

A survey on infection of *Turcinoemacheilus kosswigi*, first record of the genus *Procamallanus* (Nematoda: Camallanidae) from Iran

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Abstract: The present study was conducted to identify the parasitic infection of the nemacheilid loach, *Turcinoemacheilus kosswigi*, in 5 rivers of the Tigris basin in Iran, from July 2007 to August 2008. Extracted from 43 fish specimens were 3 parasitic species: metacercaria of *Posthodiplostomum cuticola* (Digenea: Diplostomatidae) in the skin, fins, gills, and muscles; *Allocreadium* sp. (Digenea: Allocreadidae) and *Procamallanus* sp. (Nematoda: Camallanidae) in the intestine. Prevalence and mean intensity of parasitic infection were: 100%, 33 for the river Khoramroud; 12.5%, 1 for the river Hana; 50%, 1 for the river Kakareza; and 16.6%, 1 for the river Shalamzar. Specimens of the river Marboreh had no parasitic infection. *T. kosswigi* was introduced as a new host for these parasites and the genus *Procamallanus* was recorded in the fish of Iran for the first time.

Key words: *Turcinoemacheilus*, parasite, first record, *Procamallanus*, Iran

So far, 22 loaches have been mentioned for Iran (Nalbant and Bianco, 1998; Esmaeili et al., 2010). Because of the small size and lack of commercial value of loaches, few parasitological studies have been carried out in this country. *Turcinoemacheilus kosswigi*, endemic to the Mesopotamian region, was recently added to the freshwater fish fauna of Iran (Golzaripour et al., 2009). This loach has extensive distribution in western Iran. Our inquiry showed there is no parasitic infection history about *T. kosswigi*. The current study investigates the parasitic infections of this Mesopotamian loach within its distribution range in Iran.

From July 2007 to August 2008, a total of 43 specimens (30-51.7 cm long) were collected from 5 rivers; namely the river Marboreh (33°28'N, 49°03'E; altitude: 1456 m from the sea level; the river Shalamzar (32°05'N, 50°39'E; alt: 1987 m); the river Hana (31°11'N, 51°15'E; alt: 1600 m); the river Khoramroud (34°22'N, 47°55'E; alt: 1332 m), and the river Kakareza (33°42'N, 48°21'E; alt: 1632 m), using electro-fishing and dip nets. The fish were fixed in 10% formalin and transferred to the aquatic research laboratory of Shahid Beheshti University. Specimens were examined for parasitic infection using a stereo and light microscope. Prevalence and mean intensity were calculated based on Bush et al. (1997).

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Among the fish examined, *Posthodiplostomum cuticola* (Figure 1) was found in 15 samples. The skin, fins, gills, and muscles were infected by the black cysts (metacercaria). *Allocreadium* sp. (Figure 2) and *Procamallanus* sp. (Figure 3) were only found in 3 specimens. Both of these were intestinal parasitic infections. All of the nematodes were female. Prevalence and mean intensity of the parasites are presented in the Table.

The metacercaria of parasite *P. cuticola* are common on numerous fish species (Rolbiecki, 2004). Mokhayer (1981) reported this parasite from *Barbus brachycephalus* for the first time in Iran. Gholizadeh et al. (2009) detected *P. cuticola* in *Capoeta capoeta gracilis* in Golestan Province. In the present study, *P. cuticola* was only observed in the specimens of the river Khoramroud (Kermanshah Province).



Figure 1. *Posthodiplostomum cuticola*; found in the skin, fins, gills, and muscles.

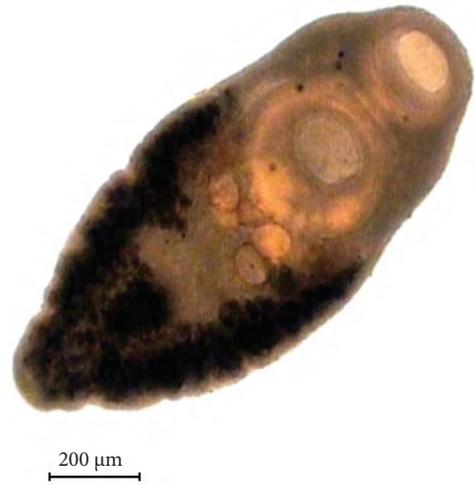


Figure 2. *Allocreadium* sp.; found in the gut.



Figure 3. *Procamallanus* sp.; female, found in the gut.

Table. Prevalence and mean intensity of fish examined during the study.

River	Species of parasite	No. infected Fish/No. Fish examined	No. of parasites	Prevalence (%)	Mean intensity	Site of infection
Khoramroud	<i>Posthodiplostomum cuticola</i>	9/9	297	100	33	Skin, fins, gills, and muscles
Hana	<i>Allocreadium</i> sp.	1/8	1	12.5	1	Intestine
Kakareza	<i>Procamallanus</i> sp.	3/6	3	50	1	Gut
Shalamzar	<i>Allocreadium</i> sp.	2/12	2	16.6	1	Intestine
Marboreh	-	0/8	-	0	0	-

In the current survey, *Allocreadium* sp. was found in fish of the rivers Hana and Shalamzar (Esfahan and Chaharmahal bakhtiari Prov., respectively). Of the genus *Allocreadium*, *A. isoporum* had already been reported in intestine of *Leuciscus lepidus*, *Alburnoides bipunctatus*, *Capoeta aculeate*, and *Capoeta capoeta* from Iran (Williams et al., 1980; Jalali, 1998; Pazooki et al., 2007).

Procamallanus sp. was only found in specimens of the river Kakareza (Lorestan Prov.). The genus *Procamallanus* is one of the largest genera of the nematodes in fish with a cosmopolitan distribution (Hafizuddin and Bashirullah, 2005). Various species of this genus were introduced from different localities (Moravec et al., 2004) but have not been reported from the fish of Iran. Bashĥ and Abdullah (2010) reported *P. viviparous* from the Zab river of Iraq, located west of Iran.

In this study, we only found 3 female specimens, while the male gender is necessary for identifying in species level. The present classification of this nematode group remains controversial due to inadequate descriptions. Therefore, using new methods can be effective for the species identification of this genus (Moravec et al., 2004).

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Among the investigated rivers, no parasitic infections were observed in the specimens of the river Marboreh. Different occurrences of a parasite in one river comparable to other rivers confirms that the presence of a parasite is dependent on the situation of the definitive host in a given location (Xianghua, 1987) and the availability of the intermediate host (Moser and Cowen, 1991).

Prior to the current survey, there was no report regarding parasitic infections in *T. kosswigi*. Therefore, this loach is regarded as a new host for these parasites. Furthermore, this study introduces the first record of the genus *Procamallanus* from Iran.

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