



## A NEW CAVE FISH LOCALITY FOR IRAN

Atabak Mahjoorazad<sup>1</sup>, Brian W. Coad<sup>2</sup>

<sup>1</sup>Section of Environmental Studies, Department of Integrated Studies of Water and Soil Resource and Environment, Mahab Ghodss Consulting Engineering Company, P.O. Box 19395-6875, Tehran, Iran, e-mail [atabak:mahjoorazad@yahoo.com](mailto:atabak:mahjoorazad@yahoo.com)

<sup>2</sup>Canadian Museum of Nature, PO Box 3443, Station D, Ottawa, Ontario, Canada K1P 6P4, e-mail: [bcoad@mus-nature.ca](mailto:bcoad@mus-nature.ca)

**Abstract:** A new locality is reported for the Iranian cave fish, *Iranocypris typhlops* (Cyprinidae). Formerly known from a single locality in the Dez River drainage of western Iran, it is now recorded from drainage, the Simarreh River basin, ca. 131 km away in a direct line. The new locality was an intake tunnel for a dam, now inaccessible. The species may be widely distributed through karst areas of the Zagros Mountains and its vulnerable status is called into question.

**Key Words:** *Iranocypris typhlops*; cave fish; Iran

**Accepted:** 13 May, 2009

The Iranian cave fish, *Iranocypris typhlops* Bruun and Kaiser, 1948, a cyprinid fish, is known from a single locality in the Zagros Mountains of Iran. It co-occurs with a balitorid fish *Paracobitis smithi* (Greenwood 1976) which also lacks pigment and eyes. This situation is mirrored in Iraq where two species, *Typhlogarra widdowsoni* Trewavas, 1955 and *Caecocypris basimi* Banister and Bunni, 1980, both cyprinids, are found at a single locality at Haditha.

The Iranian fishes can be seen and collected from a well-like but natural outlet whose water level varies with the season. The outlet overflows to form a small stream from January to May (Smith 1979) during the snow-melt period in the Zagros Mountains but in April to June this flow ceases. The well is at least 23 m deep as measured by R. Mehrani who let down a rope of this length without reaching the bottom (Coad *et al.* 2009). It seems probable that a complex of flooded but narrow and inaccessible passages in karst is the habitat of this species and the well is merely the surface manifestation of this complex (Bruun and Kaiser 1948; Smith 1978; Banister 1992; Coad 2008). There is a smaller pool (about 2 m

across narrowing rapidly inside) with a flowing exit stream lower down the gorge, about 50 m away from the main locality, where a blind fish was seen by BWC but not caught in December 2000. Smith (1979) also tentatively reports sighting a fish here. This is assumed to be evidence of the interconnectivity of subterranean passages. The main pool was not flowing at this time.

This Iranian cave fish is on the 2007 IUCN Red List as VU D2 (Vulnerable, acute restriction in its area of occupancy). Coad (2000), using 18 criteria, found this species to be one of the top 4 threatened species of freshwater fishes in Iran. The original locality is at "Kaaje-ru" above the garden "Bagh-e Loveh" (probably Loven). The stream below the cave locality is the "Ab-e Serum" which runs into the "Ab-e Zesar" which is a tributary of the Dez River, in Lorestan Province. The Dez flows into the Karun River which drains to the head of the Persian Gulf. Further locality details are given in Bruun and Kaiser (1948) and Coad (2008). The locality is at 744 m and 33°04'38.6"N, 48°35'33.1"E according to the *Iranian Fisheries Research and Training Organization Newsletter*, 21:3, 1998 and Kiavash Golzarian, *pers. comm.*, 6 April 2008).

The construction of a dam on the Simareh River on the Lorestan-Illam provincial border, 30 km northwest of Darrehshahr at 33°16'56"N, 47°12'16"E, involved excavation of an intake tunnel for a power house, 11 m in diameter and 1500 m in length, at 597 m altitude. The tunnel intersected many faults, joints or small karstic features. Groundwater penetrated through these discontinuities into the tunnel and formed a large pool (Khashaiar Solgi, *pers. comm.*, 27-29 April 2008). Two blind, white fish were caught here on 15 December 2005. Fifteen more specimens were caught and pho-

tographed on 30 December 2005 (Figure 1). A total of about 50 fish were observed in the pool. A pale amphipod was also caught. The tunnel is now encased in concrete and the karst environment is no longer accessible. The Simareh River becomes the Karkheh River lower down and debouches into the Hawr-al-Azim marshes on the Iran-Iraq border in the Tigris River basin. The following physico-chemical parameters are the average of 10 samples over 4 months from April to July 2005 for the river and the groundwater habitat of the cave fish:-

Parameter	Simareh River	Groundwater
SO <sub>4</sub> <sup>2+</sup> (mg/l)	141.8	352.7
Cl <sup>-</sup> (mg/l)	58.8	239.9
Na <sup>+</sup> (mg/l)	46.4	160.4
Ca <sup>2+</sup> (mg/l)	69.5	142.7
Mg <sup>2+</sup> (mg/l)	20.1	40
K <sup>+</sup> (mg/l)	2.1	1.9
pH	7.51	7.59
Total alkalinity (mg/l)	64.1	217.6
EC 25°C m.mhos/cm	0.7	1.5
Suspended solids (mg/l)	125.9	26.9

Only two specimens, 20.9-24.6 mm total length, were retained and are in a delicate condition. Photographed specimens were larger (Figure 1). This material resembles *Iranocypris* in general body shape, fin characters, flattened head, presence of 4 small barbels, and an indication of a mental disc. X-rays on the two specimens from the new site show a total vertebral count of 35, dorsal fin branched rays 7-8, anal fin branched rays 5, branched caudal fin rays

17, branched pectoral fin rays 15, branched pelvic fin rays 7 and total gill rakers 11. Main row pharyngeal teeth were 5 with anterior teeth hooked and posterior teeth having a short, flat to slightly concave surface below the tip. These observations accord with *Iranocypris typhlops*. Sargeran *et al.* (2009) and Coad (2008) document variability in the cave fish at the original site, including fish with and without a mental disc.



**Figure 1. Simareh cave fish (these specimens not retained)**

Only two specimens, 20.9-24.6 mm total length, were retained and are in a delicate condition. Photographed specimens were larger (Figure 1). This material resembles *Iranocypris* in general body shape, fin characters, flattened head, presence of 4 small barbels, and an indication of a mental disc. X-rays on the two specimens from the new site show a total vertebral count of 35, dorsal fin branched rays 7-8, anal fin branched rays 5, branched caudal fin rays 17, branched pectoral fin rays 15, branched pelvic fin rays 7 and total gill rakers 11. Main row pharyngeal teeth were 5 with anterior teeth hooked and posterior teeth having

a short, flat to slightly concave surface below the tip. These observations accord with *Iranocypris typhlops*. Sargeran *et al.* (2009) and Coad (2008) document variability in the cave fish at the original site, including fish with and without a mental disc.

The locality is ca. 131 km in a direct line from the original Iranian cave locality and in a distinct river basin. The fish appear to be identical to *Iranocypris typhlops* so the status of this species as Vulnerable would need re-examination as the taxon may be widespread in the Zagros Mountains, including areas inaccessible to normal collecting.

This wide distribution of the Iranian cave fish is paralleled in the U.S.A. where an unrelated amblyopsid species, *Typhlichthys subterraneus*, is found in karst across 8 states in two major disjunct areas.

Extensive sampling by one of us (AM) in 2008 of springs and other surface waters in this region, which will be submerged by the new dam, did not reveal any cave fish populations. Further construction in this area and exploration for caves and natural karst outlets should bear in mind the possibility of obtaining material of these cave fish. These should be well-preserved and include some material suitable for molecular analyses. Such fish would provide valuable insight into cave fish biology and evolution, answering such questions as specific limits, parallel evolution, and gene flow over long distances through a karst environment.

## References

- Banister K (1992) Blind cave fishes. *Aqua Geographia*. **2**: 65-73.
- Bruun AF, Kaiser EW (1948) *Iranocypris typhlops* n. g., n. sp., the first true cave fish from Asia. *Danish Scientific Investigations in Iran*. **4**(1944): 1-8.
- Coad BW (2000) Criteria for assessing the conservation status of taxa (as applied to Iranian freshwater fishes). *Biologia*, **55**(5): 539-557.
- Coad BW (2008) Freshwater Fishes of Iran. [www.briancoad.com](http://www.briancoad.com).
- Coad BW, Mehrani R, Najafpour N (2009) Threatened fishes of the world: *Paracobitis smithi* (Greenwood, 1976) (Balitoridae). *Environmental Biology of Fishes*. **84**(3): 323.
- Sargeran P, Bakhtiyari M, Abdoli A, Coad BW, Sarvi K, Lishi MR, Hajimoradloo A (2008) The endemic Iranian cave-fish, *Iranocypris typhlops*: two taxa or two forms based on the mental disc? *Zoology in the Middle East*. **44**: 67-74.
- Smith A (1978) The blind fishes of Persia. *Nature*, **271**: 711.
- Smith A (1979) *A Persian Quarter Century*. Hodder and Stoughton. 192 pp.

---

Copies of the PDF file of this work have been deposited in the following publicly accessible libraries: 1. National Museum of Natural History, Smithsonian Institution, Washington D.C. USA; 2. Natural History Museum, London, UK; 3. California Academy of Sciences, San Francisco, California, USA; 4. Department of Ichthyology, Museum National d'Histoire Naturelle, 75005 Paris, France; 5. Senckenberg Museum, Frankfurt/Main, Germany; 6. National Museum of Natural History, Leiden, The Netherlands. 7. The Gitter- Smolartz Library of Life Sciences and Medicine, Tel Aviv University, Israel; 8. The National and university Library, Jerusalem, Israel; 9. Library of Congress, Washington, D.C. USA; 10. South African Institute for Aquatic Biodiversity, Grahamstown, South Africa; 11. The National Science Museum, Tokyo, Japan; 12. The Swedish Museum of Natural History, Stockholm, Sweden.