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FISH FAUNA OF MAJOR RIVERS OF DARJEELING DISTRICT, WITH SPECIAL REFERENCE TO THEIR CONSERVATION STATUS

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INTRODUCTION

Freshwater fishes represent the most diverse group of Indian vertebrates with minimum of 600 species (Talwar & Jhingran, 1991). In freshwater fish diversity India is eighth in the world and third in the Asia (Kottelat and Whitten, 1996). Recent conservation assessment reveals that 88 species in Western Ghat streams and 82 species in Eastern Himalayas are in threatened category. West Bengal possesses 59 threatened freshwater fish species of India (Menon, 1999 & 2004). Considering the presence of a number of the threatened and endemic species in North Bengal, the region may be described as the 'Hot Spot' of the fish resource of West Bengal (Barman, 2007).

Darjeeling, the north western district of West Bengal, lies between 26°31´N and 27°13´N latitude and between 87°59´E and 88°53´E longitude. This district is full of rivers, canals and jhoras. Rivers like Mechi, Balason, Mahananda and Teesta represent the major water resources of this district. Darjeeling is thickly interspersed with innumerable hill streams, some of which are potential sources of fish supply. The rich ichthyofaunal resources of these hill streams have never been explored before. Previously Shaw and Shebbeare (1937) recorded 131 species of fishes from different water bodies of Darjeeling and Jalpaiguri. The present work is an attempt to illustrate the status of different fish species available in District Darjeeling.

MATERIALS AND METHODS

Present work is based on extensive field survey and fish sampling conducted from September, 2005 to August, 2007.

I. *Site descriptions*

Surveys and fish sampling were conducted at 5 stations/sites of Darjeeling District according to the probable availability of fish fauna (Figure-I).

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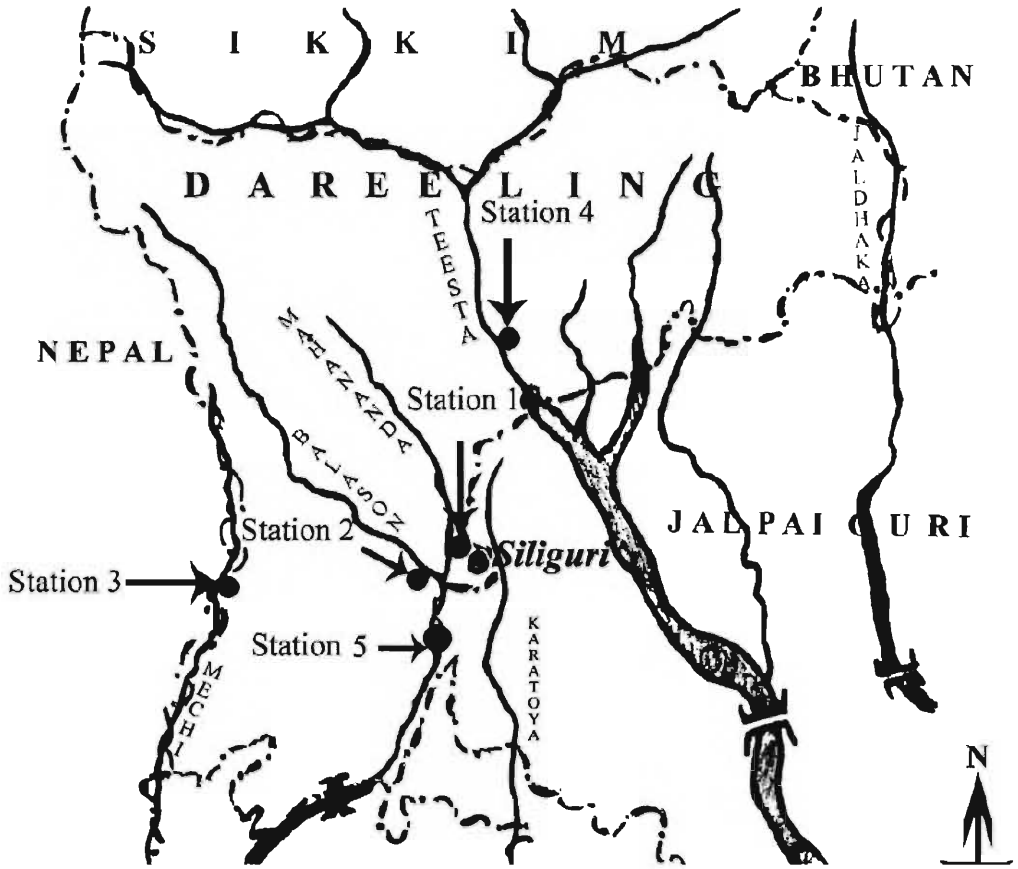

Fig. I. Map of Darjeeling representing the five sampling stations.

Station 1 : It is a fish sampling site at River Mahananda near Siliguri with geographical position 26°43´N and 88°25´E.

Station 2 : Fish fauna of river Balason were sampled near Matigarah village with geographical position 26°41´N and 88°24´E.

Station 3 : Mechi river originates from the hills of the border of Nepal. Our sampling was done from this river near Naxalbari (26°44´N and 88°25´E).

Station 4 : Fish sampling from river Teesta was done near Teesta Bazar of Kalimpong (27°54'N and 88°25'E).

Station 5 : Fulbari Barrage on river Mahananda was chosen as fish sampling site (26°38'N and 88°24'E). It is situated at the border between Darjeeling and Jalpaiguri district where water of River Teesta is channelized to river Mahananda as a part of the Teesta River Valley Project. The

reservoir indicates the association of important rivers and canals of District Darjeeling. Therefore, it is not so difficult to assume that fish fauna of the Mahananda reservoir significantly represents a larger section of fishes of this district.

II. *Collection and Identification of fishes*

The data is based on fish collection from rivers, direct field observations and information sampling. The fishermen used different types of gill nets and cast nets for fishing. Locally known Ber jal, Khapla jal, Porongi jal (Hand lift net) and Bhasal jal (Dip Net) are very commonly used in the different fishing sites of Darjeeling. Questionnaires were administered to collect the information regarding changing pattern of the rivers and fish distribution. Fish sampling involved collection at the water bodies of the above mentioned five stations and related local markets.

Collected samples were preserved in 4-8% formaldehyde solution and a longitudinal incision was made along the abdomen for larger specimens. Collected fish samples were identified after Day (1878), Jayaram (1999) and Talwar & Jhingran (1991). Identification was confirmed by the help of Zoological Survey of India, Kolkata.

RESULTS

The present work reports a total of 71 species from 48 genera, 20 families and 8 orders. In accordance with Conservation Assessment and Management Plan (CAMP) report (1998), out of 74 species 1 is categorized as Critically Endangered (CR), 8 Endangered (EN), 14 Vulnerable (VU), 1 Data Deficient (DD), 25 Lower Risk near threatened (LR-nt), 4 Lower Risk least concern (LR-lc) and about 18 species are Not Evaluated (NE) yet (Table-1).

DISCUSSION

The survey result shows that among the total fish species collected, Order Cypriniformes holds a major portion of the Darjeeling district's fish fauna. Fishes of the Family Cyprinidae is most abundant (39% of the total fish species) followed by the Family Balitoridae (11%) as loaches are found at the upper course of River Teesta and Mahananda (Figure-II).

The present study reveals that percentage of fishes under the threatened category have raised almost up to 30%. More precisely, 11% of the total fish species have become Endangered, 20% have become vulnerable and one species namely *Pangasius pangasius* (Ham) is considered as Critically Endangered (on the basis of the report of BCPP-CAMP workshop, 1998). Status of the 25% of the total collected species is yet to be evaluated (Figure-III).

As our survey was concentrated around the southern portion of Darjeeling, upper hill stream and jhoras still remain unexplored. Reviewing the previous references it has been revealed that a major number of hill stream fishes (loaches) of this particular area have declined. The major causes behind this decline may be attributed to consecutive flood of river Teesta causing habitat destruction of loaches and other tiny species. River Teesta has experienced consecutive floods since 1960. This resulted in the destruction of breeding ground of many fish species. Siltation due to catchment

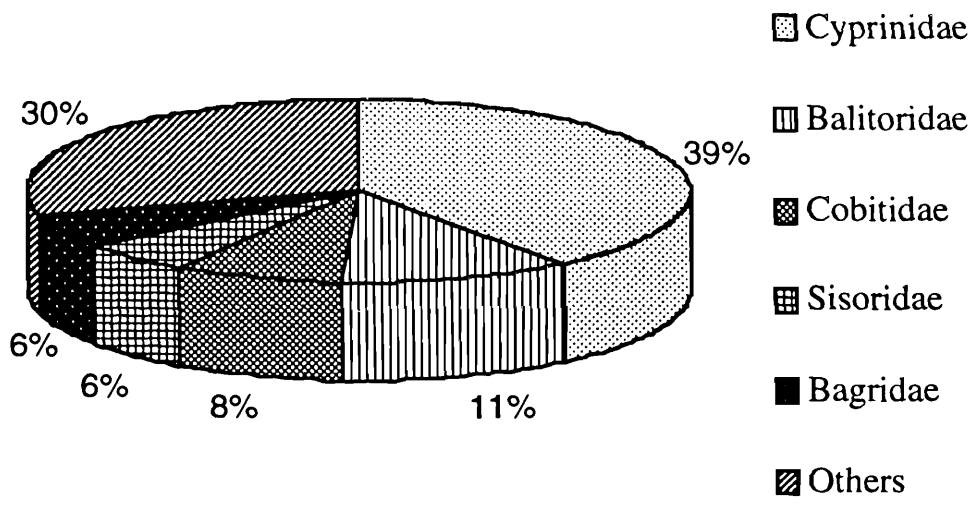

Fig. II. Percentage of major families representing fish species in the Darjeeling district of West Bengal.

erosion or waste dumping makes the water column shallow, depriving Mahaseers (*Tor* sp.) and other larger fishes their habitat. Fishes like Boroli (*Barilius* sp.) have also shown significant decline as a result of excessive harvesting due to their high food value and demand.

Pollution has also driven significant population decline or loss. Not a single species of *Nandus nandus* was found during our survey period, but this fish was abundant here as recorded by Shaw and Shebbeare (1937).

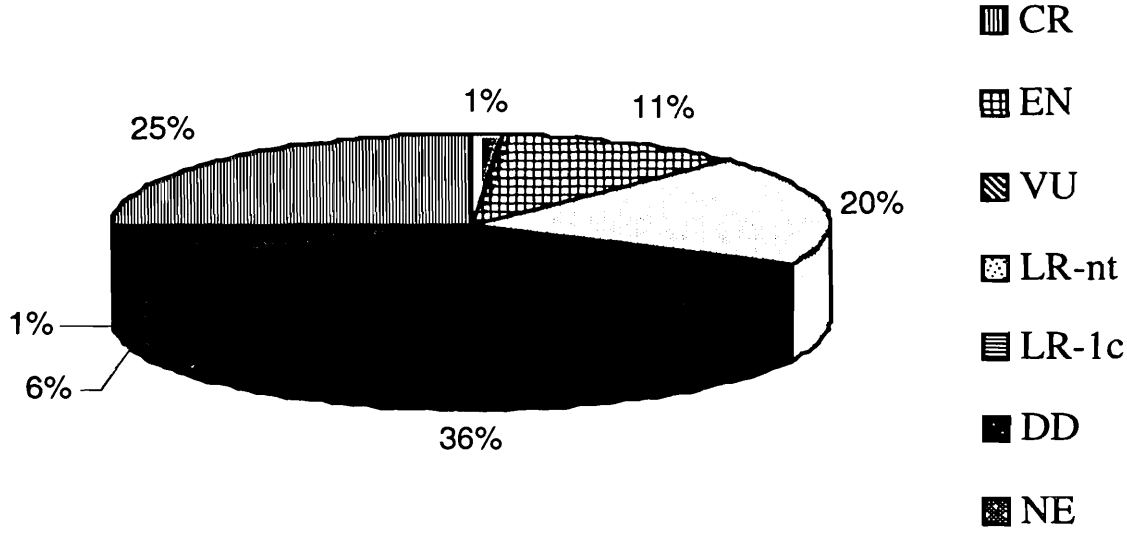

Fig. III. Percentage of conservation status representing fish species of Darjeeling district.

Hara horai (Misra), a Sisorid fish is actually suggested as endemic to North Bengal (Barman, 2007). Another endemic fish *Aborichthys elongatus* (Hora) of Family Balitoridae can be suggested as endangered according to the BCPP-CAMP report.

Table-I. List of the fishes recorded from Darjeeling district

Order	Family	Scientific Name	Local name	Status	Distribution				
					1	2	3	4	5
Cypriniformes	Cyprinidae	*Aspidoparia morar* (Ham.)	Chela	LRnt	+	-	-	-	-
		Barilius bendilesis (Ham.)	Joia, Guderi	LRnt	-	-	-	+	+
		Barilius vagra (Ham.)	Boroli	VU	+	-	-	+	+
		Barilius shacra (Ham.)	Koksa, Na-borna	LRnt	+	-	-	+	+
		Chagunius chagunio (Ham.)	Jerruah	NE	+	+	-	-	+
		Chela laubuca (Ham.)	Bekichela, Dankena	LRlc	-	-	+	-	-
		Crossocheilus latius (Ham)	Lahari	DD	-	-	-	+	-
		Danio aequipinnatus (McClelland)	Chebli, Bhitti	LRnt	-	+	-	+	+
		Danio dangila (Ham.)	Nipati	NE	+	-	-	+	-
		Esomus danricus (Ham.)	Danrika	LRlc	-	+	-	+	+
		Garra annandalei (Hora)	Choak-si, Ghor-poia	NE	+	-	-	-	-
		Garra gotyla (Gray)	Budena	VU	+	-	-	+	+
		Labeo boga (Ham)	Bogabata, Bangan	LRnt	+	-	-	+	+
		Labeo dero (Ham)	Kursa, Katalkusi, Gardi	VU	-	-	-	+	-
		Labeo gonius (Ham.)	Kurchi, Goni	LRnt	+	-	-	+	+
		Labeo pangusia (Ham)	Utti	LRnt	+	-	-	-	-
		Neolissocheilus hexagonlepis (Mc Clelland)	Katli	NE	-	-	-	+	+
		Puntius conchonius (Ham.)	Kanchan-punti	VU	+	+	-	+	+
		Puntius gelius (Ham)	Gilli-punti	NE	+	-	-	-	+
		Puntius sarana sarana (Ham)	Swornopunti	LRnt	+	-	-	+	+
		Puntius phutunio (Ham)	Phutuni-punti	LRlc	+	-	-	-	+

Table-I. ***(Cont'd)***

Order	Family	Scientific Name	Local name	Status	Distribution				
					1	2	3	4	5
		Puntius terio (Ham)	Teri- punti	LRnt	+	-	-	-	-
		Puntius sophore (Ham)	Punti	LRnt	+	-	-	-	+
		Puntius ticto (Ham)	Tita- punti	LRnt	+	-	-	-	+
		Raiamas bola (Ham.)		VU	+	-	-	-	-
		Schizothorax richardsonii (Gray)	Nak-Katwa, Asala	VU	-	+	-	-	-
		Semiplotus semiplotus (Gray)	Chepti, Badangi	VU	-	-	+	+	+
		Tor putitora (Ham.)	Mahaseer	EN	-	-	-	+	+
Cypriniformes	Balitoridae	*Aborichthys elongatus* (Hora)	Langai	EN	-	-	-	+	-
		Balitora brucei (Gray)	Tita- Kabri	LRnt	+	-	-	+	-
		Schistura beavani (Gunther)	Pola	NE	+	+	-	+	+
		Acanthocobitis botia (Ham)	Pola	LRnt	+	-	-	+	+
		Nemacheilus devdevi (Hora)	Khorika	NE	-	-	-	+	+
		Nemacheilus multifasciatus (Day)	Khorkey	EN	-	-	-	+	-
		Schistura rupecula (Mc Clelland)	Rupali-Khorkey	LRnt	-	-	-	+	-
		Nemacheilus shebbearei (Hora)	Khorika	NE	-	-	-	+	-
	Cobitidae	*Pangio pangia* (Ham)	Pangya	NE	-	+	-	-	-
		Botia dario (Ham)	Balabotia	NE	-	-	-	+	-
		Lepidocephalichthys annandalei (Chaudhuri)	Poa, Poia	LRnt	-	+	-	-	+
		Lepidocephalichthys berdmorei (Blyth)	Guntel	EN	+	-	-	+	+
		Lepidocephalychthys guntea (Ham.)	Guntel	NE	+	+	-	-	+
		Somileptes gongota (Ham)	Nadiaari Maachh	VU	-	+	-	+	+

Table-I. ***(Cont'd)***

Order	Family	Scientific Name	Local name	Status	Distribution				
					1	2	3	4	5
	Psilorhynchidae	*Psilorhynchus sucatio* (Ham.)	Chepti	EN	-	-	-	+	-
Siluriformes	Bagridae	*Mystus bleekeri* (Day)	Tengra, Golsa tengra	VU	+	+	-	+	+
		Mystus cavasius (Day)	Kabasi tengra, Tengra	LRnt	-	+	-	-	-
		Mystus vittatus (Bloch)	Tengra, Golsa tengra	VU	-	+	+	-	+
		Rita rita (Ham.)	Rita, Reta	LRnt	-	+	-	+	+
	Siluridae	*Ompok pabda* (Ham)	Pabda	EN	+	-	-	-	+
		Ompok pabo (Ham)	Pabda	NE	+	-	-	-	-
	Pangasidae	*Pangasius pangasius* (Ham)	Pangas	CR	-	+	+	-	-
	Schilbeidae	*Pseudetropius atherinoides* (Bloch)	Doya, Potasi	EN	-	-	-	+	-
		Silonia silondia (Ham.)	Utti	LRnt	-	-	-	+	+
	Sisoridae	*Bagarius bagarius* (Ham)	Bagha-ar	VU	+	-	-	+	+
		Hara horai (Misra)	Kala-kabri	EN	-	-	-	+	-
		Hara jerdoni (Day)	Tinkantiya	NE	-	-	-	+	-
		Pseudecheneis sulcatas (McClelland)	Kabri	VU	-	-	-	+	-
	Heteropneustidae	*Heteropneustes fossilis* (Bloch)	Singhi	VU	-	+	-	-	-
Siluriformes	Chacidae	*Chaca chaca* (Ham.)	Chega, Chaka	NE	-	-	+	+	-
		Olyra longicaudata (McClelland)	Bot-singhi	NE	+	-	-	+	+
Perciformes	Badidae	*Badis badis* (Ham.)	Bot-koi	NE	+	-	-	-	+
	Osphronemidae	*Polyacanthus fasciatus* (Schneider)	Kholisa	LRnt	-	+	-	-	+
		Ctenops nobilis (McClelland)	Koleehona	NE	-	-	-	+	+

Table-I. ***(Cont'd)***

Order	Family	Scientific Name	Local name	Status	Distribution				
					1	2	3	4	5
	Ambassidae	*Pseudambassis ranga* (Ham.)	Chanda	NE	+	-	-	-	-
	Channidae	*Channa orientalis* (Bloch & Schneider)	Taki	VU	-	+	+	-	-
		Channa punctatus (Bloch)	Taki	LRnt	-	+	+	-	-
Synbranchiformes	Mastacembelidae	*Macrognathus aral* (Bloch & Schneider)	Baan-Maachh	LRnt	+	+	-	+	+
		Macrognathus pancalus (Ham.)	Pankal	LRnt	-	-	-	+	+
Tetraodontiformes	Tetraodontidae	*Tetraodon cutcutia* (Ham.)	Tepa	LRnt	+	-	-	+	-
Clupeiformes	Clupeidae	*Gudusia chapra* (Ham.)	Khoira	LRlc	-	+	-	-	+
Osteoglossiformes	Notopteridae	*Notopterous notopterous* (Pallas)	Pholui	LRnt	-	+	+	-	+
Beloniformes	Belonidae	*Xenentodon cancila* (Ham.)	Kakla	LRnt	+	+	-	+	+

Critically Endangered = CR; Endangered = EN; Vulnerable = VU; Lower Risk - near threatened = LR-nt; Lower Risk - least concern = LR-lc; Date Deficient = DD; Not Evaluated = NE; Present = +; Absent = - ;

CONCLUDING REMARK

The water bodies of District Darjeeling have undergone several major changes during the past few years through deforestation, flood and other activities. These changes have attributed to the changes in the composition of fish fauna. Several species may have become extinct from this region, which is yet to be proven. Conservation status of the freshwater fishes of this region is very poor. Despite the discovery of several new species to date, the rate of increase of pressure on these is so high that extinction may be expected even before discovery. The NBFGR's conservation research strategies should be implemented with immediate effect. Moreover, thorough exploration of hill streams and jhoras may provide ample information about the fish fauna of this district.

ACKNOWLEDGEMENT

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