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Catfish (Teleostei: Siluriformes) diversity in Karala River of Jalpaiguri District, West Bengal, India

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Abstract: The diversity of fresh water catfish fauna of the Karala River in Jalpaiguri District of West Bengal was studied from February 2009 to January 2010. A total of seven species belonging to six genera and six families were identified. Bagridae was the dominant family with two representatives, whereas Amblycepitidae, Chacidae, Olyridae, Sisoridae and Siluridae were each represented by single species. Maximum fish diversity was recorded higher in Hakim Para (H′ =1.266) as compared with DasPara (H′ =1.218) and Aquiduct (H′ =1.04). The evenness index at three sampling stations indicates uneven distribution of catfish in this tributary, possibly due to the irregular depth of river, occurrence of submerged vegetation and physicochemical water characteristics.

Keywords: Bagridae, Catfish, Karala River, Siluriformes fishes.

The major riverine fishery resources of northern West Bengal are provided by the Teesta, Torsha, Jaldhaka, Mahananda, Raidak, Sankosh, Kaljani, Korotoa, Punarbhaba and Atrai river systems. The Teesta originates from Jemu glacier in Sikkim and is the largest river of northern West Bengal, passing through the districts of Darjeeling, Jalpaiguri and Mekhliganj subdivision of Coochbehar and meeting the Brahmaputra (known as Yamuna in Bangladesh). The main stream is connected by several tributaries including the Karala (also known as Kalla), which originates from the Baikunthapur forest and flows down into the Teesta near Mandal Ghat in Jalpaiguri Town, bisecting Jalpaiguri District (located on the confluence of river Teesta and Karala). The total catchment area is 141km^2, most of which is covered by arable land. The basin of this river sustains life and livelihoods of tea gardeners, fishermen and slum-dwellers.

So far as ichthyofauna diversity in northern Bengal is concerned, the earliest report is by Shaw & Shebbeare (1937), who reported 131 species from the rivers, streams and ponds in the hills and plains of the Darjeeling District and the adjoining Duars. Of these 131 species they reported 34 species of catfish. Hora & Gupta (1941) reported on a small collection of fish from Kalimpong, Duars and Tarai, adding two species to this list. In 1977 Jayaram & Singh reported 26 species of catfish from the Tengan-Mahananda confluence, the Atrai, Purnabhasa, Dharla (at Changrabandha), Kalindri, Mahananda (at Malda Town), Jamuna (at Hilli Village of Balurghat), Teesta, Karotayar, Panga, Balasan and Jaldhaka. None of these sites were connected with the Karala River, thus the present study represents the first attempt to study ichthyofauna diversity in this lotic system and determine fresh water catfish resources, distribution, diversity and status on the basis of catch frequency.

Materials and Methods

Fortnightly fishes were captured from three different study sites (Fig. 1) of the Karala River. Station-I (Aquiduct) is located near the origin of the river at 26^{0}47’13”N & 88^{0}32’17”E, 122m elevation. From Jalpaiguri town its distance by bus route is 32km, water

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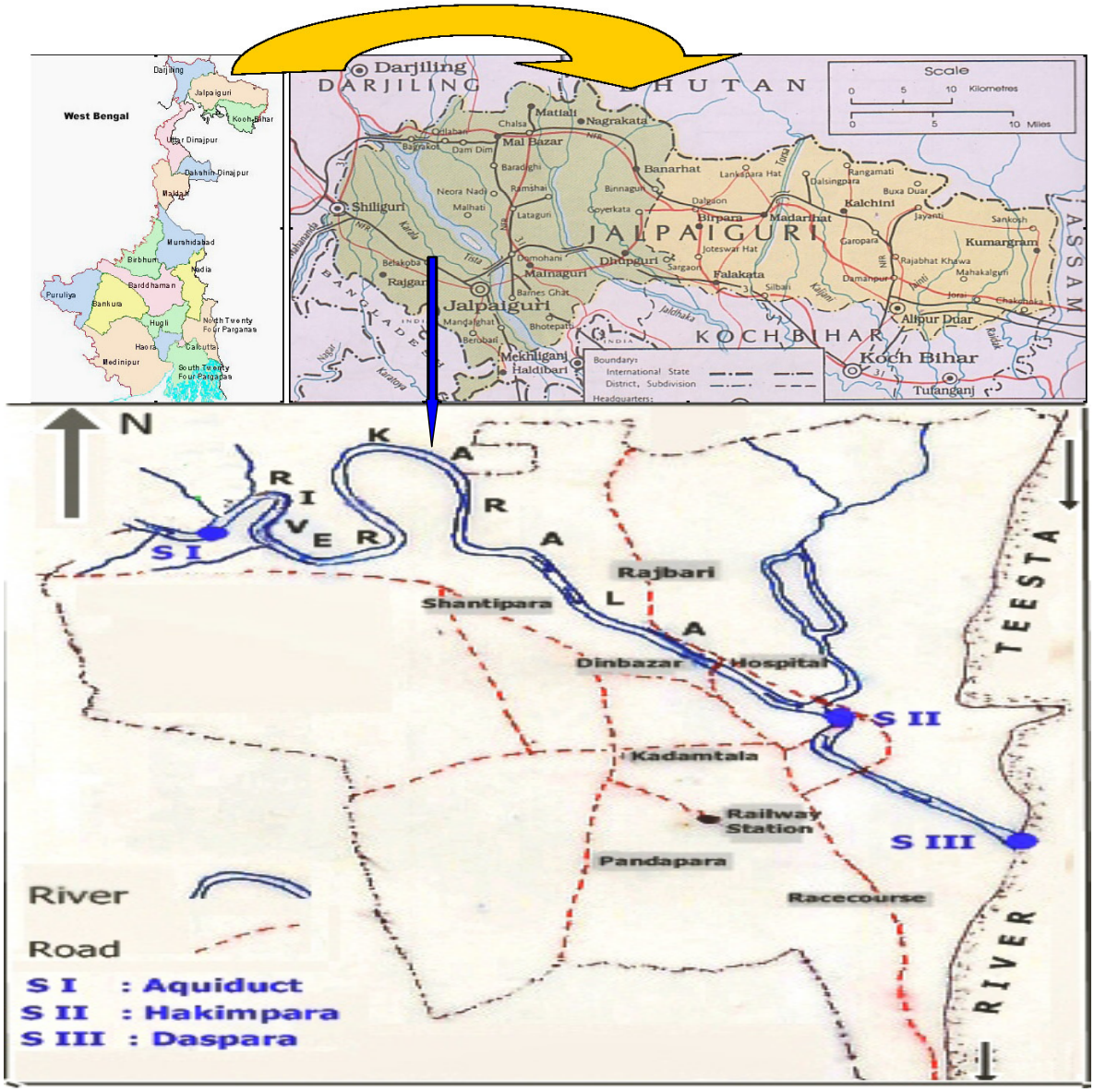

Figure 1. Origin and distribution of Karala River with three different study sites

depth is 0.4 to 0.6 m pre-and-post monsoon, rising during rain and flood 4 to 5.5 m. At station-I fish were captured by cast net (mesh size 6x6 mm) and naphi jal (local contrivance, mesh size 5x5 mm). Station-II is located in the heart of the district town and behind the hospital and market (Hakim Para) at 26^{0}31’51”N & 88^{0}43’23”E, 86m elevation. From Jalpaiguri District town its distance by bus route is 0.5km, regular water depth is 3.7 to 5.2 m during pre-and-post monsoon, during rain fall and flood the depth increase to 6.6 to 7.6 m. Station-III is located at the junction of Teesta and Karala near Daspara at 26^{0}28’42”N & 88^{0}44’27”E, 81m elevation. From Jalpaiguri district town its distance by bus route is 7km, regular water depth is 3.7 to 4.6 m during pre- and post-monsoon and during rain fall and flood it increases to 6.1 to 7 m. In station II and III fishes were captured by vessel net or khara jal (local contrivance, mesh size 6x6 mm), gill net (variable mesh sizes), and cast net (5x5 mm mesh size). Colour, colour patterns, spots etc. were noted immediately after capture and photographs were taken by Nikon Coolpix S4, fishes were killed by formalin solution containing one part commercial formalin (37–40 % HCHO) + nine part glass distilled water and 7g Borax/liter (Jayaram 1981). All samples were kept in this buffer formalin solution for 4–5 hours for proper

Table 1. Species diversity of cat fishes and their local name, status and fishery importance.

	Scientific Name	English Name	Local Name	Status (According to catch frequency)	Threat status (Barman 2007)
1	Bagridae *Mystus bleekeri* (Day)	Day's Mystus	Golsha Tengra or Palwa Tangra	Rare in S-II and S-III	Vulnerable
2	Bagridae *Mystus tengara* (Hamilton)	Tengara Mystus	Halud or Kalo Tengra	Common in both S-II and S-III.	Out of danger
3	Amblycipitidae *Amblyceps mangois* (Hamilton)	Indian Torrent Catfish	Ban Magoor	Common in S-I during entire study.	Near Threatened
4	Chacidae *Chaca chaca* (Hamilton)	Squarehead Catfish	Chaga or Chag-bega.	Common in S-II and S-III.	Out of danger
5	Olyridae *Olyra longicaudata* McClelland	Longtail Catfish	Bot Singhi, Ranghang.	Abundant in S-I.	Out of danger
6	Siluridae *Wallago attu* (Bloch & Schneider)	Wallago or Fresh Water Shark	Bowal	Occasional in S-II and S-III	Near Threatened
7	Sisoridae *Erethistoides montana montana* Hora	Nil	Kutakanti' or Kurkati.	Common in S-I.	Out of danger

fixation. Catfish were segregated from the master stock and subsequently identified by the literature of Jayaram (1999, 2006) and Talwar & Jhingran (1991). Scientific names were confirmed from freshwater fish section of ZSI, Kolkata.

The frequency of occurrence of each species was calculated based on the number of occasions the species was collected during the samplings. The status was determined with the help of a standard catch frequency chart presented by Tamang et al. 2007 (Catch frequency 91-100 % = Common, 81-90 = Abundant, 61-80 = Frequent, 31-59 = Occasional, 15-30= Sporadic, 05-14= Rare and <5% = Extremely rare). Threat status and endemism were assigned following Barman (2007). The diversity and evenness indices were calculated according to Shannon-Weaner (1949) and Pielou (1975). Capture of fish was done from 0800 to 1300 hr each sampling day. The study was carried out from February 2009 to January 2010.

Results

A total of seven species belonging to six families and six genera were collected. They have naked skin or bony scute or plates, scales are always absent. Their oral portion contains nearly always 1–4 pairs of barbells. The atlas, axis, 3rd and 4th vertebrae are ossified and form a complex vertebra. An analysis of the taxonomic composition of the catfish fauna suggests Bagridae to be the most dominant family with two representatives occurring at SII and SIII. Amblycepitidae, Chacidae, Olyridae, Sisoridae and Siluridae each had a single species representation. A check list of captured fish, local names, status (on the basis of catch frequency) and threat status is presented in Table 1. On the basis of catch frequency *Amblyceps mangois* (Image 1) and *Erethistoides montana montana* (Image 2) were common, and *Olyra longicaudata* (Image 3) was abundant at upstream (SI). They were extremely rare at SII and not captured at SIII. This observation indicates that the above three catfishes are hill stream fish representatives and prefer low current and least water depth. The *Mystus tengara* (Image 4) and *Chaca chaca* (Image 5) are common,

Image 1. *Amblyceps mangois* (Hamilton)

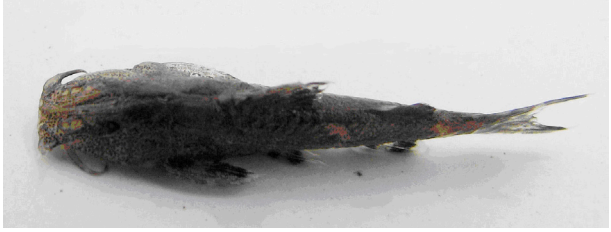

Image 2. *Erethistoides montana montana* Hora

Image 3. *Olyra longicaudata* McClelland

Image 4. *Mystus tengara* (Hamilton)

Image 5. *Chaca chaca* (Hamilton)

Image 6. *Wallago attu* (Bloch & Schneider)

Image 7. *Mystus bleekeri* (Day)

Wallago attu (Image 6) was occasional and *Mystus bleekeri* (Image 7) was rare in both SII and SIII. The species richness in three sampling sites of this river showed considerable variation and higher richness was recorded in the mid to down stream. Maximum species richness was recorded from SII (Hakimpara, total number = 06) and SIII (Daspara, total species = 04) while lower species richness was recorded from SI (Aquiduct, total number = 03) respectively. The species diversity index of different sampling sites was ranged from 1.04 to 1.218. In this study maximum fish diversity was recorded higher in SII (H′ = 1.266) as compared with SIII (H′ = 1.218) and SI (H′ = 1.04) and indicates good correlation with over all species richness across the sites. The evenness index at three sapling stations (SI = 0.947, SII = 0.707 and SIII = 0.879) indicates uneven distribution of catfishes in this tributary.

Discussion and Conclusions

The knowledge of ichthyofaunal diversity, their present threat status, role in ecosystem and human economy are prerequisites for adopting the proper conservation strategies of fish fauna. The present study has recorded seven species of catfishes from Karala River, a tributary of the river Teesta. In this lotic system they were distributed unevenly, down streams were richest and more diversified than upstream. At down streams, the highest organic load occurs that cause the productivity. Sub-merged weeds of SII (Hakim Para) and SIII (Daspara) provide the shelter and food of fishes. For these reasons the diversity is high. It also may be due to the heterogeneous depth of water body due to silting, abundance of prey, substratum soil quality and physico-chemical features of water like temperature, pH, turbidity, total solid, dissolved oxygen, BOD etc. Three species are threatened catfishes of India found

in this river (Table 1). Among these three species, one has been designated as Vulnerable and two have been designated as Near Threatened by Barman (2007). The rest are data deficient or out of danger. The only species *Erethistoides montana montana* Hora is endemic to northern Bengal (Barman 2007). The cause of threatening may be due to the habitat loss, habitat degradation, over exploitation, pollution and unscientific capture technology.

Till date it is unfortunate that the Karala River of Jalpaiguri District has not received any attention from the ichthyological aspects. This report gains importance as the Karala River has been described as one of the most important tributaries of Teesta.

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