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Present Status of Ichthyofaunal Diversity of Gadadhar River at Cooch Behar District, West Bengal, India

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ABSTRACT

Fish is most important aquatic fauna, directly or indirectly related with human health and wealth. Rivers are one of the major sources of rich variety of fish species. A study was carried out during April 2013-March 2015 to record the present fish diversity in different sites of river Gadadhar at Cooch Behar District, West Bengal. The aim of the study was explore the fish fauna of Gadadhar River. The result of present investigation reveals the occurrence of 73 fish species belonging to 21 families and 45 genera. The family cyprinidae represented the largest diversity accommodating 17 genera and 32 species. References to conservation status categories based on IUCN classification as per CAMP-NBFGR,9.58% of the recorded fishes belonged to lower risk near threatened(LRnt) ,47.94% lower risk least concern (LRlc) ,26.02% vulnerable (VU) , 9.58% endangered (EN), 1.36% critically endangered (CEN), 1.36% not evaluated (NE)and 4.1% data deficient (DD) category. It is concluded that, the conservation of Ichthyodiversity is important for sustainable livelihood of fisherman and also essential for Socio-economic development of the country.

Key words: *Ichthyofaunal diversity, Gadadhar river, Cooch Behar, Ornamental fish, Conservation status.*

INTRODUCTION

India is a megadiverse nation, housing around 10% of worlds species . North Bengal comprising the districts of Jalpaiguri, Darjelling, Dinajpur and Cooch Behar lies at the foothill of the great Himalayas. The area covers the most and dense riverine forests of the Bengal Dooars. The unique climatic and ecological conditions makes North Bengal an Unique home for a large variety of mega-fauna and flora . Cooch Behar district of North Bengal lying between 25° 57” 47” to 26° 36’2” north latitude and between 89° 54’ 35” to 88° 47’ 44” East longitude, is very unique in its topography and climatic characteristics and a total water stretch of more than6121 ha including hill stream rivers, beels and other aqua culture resources.In India there are 2,500 species of fishes of which 930 live in fresh water and 1,570 are marine (kar *et al.*,[1]). Day[2] describes 1418 species of fish under 342 genera from British India. Jayaram[3], listed 742 fresh water species of fishes coming under 233 genera, 64 families and 16 orders from the Indian region. Talwar[4] and Jhingran[4] estimated 2546 species of fish belonging to 969 genera, 254 families and 40 orders from India. Recently, Jayaram[5] grouped and estimated 852 species of fishes belonging to 71 families and 16 orders from the Indian region.

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The total riverine network of Cooch Behar include some major rivers like Torsa, Ghargharia, Kaljani, Gadadhar etc. which are the potential source, of huge indigenous fish diversity along with a considerable number of ornamental fish population. Dey *et al*.,[6] reported that 46 indigenous ornamental fish species belonging to 11 orders, 21 families, 29 genera were collected and identified from Ghargharia river. Dey *et al.*[7] reported that about138 fish species were recorded in the kaljani river which belonged to 31 families. Few workers have studied on fish diversity of Northern region of West Bengal[8,9,10,11,12,13]. There is practically not much information available in literature regarding the recent fish fauna of the Gadadhar River at Cooch Behar. Further no attempt seems to have been made so far to study the fish diversity of this river. The fish diversity of Gadadhar river is still unexplored and not documented. Gadadhar river is a part of Brahmaputra –Meghna riverine system, originated in Pamsechura of Buxaduar. It meets Torsha at Balabhut area, after flowing through the Alipurduar and Cooch Behar District of West Bengal. A study was carried out during April 2013 to March 2015 to record the present fish diversity in river Gadadhar at Cooch Behar district. Fish sampling was conducted at four selected locations in the river Gadadhar namely chhat Genduguri, Bilsi, Naokhuli, Ghogarkuthi pratham khanda. The river is the life line of the people resides in nearly villages mostly for various domestic activities. Fishing for livelihood and food is a common practice of the local community.

MATERIALS AND METHOD

The present study was carried out in the river Gadadhar in Cooch Behar district covering mostly rural areas, Monthly sampling was carried out (from April 2013 to March 2015) in the river at four sampling sites following fisherman or local people who used to catch fish in this region.

Table 1 : Details of study sites at Gadadhar river district Cooch Behar

S.No.	Name of the Sampling station	Latitude and longitude of the sampling station	Distance (k.m)
1.	Chhat Genduguri, W.B.	26°.36’ N Latitude 89°.61’ E Longitude	Starting point
2.	Bilsi, W.B	26°.34’ N Latitude 89°.61’ E Longitude	4 km. from Chhat Genduguri
3.	Nao khuli, W.B	26°.32’ N Latitude 89°.62’ E Longitude	4 km. from Bilsi
4.	Ghogarkuthi , Pratham Khanda , W.B	26°.30’ N Latitude 89°.63’ E Longitude	4 km. from Nao khuli

Collection of Fish Samples and preservation

Fish samples were collected from various sampling sites and much other valuable information were collected from the local fisherman and resident adjacent to the selected sites of Gadadhar river. Fishing was carried out with the help of local fishers using cast net (small in size, r=1.2 m, weigh about 5 kg. mesh size ranging from 0.5 to1.5 cm. with an average 1.0 cm and covers an area about 4.5m^2), gillnet, drag net, scoop net including hooks and lines. The samples were photographed (Nikon, Coolpix L24), immediately prior to preservation as formalin decolorizes the fish colour on long preservation.As soon as the small fishes were collected they were directly placed in a wide mouth jar having 2 litre capacity with 8% formalin solution (Bagra[14]). Separate jars were used for preserving individual species and brought to the laboratory for Identification.

Four sampling sites at river Gadadhar

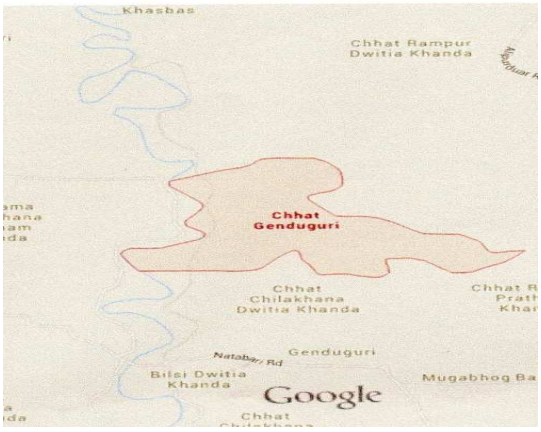

Fig.1: Sampling site 1

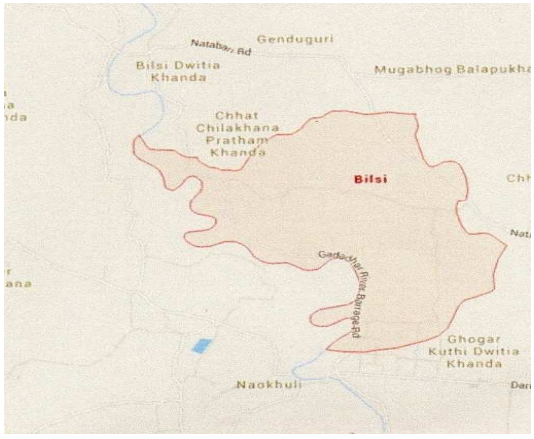

Fig.2: Sampling site 2

Fig.3: Sampling site 3

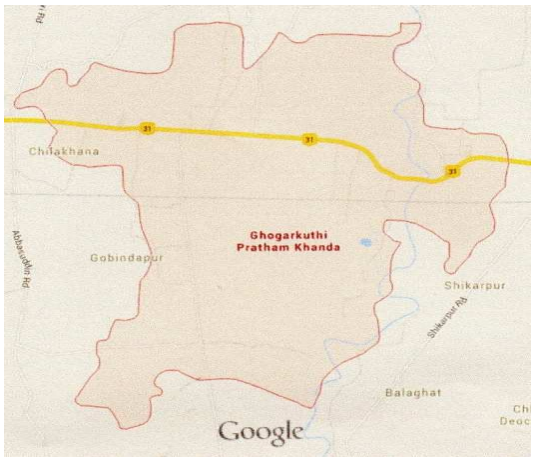

Fig.4: Sampling site 4

Identification

The samples were identified based on keys for fishes of the Indian subcontinent (Talwar and Jhingran)[4]. Classification were carried out on lines of Jayaram[5]. Data were analysed on the basis of availability of species at river sites and markets fed by the riverine resource. The IUCN[15] Red list of threatened species and CAMP[16] was followed to assign the conservation status of the fish species collected.

RESULT AND DISCUSSION

So far as the Ichthyofunal diversity is concerned during the present study in Gadadhar river 73 species of fishes belonging to 21 families and 45 genera were recorded over a period of two year, from April 2013 to March 2015 (Table.2). The family wise interpretation (Fig.6) revealed cyprinidae as the largest family accomodating 17 genera and 32 species. The genus *Puntius*, ranked first among the genera with its numerical strength of 9 speices. Family sisoridae with 6,cobitidae with 5, channidae with 4 and bagridae with 3 species, clupeidae with 2, siluridae with 4, Mastacembelidae with 3, Natopteridae with 2 and other 12 families like badidae, claridae, belonidae, Balitoridae, Pangasiidae etc. respesented single member from each. Among the 73 speices, 27 species had food value, 16 species had ornamental value and 30 species had both ornamental and food value (Table.2)

Bhattacharya *et al.*,[17] reported 52 indigenous ornamental fish species occurring in the North-East Recently, Dey *et al.*,[7] reported 58 species with ornamental and 25 species with both ornamental and food value in Kaljani river in Cooch Behar district. Mahapatra *et al.*,[18] reported 190 fish species fron West Bengal . In West Bengal, the survey and enlistment of indigenous ornamental fishes is fragmentary represented by few works. Therefore in the present study an attempt has been made to explore the

available indigenous ornamental fish fauna of North Bengal. All the three types of feeding habit of fishes like carnivorous, omnivorous and herbivorous were available in this region. About 53 speices of fishes are carnivorous, 11 species are omnivorous and 09 species are herbivorous (Table. 2).

References to conservation status categories with in this paper are based on IUCN[15] classification as per CAMP-NBFGR[16]. Thus , out of recorded species, 9.58% of the fishes belonged to lower risk near threatened (LRnt), 47.94% lower risk least concern (LRIc) 26.02% vulnerable (VU), 9.58% endangered (EN), 1.36% critically endangered (CEN), 1.36% not evaluated (NE) and 4.1% data deficient (DD) category . It was indicated that species number increased during the months March to June and September to November. *Pangasius pangasius* is a critically endangered species found in Gadadhar river.

Fig.5: Sector diagram showing the percentage of conservation status of fishes in river Gadadhar recorded during the period April 2013-March 2015

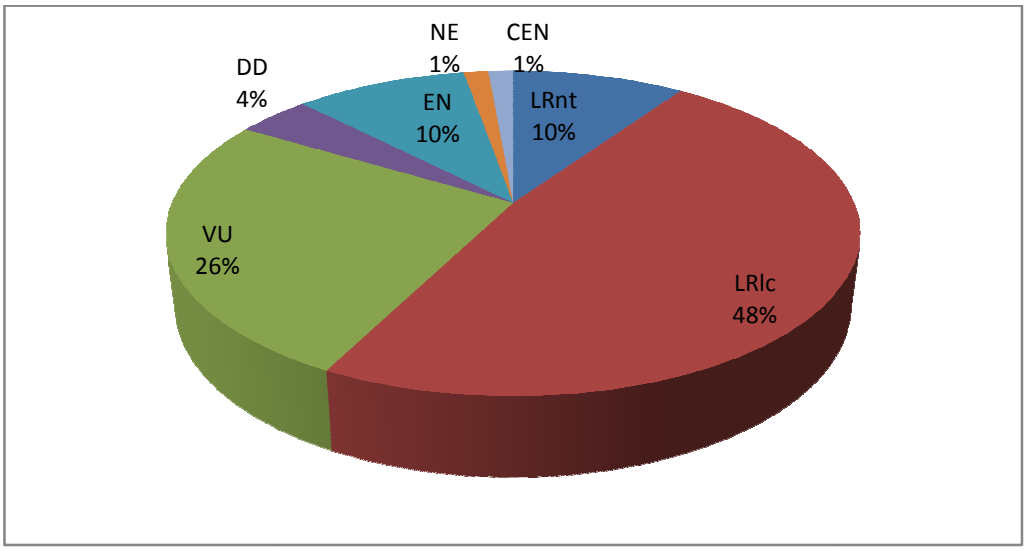

Fig.6 : Bar diagram showing the family wise distribution of fishes in the river Gadadhar

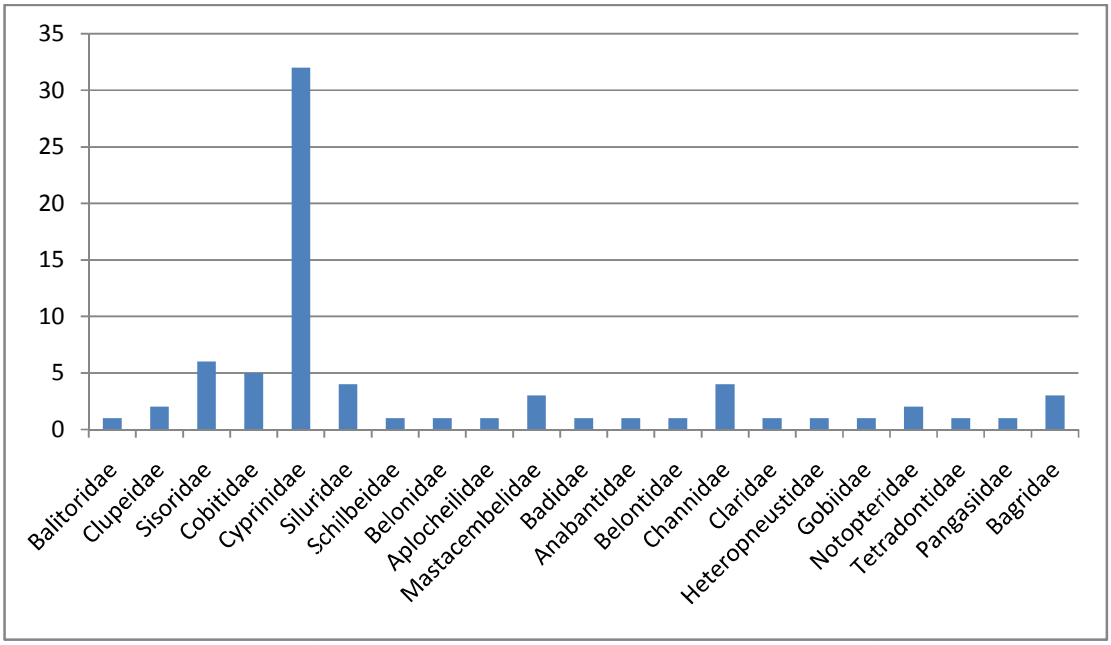

Table 2: Ichthyofaunal Diversity of River Gadadhar in CoochBehar District of West Bengal

S.No.	Local Name	Scientific Name	Family	Conservation Status	Relative abundance	Food Habit	Economic Importance	Gadadhar River			
								Site- 1	Site-2	Site-3	Site-4
1	Rui	*Labeo rohita* (Hamilton Buchanan)	Cyprinidae	LRnt	+	H	Fd	+	+	+	+
2	Calbaus	*Labeo Calbasu* (Hamilton)	Cyprinidae	LRlc	++	H	Fd	+	+	+	+
3	Bata	*Labeo bata* (Hamilton)	Cyprinidae	LRlc	++	H	Fd	+	+	+	+
4	Catla	*Catla Catla* (Hamilton Buchanan)	Cyprinidae	LRlc	+	H	Fd	+	+	+	+
5	Mrigel	*Cirrhinus mrigala* (Hamilton Buchanan)	Cyprinidae	LRnt	+++	O	Fd	+	+	+	+
6	Punti	*Puntius Chola* (Hamilton Buchanan)	Cyprinidae	LRlc	+++	C	Fd/Or	+	+	+	+
7	Punti	*Puntius Conchonius* (Hamilton)	Cyprinidae	LRlc	+++	C	Fd/Or	+	+	+	+
8	Sarpunti	*Puntius Sarana* (Hamilton)	Cyprinidae	VU	+	C	Fd	+	+	+	+
9	Punti	*Puntius Sophore* (Hamilton)	Cyprinidae	LRlc	+++	C	Fd/Or	+	+	+	+
10	Teripunti	*Puntius Terio* (Hamilton)	Cyprinidae	LRlc	+	C	Fd/Or	+	+	+	+
11	Titpunti	*Puntius ticto* (Hamilton)	Cyprinidae	LRlc	+++	C	Fd/Or	+	+	+	+
12	Gilipunti	*Puntius gelius* (Hamilton)	Cyprinidae	LRlc	+	C	Fd/Or	+	+	+	+
13	Punti	*Puntius phutanio* (Hamilton)	Cyprinidae	LRlc	++	C	Fd/Or	+	+	+	+
14	Gilachaki	*Osteobrama cotio* (Hamilton)	Cyprinidae	LRlc	+	C	Fd/Or	+	+	+	+
15	Kalabatta	*Crossochelus latius* (Hamilton Buchanan)	Cyprinidae	LRlc	+	H	Fd/Or	+	+	+	+
16	Pithkati	*Chagunius chagunius* (Hamilton)	Cyprinidae	DD	+	O	Fd/Or	+	_	+	+
17	Chepti Puthi	*Semiplotus semiplotus* (Meclelland)	Cyprinidae	VU	+	C	Fd	+	+	+	+
18	Klagachhi	*Garra kempi* (Hora)	Cyprinidae	LRlc	++	H	Fd	+	+	+	+
19	Klagachhi	*Garra gotyla* (Gray)	Cyprinidae	VU	++	H	Fd	_	+	+	+
20	Boroli	*Barilius barila* (Hamilton)	Cyprinidae	VU	++	O	Fd	_	+	+	+
21	Boroli	*Barilius barna* (Hamilton)	Cyprinidae	LRnt	++	O	Fd	+	+	+	+
22	Boroli	*Barilius bendelisis* (Hamilton)	Cyprinidae	VU	+++	O	Fd	+	_	+	+
23	Boroli	*Barilius tileo (Hamilton)*	Cyprinidae	VU	++	O	Fd	+	+	+	+
24	Devriputh i	*Devario devario* (Hamilton)	Cyprinidae	LRlc	++	C	Or	+	+	+	+
25	Darikana	*Rasbora daniconius* (Hamilton)	Cyprinidae	LRlc	+	C	Or	+	+	+	+
26	Bhola	*Raiamas bola* (Hamilton)	Cyprinidae	VU	+	C	Fd/Or	_	+	+	+
27	Chela	*Salmophasia bacaila* (Hamilton)	Cyprinidae	LRnt	++	C	Fd/Or	+	+	+	+
28	Balitora	*Psilorhynchus sucatio* (Hamilton)	Cyprinidae	LRlc	+	O	Or	+	+	+	+
29	Gilachaki	*Osteobrama belangeri*	Cyprinidae	LRnt	+	O	Fd/Or	+	+	+	+

		(Hamilton)									
30	Klagachhi	*Garna lamta* (Hamilton)	Cyprinidae	LRlc	++	H	Fd	+	+	+	+
31	Punti	*Puntius stolickanus* (Day)	Cyprinidae	LRlc	+	C	Fd/Or	+	+	+	+
32	Silghorea	*Labeo dyochelius* (Meclelland)	Cyprinidae	VU	+	H	Fd	_	+	+	+
33	Chapila	*Gudusia chapra* ((Hamilton Buchanan)	Clupeidae	EN	+	O	Fd	_	+	+	+
34	Chandan Ilish	*Tenualosa toli* (Hamilton)	Clupeidae	VU	+	C	Fd/Or	+	+	+	+
35	Betrongi	*Botia daria* (Hamilton)	Cobitidae	VU	+	C	Or	+	_	+	+
36	Ladder loach	*Botia rostrala* (Gunthen)	Cobitidae	VU	+	C	Or	+	_	+	+
37	Loha chata	*Botia lohachata* (Chaudhuri)	Cobitidae	EN	+	C	Or	+	+	+	+
38	Gutum	*Lepidocephalichthys grunachalensis* (Datta and Barman)	Cobitidae	EN	++	C	Or	+	+	+	+
39	Gutum	*Lepidocephalichthys manipurensis* (Arun Kumar)	Cobitidae	LRlc	++	C	Or	+	+	+	+
40	Balitora	*Balitora brucei* (Gray)	Balitoridae	NE	+	O	Or	+	+	+	+
41	Bagari	*Bagarius bagarius* (Hamilton)	Sisoridae	VU	+	C	Fd	-	+	+	+
42	Tinkantia	*Erethises pussilus* (Muller and Tiroschel)	Sisoridae	LRIC	+	C	Or		+	+	+
43	Tinkantia	*Erethistoides montans* (Hora)	Sisoridae	DD	+	C	Or	+	+	+	+
44	Kaoyatengra	*Gagata dolichonema* (He)	Sisoridae	LRIC	+	C	Fd/or	+	+	+	+
45	Tinkata	*Hara hara* (Hamilton)	Sisoridae	LRIC	++	C	Or	+	+	+	+
46	Tinkata	*Hara jerdoni* (Day)	Sisoridae	LRIC	++	C	Or	+	+	+	+
47	pabda	*Ompok pabda* (Hamilton)	Siluridae	VU	+	C	Fd/or	+	+	+	+
48	pabda	*Ompok pabo* (Hamilton)	Siluridae	EN	+	C	Fd/or	+	+	+	+
49	pabda	*Ompok binaculatus* (Bloch)	Siluridae	EN	+	C	Fd/or	+	+	+	+
50	Boyal	*Wallago attu* (Schneider)	Siluridae	VU	+	C	Fd	+	+	+	+
51	Kocha	*Clupisoma Montana* (Hora)	Schilbeidae	LRIC	+	C	Fd	+	+	+	+
52	Gosha tengra	*Mystus Gulio* (Hamilton)	Bagridae	LRIC	+	C	Fd/or	+	+	+	+
53	Aar	*Sperata aor* (Hamilton)	Bagridae	VU	+	C	Fd	+	+	+	+
54	Guji	*Sperata seenghola* (sykes)	Bagridae	VU	+	C	Fd	+	+	+	+
55	*Kakhila*	*Xenentodon canolia* (Hamilton	Belonidae	LRIC	+	C	Or	+	+	+	+
56	*Panchokha*	*Aplocheilus panchax* (Hamilton)	Aplocheilidae	LRIC	+	C	Or	+	+	+	+
57	*Bhaim*	*Maerognathus morehensis* (Arun Kumar and Tombi)	Mastachembelidae	LRIC	+	C	Fd/Or	+	+	+	+
58	*Bhaim*	*Maerognathus pancalus*(Hamilton)	Mastachembelidae	LRlc	+	C	Fd/Or	+	+	+	+
59	*Bhaim*	*Mastacembelus armatus* (lacepede)	Mastachembelidae	LRlc	+	C	Fd/Or	+	+	+	+
60	*Napit*	*Badis assamensis* (Ahl)	Badidiae	DD	+	C	Fd/Or	+	+	+	+

61	*Shol*	*Channa striata* (Bloch)	chennidae	LRlc	+	C	Fd/Or	+	+	+	+
62	*Cheng*	*Channa gachua* (Hamilton)	chennidae	LRlc	+	C	Fd/Or	+	+	+	+
63	*Sal*	*Channa marulius* (Hamilton)	chennidae	LRlc	+	C	Fd/Or	+	+	+	+
64	*Lata*	*Channa punctatus* (Bloach)	chennidae	LRlc	+	C	Fd/Or	+	+	+	+
65	*Bele*	*Glossogobius giuris* (Hamilton Buchanan)	Gobiidae	LRnt	+	C	Fd	+	+	+	+
70	*Pholi*	*Notopterus notopterus* (Pallas)	Notopteridae	EN	+	C	Fd	-	+	+	+
71	*Chital*	*Notopterus chitala* (Hamilton Buchanan)	Notopteridae	EN	+	C	Fd	-	+	+	+
72	*Tepa*	*Tetradon cutcutia* (Hamilton Buchanan)	Tetradontidae	LRnt	+	C	Or	+	+	+	+
73	*Pangus*	*Pangasius pangasius* (Hamilton Buchanan)	Pangasiidae	CEN	+	C	Fd	-	-	-	+

Note: Feeding habit : O = Omnivorous, C= Carnivorous, H= Herbivorous, Economic importance : Fd = Food fish, Or= Ornamental fish. Conservation Status : According to IUCN[15] and CAMP [16] DD = Data deficient, NE= Not evaluated, VU= Vulnerable, EN= Endangered, CEN= Critically endangered, LRnt= Lower risk near threatened, LRlc= Lower risk least concern.

CONCLUSION

The fish diversity of Gadadhar river passing by Cooch Behar district constitute a valuable natural resources in economic, aesthetic and scientific terms and its conservation and management are critical to the interests of humankind itself. The area is very rich in ornamental and food fish. Swain[19] reported that about almost 85% of the exportable ornamental fish are contributed by North Eastern states. Fish diversity of Northern part of North Bengal has close similarity with the North Eastern states of India as shown in the present study. 7 endangered and 1 critically endangered species are present in these areas like *Notopterus notopterus, Notopterus chitala, Gudusia chapra, Botia lohachata* etc. These species have a high market value.

In the present study, it was observed that anthropogenic activity altering the fine tune of the river ecosystem and established as a major cause of habitat alteration and fish stock depletion and thus many of the species were rare. To this all concerned, conservationists, government and non governmental agencies have a major role to play in creating public awareness and support for the conservation mechanisms for the fish species.

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