pol-e-Tighen, 31° 23.5' N 49° 53' E. This has been the only location where the species has been reported so far. Aala Rood, originating from foothills of a peak of 3613m a.s.l., of Zagros elevations, runs down west ward, some 25km southwest of Bagh-e-Malek, where it joins the Rood-Zard, forming Rood-e-Jarrahi, the main river, running down to Khuzestan plain, ends in Shadegan and Khor-e-Douragh marshlands. Coad and Najafpour (1997) have rectified the species by comparing it with *Barbus kosswigi* and *Barbus luteus* on the basis of their morphology. Here we have repeated the same morphological comparison on six *B. sublimus* specimens collected recently from this new locality, with specimens of *B. kosswigi* and *B. luteus* available from previous collections. The new locality from which a population of the species being reported is below Pol-e-Fahlian at 30° 11' N 51° 31' E and 913m a.s.l., a bridge about 10km North of Noorabad City in Fars province, some 380km southwest of previous recorded locality at

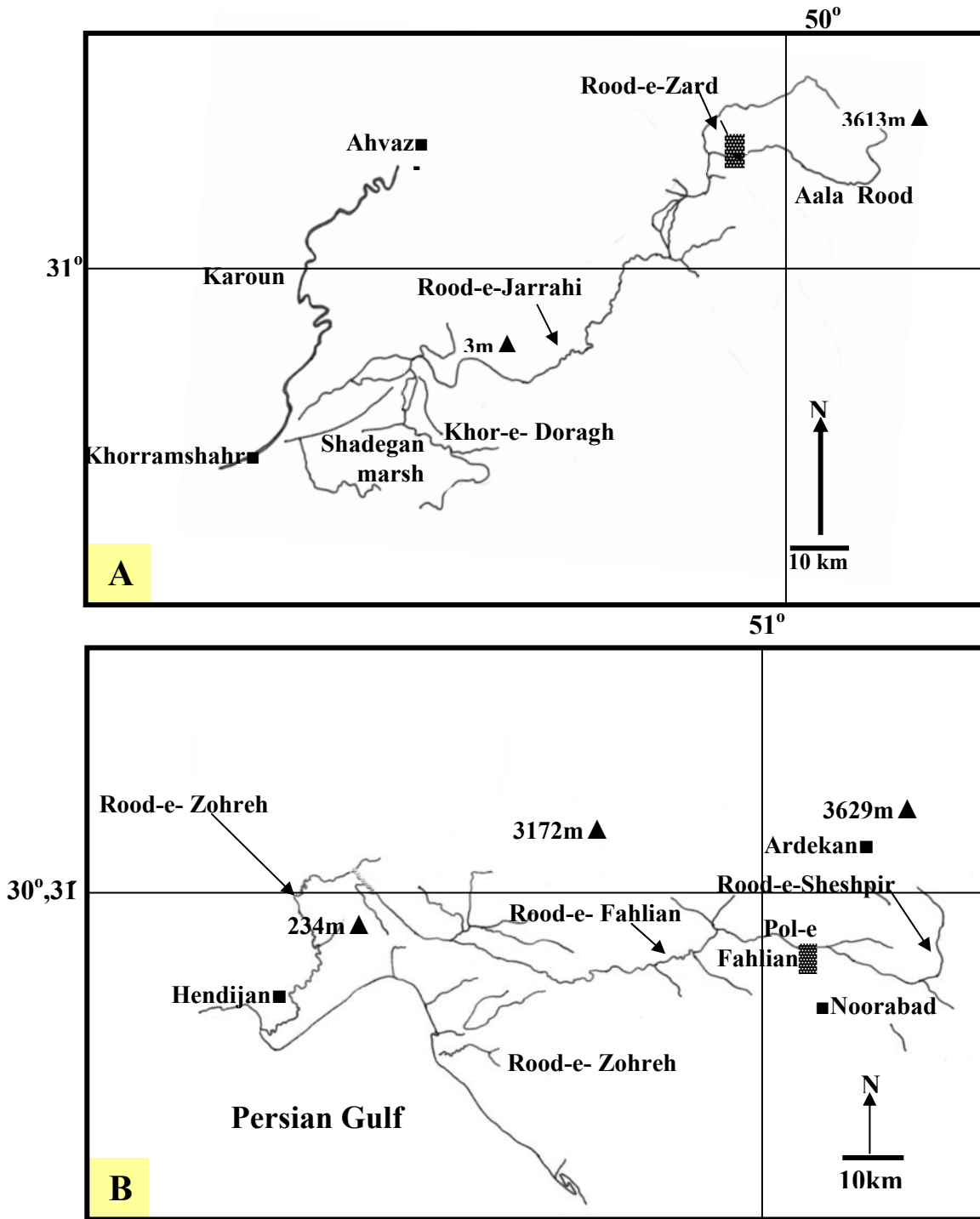


FIG.1.– Maps showing the basins in which *Barbus sublimus* is found in Iran. A) Previous record; B) Present record. ■: collection location

Aala Rood. Rood-e-Fahlian is one of the most important headwaters of Rood-e-Zohreh which runs down to Persian Gulf in province of Khuzestan. Its basin – the Zohreh Basin, extends southward joins and the common Persian Gulf Basin (Fig. 1).

MATERIAL AND METHODS

The specimens of this population of *Barbus sublimus*, were collected, along with the specimens of local fish populations with electroshoker from a suitable location some 200m downstream of a bridge called Pol-e-Fahlian (taken from the name of the river "Fahlian") near Noorabad, a city in Fars province. The specimens were preserved in 10% formalin in the field, then labeled individually and deposited in the Collection of Biology Department in Shiraz University (CBSU). All were identified and verified, using necessary references and consultations with experts.

RESULTS

The new locality was characterized by shallow, relatively clear water, heterogeneous bed morphology with a variety of substrata (e.g. sand, gravel, stone, pebbles, rock, and ect.) and the absence of aquatic and riparian vegetation (Fig. 2). Sixty eight specimens of fish were collected from this locality. They were identified to be representatives of local population of seven species. Six of these were identified, verified and finalized as *Barbus sublimus*, recognized from this locality for the first time. The rest of specimens were identified as cyprinids *Chondrostoma regium* (Heckel, 1843), *Garra rufa* (Heckel, 1843) being the dominant one, *Cyprinion tenuiradius* (Heckel, 1849) and *Chalcalburnus mossulensis* (Heckel, 1843); the sisorid catfish *Glyptothorax silviae* Coad, 1981, and mastacembelid spiny eel fish, *Mastacembelus mastacembelus* (Banks and Solander in Russell, 1794). The latter six species had already been reported from this basin. The overall live color of the collected *Barbus* specimens was silvery with the black olive-green. There is a dark spot on the base of the caudal fin (Fig. 3). Morphometric and meristic characters are as follows and almost agree with those given by Coad and Najafpour (1997): mean of total length 62.30mm, standard length 49.09mm, mean of caudal peduncle 12.55mm, dorsal fin with 3 spines and 11 branched rays, anal fin with 3 unbranched and 6-8 branched rays, pectoral fin with 16-18 branched rays, lateral line scales 24-28, predorsal scale rows 9-10, caudal peduncle scales 5-8, total gill rakers 10-12 (usually 10), mouth in *B. sublimus* is more similar to *B. kosswigi* than to *B. luteus* (Fig. 4 and Table. 1).

DISCUSSION

IDENTIFICATION OF THE SPECIES

Krupp characterized the six species of *Barbus* from the region (see Introduction) possessing six branched anal fin rays, nine or more branched dorsal fin rays, a smooth last unbranched dorsal fin ray modified as a strong spine; large scales with lateral line counts 38 and less; and a compressed body (Krupp, 1985). Coad and Najafpour (1997), to rectify the species, compared it with *Barbus kosswigi* and *Barbus luteus* as fallow; dorsal and pectoral ray counts uniformly 11 and 17 respectively, in these three *Barbus* species, but number of lateral line scales, ventral fin rays, number of scales between anal and number of ventral fins in *Barbus sublimus* are fewer than in the other two species, and the number of gill rakers of *Barbus sublimus* be close to *Barbus luteus* and in both they are fewer than in *Barbus kosswigi*. The results of our comparison on the three species, as indicated in Table 1, agree with those of Coad and Najafpour.

SYMPATRICITY (BIODIVERSITY)

Barbus sublimus in this location of Fahlian Rood (river) is sympatric with six other species. The diversity of fish fauna obtained at Pol-e-Fahlian is given in Table. 2. Of seven species given in Table. 2, *Garra rufa*, *Mastacembelus mastacembelus*, and *Chalcalburnus musselensis* were also found in Pol-e-Tighen

TABLE 1. - Comparison of meristic characters of three *Barbus* species from Iran. D, dorsal fin; A, anal fin; P, pectoral fin; V, ventral fin; L.l, Lateral line scales; G.r, gill raker. Roman numbers (III) show the unbranched rays; Arabic numbers show the branched rays for D, A, P, V. figures in the brackets are standard deviation from the mean.

Character Species	No. of specimens	D	A	P	V	No. of L.l	No. of G.r	No. of pre dorsal fin scales	No. scales between A and V	No. scales between P and V
<i>Barbus luteus</i>	6	,11III	, 6III	17	10	27 (0.63)	9.33 (1.63)	8.6 (0.51)	7.5 (0.54)	11
<i>Barbus kosswigi</i>	2	,11III	, 7III	17	10	34	13	12	8	9
<i>Barbus sublimus</i>	6	,11III	, 7III	16.8 (0.40)	9.4 (0.83)	26 (1.09)	10	9.75 (0.51)	6.6 (0.51)	9.8 (0.40)

TABLE 2. -Fish diversity in Pol-e-Fahlian locality

Order	Family	Species	No. Specimens	%
Cypriniformes	Cyprinidae	<i>Cyprinion tenuiradius</i>	1	1.47
Cypriniformes	Cyprinidae	<i>Chonrostoma regium</i>	2	2.94
Cypriniformes	Cyprinidae	<i>Garra rufa</i>	55	80.88
Cypriniformes	Cyprinidae	<i>Chalcalburnus mossulensis</i>	2	2.94
Cypriniformes	Cyprinidae	<i>Barbus sublimus</i>	6	8.82
Synbranchiformes	Mastacembelidae	<i>Mastacembelus mastacembelus</i>	1	1.47
Silioriformes	Sisoridae	<i>Glyptothorax silviae</i>	1	1.47
3	3	7	68	100

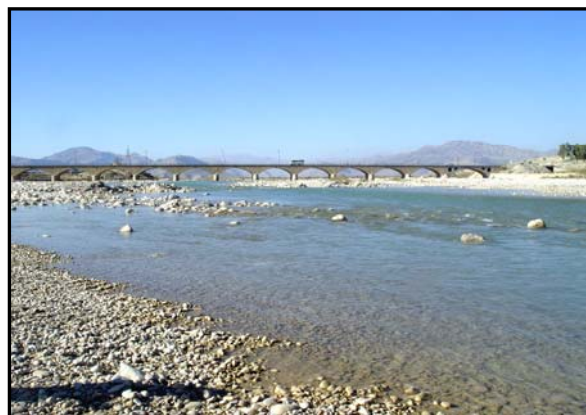


FIG.2.- Fahlian river at Pol-e- Fahlian, near the Noorabad City. New locality of *Barbus sublimus* in Fars Province (North of Persian Gulf basin).



FIG.3.- Two of the six *Barbus sublimus* specimens captured at Pol-e Fahlian in Fars province.

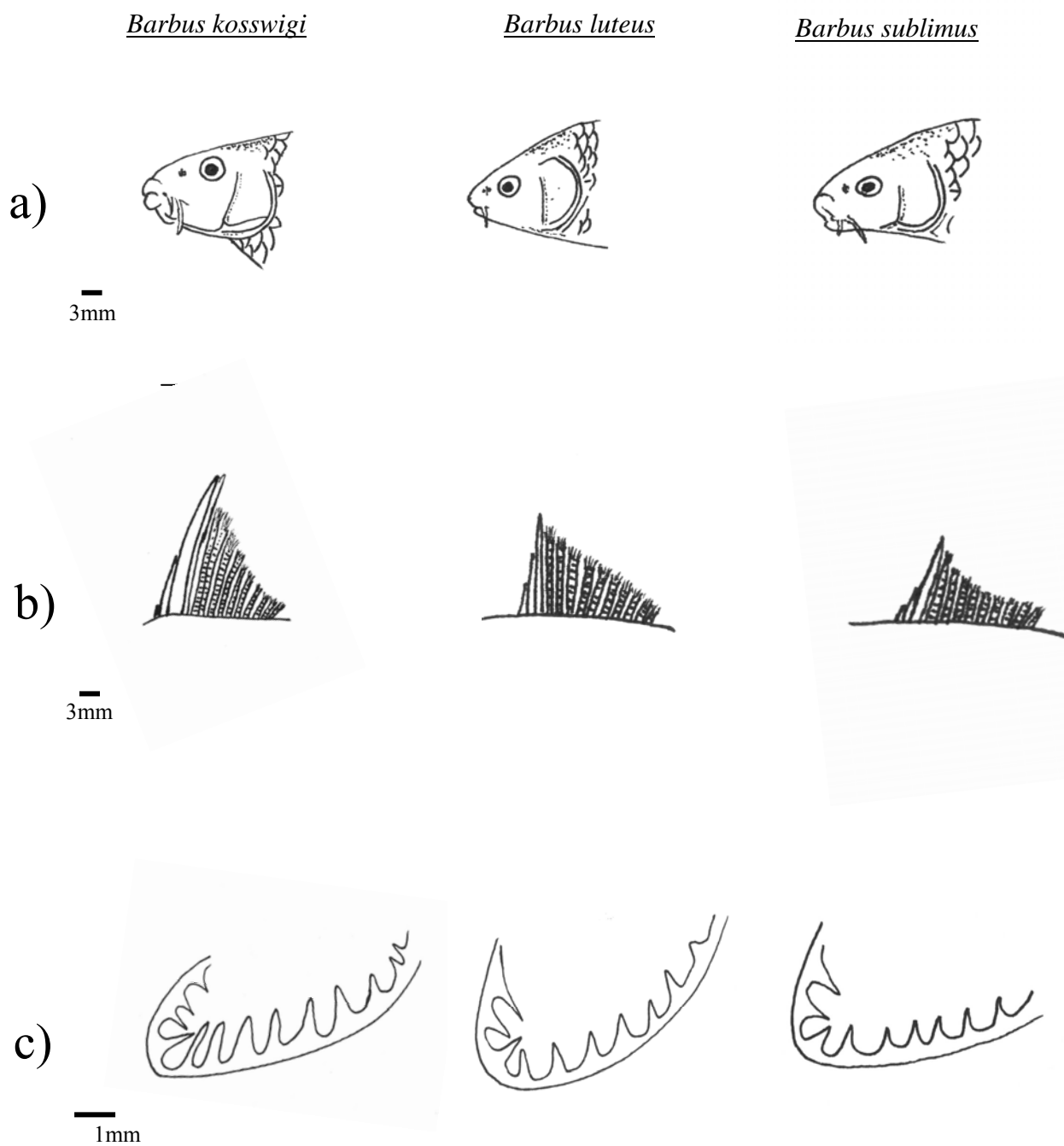


FIG. 4.- Comparison of head (a), dorsal fin (b), and gill raker (c) of three species of *Barbus* of Iran.

location of Aala river where *Chondrostoma regium* and *Cyprinion tenuiradius* were not found, but *Barbus barbulus*, *Barbus grypus*, and *Cyprinion macrostomum* which have been collected in Pol-e-Tighen locality were not present in Pol-e-Fahlian location. While the habitat of the two collecting localities are very similar the portion of difference in fish diversity against its to similarity may throw some light to the prehistory cases of the two habitats.

ZOOGEOGRAPHY

Barbus sublimus, is found, so far, only in Pl-e-Tighen location in Aala river and Pol-e-Fahlian location in Fahlian river basins in Iran. Considering the questions that, if the specimens of *Barbus sublimus* were there before but were not retrieved in previous catches in Pol-e-Fahlian location, or they were not there and appeared after previous catches may be answered by considering two factual evidences: 1) the previous collection in both localities were done by electroshokers isomethodical to the last one, and 2) the number of *Barbus sublimus* collected (the six specimens) is quite good (or rather high). Then, if this population of the species has appeared there recently, the case would be interesting and open to discussion on alternative possibilities such as local migration, local settlement, being introduced (not by man) and so on.

PHYLOGENY

As is brought up in "Introduction", Krupp (1985) claims a monophyletic clad of six *Barbus* species in Levant, Arabian Peninsula, Tigris – Euphrates basins and drainage basins in southwest of Iran (also see Coad and Najafpour, 1997). If so, the *Barbus sublimus* should cluster with other six species of *Barbus*, namely *Barbus kosswigi*, *Barbus barbulus*, *Barbus grypus*, *Barbus xanthoptus*, *Barbus lutens*, and *Barbus esocinus*, making a clad of seven species.

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