

Original Research Article

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New Record of Indian Hill Trout *Barilius bendelisis* (Cypriniformes: Cyprinidae) from Kangsabati Reservoir, West Bengal, India

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ABSTRACT

Keywords

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Exploration and characterization of germplasm resource is important for documentation of species. The present study reports new distribution record of Indian hill trout, *Barilius bendelisis* (Hamilton 1807) from Kangsabati Reservoir, West Bengal, India. Based on the past records and literature this is the first report of *Barilius bendelisis* a member of Cyprinidae family from the Kangsabati Reservoir, under Damodar basin, Ganga River system in West Bengal. The species is defined as a species of *Barilius* with dorsal profile is less convex than that of ventral; dorsal fin entirely inserted in advance of anal fin; lateral line complete with 40-42 scales and runs in the lower half of the body and predorsal scales 19; each scale with black spot and anal fin short with 8 branched rays. The paper also provides detailed diagnostic characters of the studied species.

Introduction

Barilius bendelisis was originally described by Hamilton in 1807 as *Cyprinus bendilisis*, based on the specimen collected from Cedawāti (Vedawati) stream, headwaters of Krishna River near Heriura, Mysore, which was later placed under the genus *Barilius* (Day, 1878). Subsequently, it has been reported by Hora and Mukerjee (1936), Lai and Chatterjee (1962), Singh (1964) and Grover (1970) from rivers of Doon valley, outer Himalaya, Uttarakhand, India. *Barilius bendelisis*, commonly known as Indian Hill Trout and Khoksa or joia (West Bengal), is an upland water fish of South East Asia, commonly distributed in Brahmaputra and

hills (Kurup *et al.*, 2004; Sahoo *et al.*, 2009). It belongs to the family Cyprinidae and dwells in shallow, clear and cold water (Gurung *et al.*, 2005). The fish contributes significantly to the capture fishery in several parts of the Himalayan region of Uttarakhand, where Indian major carps and exotic carps cannot be raised successfully (Mir *et al.*, 2015). The fish is characterized by its relatively elongated compressed body, blue black bars or spots on the body and dorsal fin present behind the middle of the body. The maximum length recorded for this fish species is 22.7 cm (Rahman, 1989). Adults of this fish are found in streams and rivers along the base of hills

(Talwar and Jhingran, 1991) with pebbly and rocky bottom (Menon, 1999). As per IUCN (2012) status this fish species has been categorized as of least concern (LC) but in the near future it is likely that over exploitation and habitat destruction may pose major threat to its fishery. The Kangsabati Reservoir in West Bengal, India, under Damodar basin is connected with the Ganga River system. Its ichthyofaunal diversity is poorly explored till date (Kumar *et al.*, 2017). Collections from the exploratory survey conducted under the present study from this Reservoir include an undescribed species of *Barilius* which is herein described as a new record.

Materials and Methods

A total of 3 number of specimens (n=3) of *B. bendelisis* (Image 1) were collected from Kangsabati Reservoir (23°02'31.8"N, 86°43'33.6"E) (Figure 1) by using cast net and gill net during October 2015. Measurements were made point to point on the left side of specimens wherever possible with dial calipers to the nearest 0.1 mm. The colour in fresh specimens was noted before fixation and preservation in 10% formalin (Kumar and Hassan 2015). Counts and measurements follow Kottelat (1990) and lateral line scale count, Kottelat (2001). Head length (HL) and anatomical measurements are expressed as proportions of standard length (SL) and subunits of head as proportions of head length (HL) (Dishma and Vishwanath 2012). Vertebral counts follow Weitzman (1962). Fin rays were counted under a stereo-zoom light microscope.

Results and Discussion

Description

Body elongated and compressed with moderately cleft mouth. One short pairs of barbels present. Dorsal profile is less convex than that of ventral. Dorsal fin higher than the

length of its base; it commences nearer the base of the caudal fin than the tip of snout and does extend to over the anal fin and is inserted posterior to the ventral. Dorsal fin entirely inserted in advance of anal fin. Lateral line complete with 40-42 scales and runs in the lower half of the body and predorsal scales 19. Each scale with black spot and anal fin short with 8 branched rays.

D ii 7; P 13-14; V 9; A ii 8; C 18

The morphometric details of the specimen i.e., total length, standard length, body depth, length of the snout, fork length, body depth, post orbital length of head, diameter of eye, inter orbital distance, inter nostril distance, head length, head depth, head width etc. are given in table 1. In all the biometric characters, body proportions and colour pattern, the specimen agrees with the description given by Hamilton (1807); Talwar and Jhingran (1991); Rahman (1989); Jayaram (2010) and Shafi and Quaddus (2001).

Colour

Body is silvery with greyish black dark bands descending towards the lateral line and becoming indistinct in older specimens. Fins whitish tinged with orange. Margin of dorsal and caudal are greyish. Colour pattern shows that there are blotches descending to lateral line and the fins are yellow tinted with black edges. They are brightly coloured, with golden yellowish operculum, greenish snout, orange coloured lower jaw, small tubercles on both jaws, orange fringes on the paired and anal fins, and with yellowish but black-margined caudal fin. Each scale in the adult is with a black spot at its base, and each forming the lateral line.

Habitat and ecology

The Kangsabati Reservoir is a tributary of Damodar River and which is a part of Ganga

River system. The sampling site is located around 50 km away from the Bankura district (23°02'31.8"N, 86°43'33.6"E) of West Bengal. The average physico-chemical properties of the sampling site was pH- 7.87, depth- 2.83 m, transparency- 127.7 cm, water temperature- 23 °C, dissolved oxygen- 6.8 and specific conductivity- 158.4 µs/cm. The downstream is highly disturbed due to anthropogenic activities e.g. boating, bathing, construction activities etc. This species was not observed in the downstream of the river. The species is found to inhabit streams and rivers along the base of hills with pebbly and sandy bottom. Adults occur in streams and

rivers along the base of hills with pebbly and rocky bottom.

Distribution

The published information on the distribution of *B. bendelisis* has been presented in table 2. Occurrence of this species have also been reported from hill stream and rivers with rocky bottom (Rahman, 2005; IUCN Bangladesh, 2000). This species is an important commercial hill stream fish in Jammu and areas of eastern Himalaya (Talwar and Jhingran, 1991). This is a new distribution record from the Reservoir.

Table.1 Morphometric characters for *Barilius bendelisis*

Morphometric data	Specimen 1	Specimen 2	Specimen 3	Mean
Total length (mm)	65.4	120.9	96.2	94.17
Standard Length (mm)	52.6	97.5	78.1	76.07
In % of standard length				
Body Depth	26.05	25.74	27.14	26.31
Head Length	23.00	22.26	22.54	22.60
Caudal peduncle length	16.73	16.21	17.80	16.91
Caudal Peduncle depth	9.13	9.85	9.99	9.65
Upper Jaw length	10.46	15.08	16.90	14.14
Lower Jaw length	9.70	12.72	13.44	11.95
Dorsal Fin length	18.25	18.26	17.41	17.97
Pectoral Fin length	18.06	18.56	18.44	18.35
Pelvic Fin length	13.88	13.73	13.70	13.77
Anal Fin length	16.16	13.44	13.83	14.47
Caudal Fin length	22.62	22.36	23.69	22.89
Dorsal Fin Base length	10.65	11.59	12.16	11.47
Anal Fin base length	10.46	12.72	12.04	11.74
Pre Dorsal Length	48.29	58.77	55.31	54.12
Pre Pectoral Length	25.86	26.46	26.63	26.32
Pre Pelvic Length	49.81	52.82	52.88	51.84
Pre Anal Length	65.59	73.64	72.22	70.48
In % of head length				
Eye diameter	26.45	18.89	22.73	22.69
Head depth	64.46	80.64	78.98	74.69
Head Width	40.50	46.54	42.04	43.03

Table.2 Published information on distribution of *Barilius bendelisis*

S. No.	Occurrence	Source
1	Cedawati (Vedawati) stream, headwaters of Krishna River near Heriura, Mysore	Hamilton (1807)
2	Maungmagan, Tavoy District, Lower Burma	Hora and Mukerjee (1936)
3	Doon valley, Uttar Pradesh	Lai and Chatterjee (1962), Singh (1964)
4	Song River in Dun Valley, Uttar Pradesh	Grover (1970)
5	River Dikrong, Arunachal Pradesh	Sahoo <i>et al.</i> (2009)
6	River Buroi, Arunachal Pradesh	Hazarika <i>et al.</i> (2011)
7	Tributaries of Ramganga river, Western Himalaya	Atkore <i>et al.</i> (2011)
8	River Kosi, near Almora, Uttarakhand	Barat <i>et al.</i> (2012)
9	Ken River basin, Madhya Pradesh	Johnson <i>et al.</i> (2012)
10	Upper zone (Uttarakhand), Northern Himalayan, river Ganga	Sarkar <i>et al.</i> (2012)
11	Spring-fed hill-stream Relli, Darjeeling Himalaya, West Bengal	Acharjee and Barat (2014)
12	Garhwal Himalaya, India	Mir <i>et al.</i> (2015)
13	River Gaula, Kosi, Alaknanda and Mandakini, Central Indian Himalaya	Mir <i>et al.</i> (2015)
14	Bhavanisagar Reservoir, Tamil Nadu	Raja <i>et al.</i> (2015)

Fig.1 Map showing locality of *Barilius bendelisis* indicated as a star

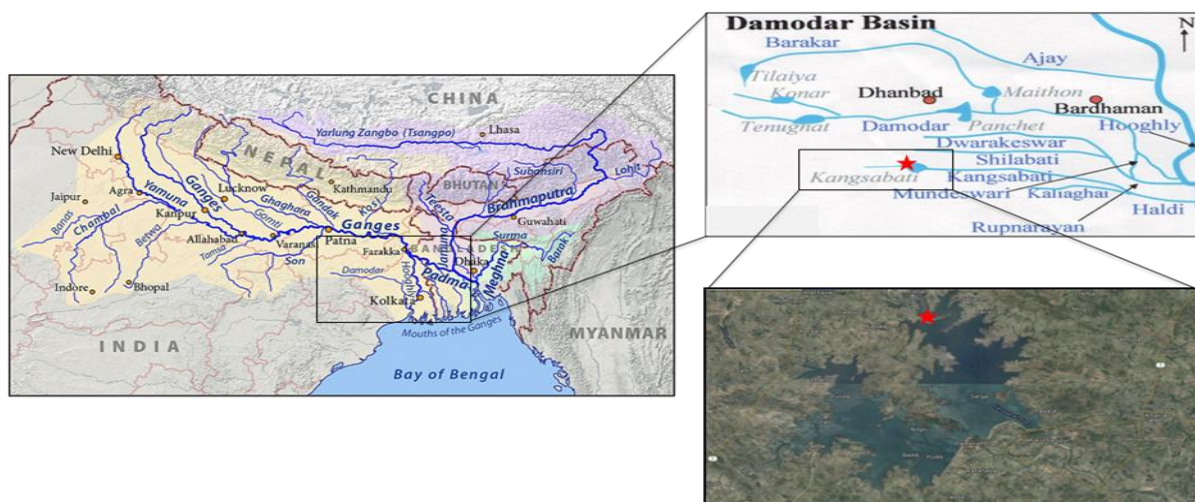
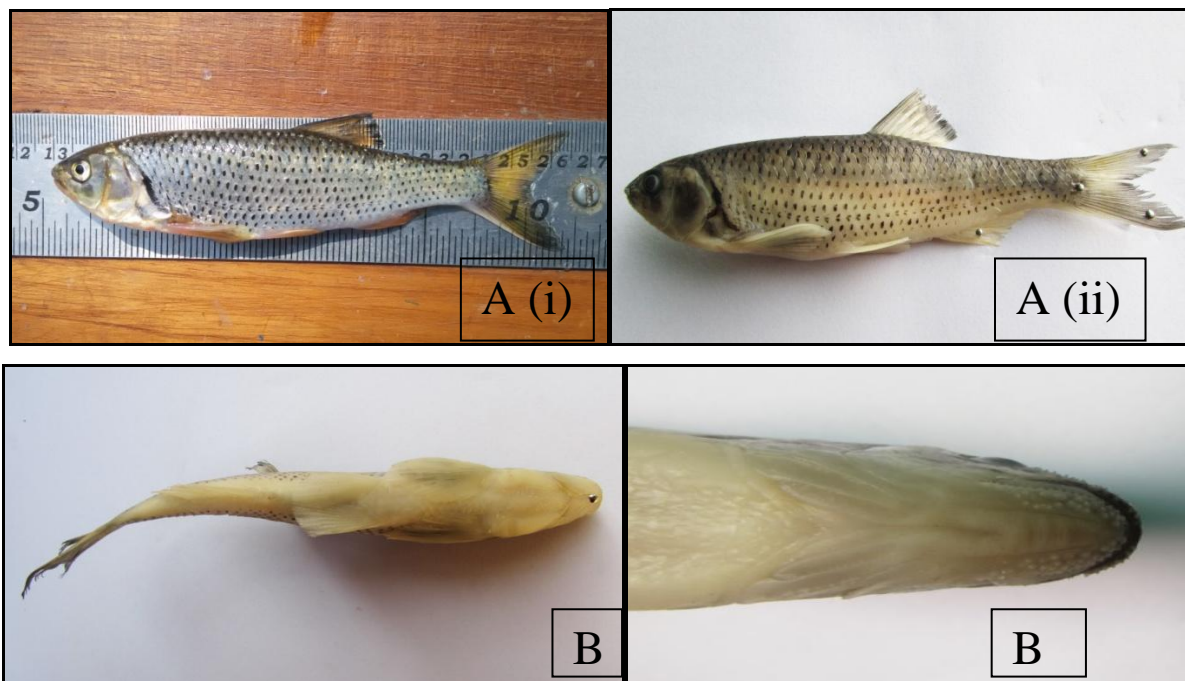


Image.1 *Barilius bendelisis* (A) Side view, i- fresh specimen, ii- formalin preserved specimen
(B) Ventral view



In the present study, *B. bendelisis* of the genus *Barilius* from Kangsabati Reservoir, West Bengal, India, have been examined in detail and described from this region for the first time. The genus *Barilius* is represented by 34 species reported from Asian region and some of the commonly available species are namely *B. ardens*, *B. bakeri*, *B. bernatziki*, *B. bonarensis*, *B. canarensis* etc.

Talwar and Jhingran (1991) and Jayaram (2010) reported coloration of the body, presence of barbels, anal fin shape with branched rays, number of scales in lateral line with black spot in *B. bendelisis*. The morphometric and meristic characteristics of the specimens collected have been found to be similar when compared with already reported specimens of *Barilius bendelisis*. The diagnostic features (Table 1) also distinctly show that the species under report, *B. bendelisis* could be readily separated from all the reported species as well as the synonymies

of the Genus *Barilius* (Day, 1878; Talwar and Jhingran, 1991; Menon, 1999; Jayaram, 1999; Vishwanath and Manoj Kumar, 2002). *B. bendelisis* was one of the common species caught in the Kangsabati Reservoir during the monsoon. It is esteemed in the region for its taste and highly priced. The fish migrates upstream from April to July and return from August to November. In other seasons, it was not present, as reported by fisherman.

The new record of *B. bendelisis* from Kangsabati Reservoir, West Bengal, India, under Damodar basin, Ganga River system has thrown a new light on the distribution of Indian hill trout in the lower stretches unlike its restricted distribution to the upper stretches of Himalayan Rivers as reported earlier. However, further studies are needed to determine the habitat preference, feeding habit and reproductive behaviour of the species so that any variability of the reported species could be further observed, if any.

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