

FISH DIVERSITY IN TWO SOUTH-WESTERN DISTRICTS OF WEST BENGAL -BANKURA AND PURULIA

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INTRODUCTION

The area lies in between the latitudes of 22°44'4"-23°44'4" North and longitudes of 85°44'4"-85°44'4" East, covering an area of 13232 km². It is situated in the lower parts of upper ridges at right flank of Damodar River in West Bengal. Once known as "Jangale mahal" cover with thick mixed dense forest mainly sal (*Shorea robusta*), palas (*Butia monosperma*), and ber (*Ziziphus zuzubi*) in uneven terrain land.

The Drainage system is mainly controlled by Damodar, Dwarakeswar and the Kangsabati river along with their network of tributaries and its feeder channels, sloping in south east direction. The courses of the principal rivers are approximately parallel to each other. Silabati (56 km.), popularly known as Silai is the largest tributary of Dwarakeswar, Joypanda (44 km) is the principal tributary of the Silabati. Kangsabati which rises in the hilly terrain of Jhalda block in the district of Purulia enters Bankura district in Khatra block. It has flows south easterly for a distance of about 56 km. across the southern part of the district and enters Midnapore district at the south east corner. Some other rivers and tributaries, like Gandheswari, Sali (74 km.), Arkasha, Birai (30 km.), Bodai (16 km.), Dangra etc. plays an important role in the district's irrigation and drainage systems. All the rivers are seasonal hence the region is drought prone.

ENVIS (2007) has reported that state possesses 171 fresh water fishes. This region consists of more than 100 small and medium reservoir/tank (>10ha) mainly utilized for irrigation and to generate hydroelectric power. These are serving as home-ground of varieties of indigenous fishes. Many of them are not recorded before and are going to decline from their stock. As parts of West Bengal where people are in general depend upon fish, pressure to water regime increasing day after day.

Very few literatures have been made on fish diversity from this region. According to Bhatt *et al.*, (2001) 9 species were identified from Kesto-Bazar nalla of district Purulia. Mishra *et al.*, (2009) reported that 25 species of fishes belonging to 18 genera, 7 families under the order Siluriformes have been recorded from different freshwater and brackish water wetlands of South West Bengal. Mukherjee and Praharaj (2009) reported that 47 species have been recorded from Kangsaboti reservoir which is situated in between Bankura and Purulia district.

MATERIALS AND METHODS

Field survey were conducted during the period from 2005-2008 through sample survey from randomly selected locations based on the thematic map and database of the study area. Total 625 numbers of closed water bodies and 37 sites in 2 main river systems were investigated.

Especially large closed water bodies and deep pool in river system had been surveyed which shows maximum diversity of fishes.

The specimens were collected using different types of fishing methods such as cast nets, gill nets, drag nets, scoop nets and other tools like use of "Changi" (living murrel fish used at the end of fishing line with hook and hang just on the surface of deep running water by strong bamboo whip to trap Chital, Boal) especially for carnivorous fishes and techniques like use of "Sand build trap" (small parts of running stretch bounded by small wall sand bundh so that fish can jump to fall on sand bundh, opening by small mouth downwards and after certain time mouth closed and fish are trap) making in the river system. Generally multistage samplings were adopted for fish collection at different stage and place, along with 87 numbers of markets were also surveyed.

Collected fish samples were preserved in 4% formalin for detailed examination and identification was done by following the methodologies after Talwar and Jhingran, 1991 and Jayaram, 1999. Classification has been done on the basis of FishBase (2009). As colour loss is rapid, accurate descriptions of colour patterns were recorded by photography. Fishes were identified to species level except for juveniles.

RESULTS

(a) Fish species richness

From the study area 100 species of fish were recorded (Table-1). Study shows that high species richness blocks were found at Bankura. Middle stretch of river Kangsaboti, Darkeswar and Kangsaboti reservoir were showing great diversity of fish richness. Water area >5ha was showed high richness of fish species and an area

Table-1 : Recorded fish fauna from the study area (After Fishbase, 2009)

Family	Species	Local Name
Ambassidae	<i>Chanda nama</i> (Hamilton, 1822) <i>Parambassis ranga</i> (Hamilton, 1822) <i>Parambassis lala</i> (Hamilton, 1822)	Chandkora Chandkora Lal chandkora
Anabantidae	<i>Anabas testudineus</i> Bloch, 1792)	Koi
Anguillidae	<i>Anguilla bengalensis bengalensis</i> (Gray, 1831)	Moula
Badidae	<i>Badis badis</i> (Hamilton, 1822) <i>Dario Dario</i> (Hamilton, 1822)	Kaloputi Lalputi
Bagridae	<i>Rita rita</i> (Hamilton, 1822) <i>Hemibagrus menoda</i> (Hamilton, 1822) <i>Sperata aor</i> (Hamilton, 1822) <i>Sperata seenghala</i> (Sykes, 1839) <i>Mystus cavasius</i> (Hamilton, 1822) <i>Mystus bleekeri</i> (Day, 1877) <i>Gagata cenia</i> (Hamilton, 1822)	Ritha Aor Aor Pat Tangra Tangra
Belonidae	<i>Xenentodon cancila</i> (Hamilton, 1822)	Gangdara
Channidae	<i>Channa punctata</i> (Bloch, 1793) <i>Channa orientalis</i> (Bloch and Schneider, 1801) <i>Channa striata</i> (Bloch, 1793) <i>Channa gachua</i> (Hamilton, 1822) <i>Channa marulius</i> (Hamilton, 1822)	Letha Chang Sol Sisir Cheng Sal
Cichlidae	<i>Oreochromis mossambica</i> (Peters, 1852) <i>Oreochromis niloticus niloticus</i> (Linnaeus, 1758)	Tilapia Nilontega
Clariidae	<i>Clarias batrachus</i> (Linnaeus, 1758) <i>Clarias gariepinus</i> (Burchell, 1822)	Magur Hybrid magur
Clupeidae	<i>Gudusia chapra</i> (Hamilton, 1822) <i>Tenualosa ilisha</i> (Hamilton, 1822)	Khoira Ilish

Family	Species	Local Name
Cobitidae	<i>Somileptus gongota</i> (Hamilton, 1822) <i>Acanthocobitis botia</i> (Hamilton, 1822) <i>Botia lohachata</i> (Chaudhuri, 1912) <i>Lepidocephalichthys guntea</i> (Hamilton, 1822)	fossils geto Geto Bagaya Geto Geto
Balitoridae	<i>Schistura beavani</i> (Günther, 1868) <i>Schistura corica</i> (Hamilton, 1822)	Chalkura Salgeta
Cyprinidae	<i>Labeo pangusia</i> (Hamilton, 1822) <i>Osteobrama cotio cotio</i> (Hamilton, 1822) <i>Piaractus brachypomus</i> (Cuvier, 1818) <i>Danio rario</i> (Hamilton, 1822) <i>Puntius sarana</i> (Hamilton, 1822) <i>Labeo gonius</i> (Hamilton, 1822) <i>Rasbora rasbora</i> (Hamilton, 1822) <i>Megarasbora elanga</i> (Hamilton, 1822) <i>Labeo fimbriatus</i> (Bloch, 1795) <i>Labeo dyocheilus</i> (McClelland, 1839) <i>Labeo calbasu</i> (Hamilton, 1822) <i>Salmostoma bacaila</i> (Hamilton, 1822) <i>Securicula gora</i> (Hamilton, 1822) <i>Barilius barna</i> (Day, 1865) <i>Barilius barila</i> (Hamilton, 1822) <i>Barilius bendelisis</i> (Hamilton, 1807) <i>Puntius ticto</i> (Hamilton, 1822) <i>Barbus terio</i> (Hamilton, 1822) <i>Puntius sophore</i> (Hamilton, 1822) <i>Aplocheilus panchax</i> (Hamilton, 1822) <i>Barilus vagra</i> (Hamilton, 1822) <i>Puntius conchoniis</i> (Hamilton, 1822) <i>Esomus danricus</i> (Hamilton, 1822) <i>Aspidoparia morar</i> (Hamilton, 1822) <i>Aspidoparia jaya</i> (Hamilton, 1822) <i>Crossocheilus latius latius</i> (Hamilton, 1822) <i>Eutropiichthys murius</i> (Hamilton, 1822) <i>Labeo boga</i> (Hamilton, 1822) <i>Labeo rohita</i> (Hamilton, 1822) <i>Catla catla</i> (Hamilton, 1822) <i>Cirrhinus cirrhosus</i> (Bloch, 1795) <i>Ctenopharyngodon idella</i> (Valenciennes, 1844) <i>Cyprinus carpio carpio</i> (Linnaeus, 1758) <i>Hypophthalmichthys molitrix</i> (Valenciennes, 1844) <i>Aristichthys nobilis</i> (Richardson, 1845) <i>Amblyopharyngodon mola</i> (Hamilton, 1822) <i>Chagunius chagunio</i> (Hamilton, 1807) <i>Garra lamta</i> (Hamilton, 1822) <i>Labeo dero</i> (Hamilton, 1822) <i>Osteochilus nashii</i> (Day, 1869) <i>Puntius amphibious</i> (Valenciennes, 1842)	Kalbasu Dhela/Nadna Piranha Uli Sar puti Bata Darke Darka Rui Kalbos Chua Chua Pera Pera Halde pera Tit puti Puti Bara Puti Techokha Pera Puti Darke Chira Chua Simsuti Bacha Bata Rui Katla Mirik Grasscap Sypon Silvercap Bricate Mourala Dekar Pathar chata Nadin rui Bara Puti
Engraulidae	<i>Setipinna phasa</i> (Hamilton, 1822)	Phasa
Gobiidae	<i>Glossogobius giuris</i> (Hamilton, 1822) <i>Brachygobius nunus</i> (Hamilton, 1822)	Bele, Bhelso Bhelso
Heteropneustidae	<i>Heteropneustes fossilis</i> (Bloch, 1794)	Singi
Mastacembelidae	<i>Mastacembelus armatus</i> (Lacepède, 1800) <i>Macrognathus pancalus</i> (Hamilton, 1822) <i>Macrognathus guentheri</i> (Day, 1865)	Ban Penkal Penkal

Family	Species	Local Name
	<i>Macrogathus aral</i> (Bloch, 1786)	Penkal
Amblycipitidae	<i>Amblyceps mangois</i> (Hamilton, 1822)	Jia
Mugilidae	<i>Rhinomugil corsula</i> (Hamilton, 1822)	Keklas mach
Nandidae	<i>Nandus nandus</i> (Hamilton, 1822)	Nados
Notopteridae	<i>Chitala chitala</i> (Hamilton, 1822) <i>Notopterus notopterus</i> (Pallas, 1769)	Chitol Folui
Osphronemidae	<i>Colisa fasciata</i> (Bloch and Schneider, 1801) <i>Colisa lalia</i> (Hamilton, 1822)	Kholse Kholse
Pangasiidae	<i>Pangasius pangasius</i> (Hamilton, 1822)	Pangus
Schilbeidae	<i>Silonia silondia</i> (Hamilton, 1822) <i>Eutropiichthys vacha</i> (Hamilton, 1822) <i>Ailia coila</i> (Hamilton, 1822) <i>Clupiosoma garua</i> (Hamilton, 1822)	Vacha Bacha Banspata Bacha
Siluridae	<i>Ompok bimaculatus</i> (Bloch, 1794) <i>Ompok pabo</i> (Ham.-Buch.) <i>Ompok pabda</i> (Ham. -Buch. 1822) <i>Wallago attu</i> (Bloch and Schneider, 1801)	Pabda Pabda Pabda Boal
Sisoridae	<i>Bagarius bagarius</i> Hamilton, 1822 <i>Glyptothorax dorsalis</i> (Vinciguerra, 1890)	Ritha Telsuti
Synbranchidae	<i>Monopterusuchia</i> (Hamilton, 1822)	Cuche

of 0.40-5.0ha notably showed low richness of fish species and were usually used for culture based fisheries in this region. Since river and rivulets of this region are seasonal in nature fish species richness were maximum shown in patches of 'daha' area (deep pool in river path). Near about 48 species were recorded from different stretch survey during survey period (Table-2).

Fishes were distributed under 9 orders and 26 families (Table-3) in this region of which Cyprinidae family was the most common (42) of all and single species belonged to family Anabantidae, Anguillidae, Belonidae, Clupeidae, Mugilidae, Heteropneustidae, Nandidae, Pangasiidae, Synbranchidae and Engraulidae. As per IUCN categories in species level, out of 26 families 21 families were under threat (in Indian context) of which Cyprinidae was the most leading family followed by Siluridae and Bagaridae. Block wise family distribution of fish showed maximum diversity in the blocks Onda (25), Hirbunth (24), Raipur (24), Ranibunth (26), Barabazar (24) and Manbazar-II (24) (Table-4).

Qualitative study of fin fish showed that categorically out of 100 species, 47 species

were identified as commercially important, 21 cat fish, 10 ornamental fish, 41 exclusively riverine and 69 threatened fishes (Table-5). From this region 69 species (Table-6) had been identified as threatened on IUCN criteria of which 51 were identified as locally threatened species. Study reveals that fish richness in Purulia was lower in comparison to Bankura. (Table-4).

Study showed that in Bankura district Onda, Raipur, Bishnupur, Kotolpur, Barjora and Bankura-I were the most cultural Block where as Purulia-I, Purulia-II, Kashipur, Raghunathpur-I and II of Purulia district was the most cultural block in this region. From this region 3 Indian major carp along with 3 exotic carps (*H. molitrix*, *C. carpio* and *C. idella*) were scientifically cultured. Among riverine fishes *Barilius barna*, *Wallago attu*, *Sperata aor*, *Labeo boga*, *Barilius bendelisis*, *Brachygobius nunus*, *Amblyceps mangois* and *Acanthocobitis botia* were found in maximum sites whereas *Chitala chitala*, *Pangasius pangasius*, *Nandus nandus*, *Ailia coila*, *Silonia silondia*, *Osteobrama cotio cotio* were found in least sited areas (Table-2).

Table-3: Family wise fish species in the study area

Family	Nos.	Family	Nos.
Ambassidae	3	Cyprinidae	42
Amblycipitidae	1	Gobiidae	2
Anabantidae	1	Heteropneustidae	1
Anguillidae	1	Mastacembelidae	4
Bagridae	7	Nandidae	1
Balitoridae	2	Notopteridae	2
Belonidae	1	Osphronemidae	2
Channidae	5	Pangasiidae	1
Cichlidae	2	Schilbeidae	4
Clariidae	2	Siluridae	4
Clupeidae	2	Sisoridae	2
Cobitidae	4	Synbranchidae	1
Mugilidae	1	Engraulidae	1
Badidae	2		

Table-4: Family wise fish distribution at block levels (Bankura and Purulia) Distribution of fish species

Bankura		Purulia	
Block	Family nos.	Block	Family nos.
Bankura-I	22	Arsha	21
Bankura-II	18	Bagmundi	15
Barjora	19	Balarampur	16
Bishnupur	22	Barabazar	24
Chattna	20	Bundwan	16
Gangajal Ghati	21	Hura	15
Hirbunndh	24	Jaypur	16
Inddus	16	Jhalda-I	18
Indpur	22	Jhalda-II	20
Joypur	20	Kashipur	22
Khatra	23	Manbazar-I	20
Kotalpur	20	Manbazar-II	24
Mejia	20	Neturia	20
Onda	25	Para	16
Patrasayer	18	Puncha	18
Raipur	24	Purulia-I	22
Ranibunndh	26	Purulia-II	22
Saltora	22	Raghunath Pur-I	15
Sarenga	22	Raghunath Pur -II	23
Simlapal	20	Santuri	18
Sonamukhi	18		
Taldangra	20		

Table-5 : Different categories of fish in the study area

Sl. No.	Species	IUCN
1	<i>Xenentodon cancila</i> (Ham.-Buch.)	-- LRnt
2	<i>Wallago attu</i> (Schneider)	-- LRnt
3	<i>Silonia silondia</i> (Ham.-Buch.)	-- LRnt
4	<i>Semiplotus semiplotus</i> (McClelland)	-- VU -- (A1c; B1, 2ab)
5	<i>Salmostoma bacaila</i> (Ham.-Buch.)	-- LRlc
6	<i>Rita rita</i> (Ham.-Buch.)	-- LRnt
7	<i>Rhinomugil corsula</i> (Ham.-Buch.)	-- VU -- (A1acd)
8	<i>Puntius ticto</i> (Ham.-Buch.)	-- LRnt
9	<i>Puntius terio</i> (Ham.-Buch.)	-- LRnt
10	<i>Puntius sophore</i> (Ham.-Buch.)	-- LRnt
11	<i>Puntius sarana sarana</i> (Ham.-Buch.)	-- VU -- (A1acd)
12	<i>Pangasius pangasius</i> (Ham.-Buch.)	-- CR -- (A1abcd)
13	<i>Osteobrama cotio cotio</i> (Ham.-Buch.)	-- LRnt
14	<i>Channa gachua</i> (Bloch and Schneider)	-- VU -- (B1,2c)
15	<i>Ompok pabda</i> (Ham.-Buch.)	-- EN -- (A1acd, 2cd)
16	<i>Ompok bimaculatus</i> (Bloch)	-- EN -- (A1acd, 2cd)
17	<i>Notopterus notopterus</i> (Pallas)	-- LRnt
18	<i>Notopterus chilata</i> (Ham.-Buch.)	-- EN -- (A1abcd, 2cd)
19	<i>Nemacheilus guentheri</i> (Day)	-- LRlc
20	<i>Nemacheilus corica</i> (Ham.-Buch.)	-- LRnt
21	<i>Nemacheilus botia</i> (Ham.-Buch.)	-- LRnt
22	<i>Mystus vittatus</i> (Bloch)	-- VU -- (A1acd)
23	<i>Nandus nandus</i> (Ham.-Buch.)	-- LRnt
24	<i>Mystus cavasius</i> (Ham.-Buch.)	-- LRnt
25	<i>Mystus bleekeri</i> (Day)	-- VU -- (A1acd)
26	<i>Monopterus cuchia</i> (Ham.-Buch.)	-- LRnt
27	<i>Macrognathus pancalus</i> (Ham.-Buch.)	-- LRnt
28	<i>Labeo rohita</i> (Ham.-Buch.)	-- LRnt --
29	<i>Labeo pangusia</i> (Ham.-Buch.)	-- LRnt --
30	<i>Labeo kontius</i> (Jerdon)	-- EN -- (B1, 2c)
31	<i>Labeo goniis</i> (Ham.-Buch.)	-- LRnt
32	<i>Labeo fimbriatus</i> (Bloch)	-- LRnt
33	<i>Labeo dyocheilus</i> (McClelland)	-- VU -- (A1acd)
34	<i>Labeo dero</i> (Ham.-Buch.)	-- VU -- (A1acd)
35	<i>Labeo calbasu</i> (Ham.-Buch.)	-- LRnt
36	<i>Labeo boga</i> (Ham.-Buch.)	-- LRnt
37	<i>Labeo bata</i> (Ham.-Buch.)	-- LRnt
38	<i>Hilsa ilisha</i> (Ham.-Buch.)	-- VU -- (A1acd)
39	<i>Heteropneustes fossilis</i> (Bloch)	-- VU -- (A1acd)
40	<i>Gudusia chapra</i> (Ham.-Buch.)	-- LRlc
41	<i>Glossogobius giuris</i> (Ham.-Buch.)	-- LRnt
42	<i>Eutropiichthys vacha</i> (Ham.-Buch.)	-- EN -- (A1abcd, 2bcd)

Table-6 Threatened fishes in the study area (after CAMP, 1998)

Sl. No.	Species	IUCN
43	<i>Eutropiichthys murius</i> (Ham.-Buch.)	-- LRnt
44	<i>Esomus danricus</i> (Ham.-Buch.)	-- LRlc
45	<i>Crossocheilus latius latius</i> (Ham.-Buch.)	-- DD
46	<i>Colisa fasciatus</i> (Bloch and Schneider)	-- LRnt
47	<i>Clupisoma garua</i> (Ham.-Buch.)	-- VU -- (A1acd, 2cd)
48	<i>Clarias batrachus</i> (Linnaeus)	-- VU -- (A1acd)
49	<i>Cirrhinus reba</i> (Ham.-Buch.)	-- VU -- (A1abcd, 2cd)
50	<i>Cirrhinus mrigala</i> (Ham.-Buch.)	-- LRnt
51	<i>Cirrhinus cirrhosus</i> (Bloch)	-- VU -- (B1, 2c)
52	<i>Channa striatus</i> (Bloch)	-- LRlc
53	<i>Channa punctatus</i> (Bloch)	-- LRnt
54	<i>Channa orientalis</i> (Bloch and Schneider)	-- VU -- (A1acd)
55	<i>Channa marulius</i> (Ham.-Buch.)	-- LRnt
56	<i>Catla catla</i> (Ham.-Buch.)	-- VU -- (A1acde)
57	<i>Botia lohachata</i> (Chandhuri)	-- EN -- (B1, 2c)
58	<i>Barilius vagra</i> (Ham.-Buch.)	-- VU -- (A1a, 1c)
59	<i>Barilius bendelisis</i> (Ham.-Buch.)	-- LRnt
60	<i>Barilius bakeri</i> (Day)	-- VU -- (A1acd)
61	<i>Bagarius bagarius</i> (Ham.-Buch.)	-- VU -- (A1acd)
62	<i>Aspidoparia morar</i> (Ham.-Buch.)	-- LRnt
63	<i>Aspidoparia jaya</i> (Ham.-Buch.)	-- VU -- (A1acd)
64	<i>Aplocheilus panchax</i> (Ham.-Buch.)	-- DD
65	<i>Anguilla bengalensis</i> (Gray)	-- EN (A1acd; B1, 2c)
66	<i>Anabas testudineus</i> (Bloch)	-- VU -- (A1acd)
67	<i>Amblypharyngodon mola</i> (Ham.-Buch.)	-- LRlc
68	<i>Amblyceps mangois</i> (Ham.-Buch.)	-- LRnt
69	<i>Ailia colia</i> (Ham.-Buch.)	-- VU -- (A1abcd, 2bcd)

VU = Vulnerable; LRnt = Lower Risk near threatened; LRlc = Lower Risk least concern; EN = Endangered; CR = Critically endangered; NE = Not Evaluated

The distribution of the most common species – *Barilius* sp., *Puntius* sp., *Danio* sp. and few loaches were recorded in river system where as some selected species with few weed fishes found in every water body. These situations were associated with the onset of the dry season in March when the flow declined end and to the middle stretch of the river or going to dry the closed water system. The fish species examined were distributed throughout the study area and were found in all the larger tributaries and closed water body. The rarest species *M.cuchia* and *A. anguila*, which were not usually found in the main

river and only occasionally in some of the creek where muddy substance remain with rocky substance. *N. chitala* was caught only once in the Kangsaboti river during post monsoon season by the typical fishing bait called “Changi” using small murrel fish at the tip of fishing line with fishing hooks in the night. *N. Chitala* never found in the Darkeswar river since last 10 years (personal communication with fisherman at different stretches).

However river Darkeswar has no obstacle (dam/bundh) in the running course. A number of diadromus fishes e.g. *Tenualosa* sp., *Eutropichthys*

sp., *Sperata* sp., *Bagarius* sp. and other cat fishes were located at the tip of this river during monsoon. But in Kangsaboti such kind of fishes are not frequently located on the upper reaches of the reservoir. It might be that some of these fishes were present here previously or might have migrated.

DISCUSSION

The study reveals that 100 species have been recorded from this region compared to 171 fresh water species in the state (ENVIS report, 2007). It demonstrates that a great diversity of fishes has been revealed from this region, some of them like *Glyptothorax dorsalis*, *Schistura corica* and *Schistura beovani* have not been recorded previously.

The first step in conservation of biodiversity is to assess the diversity of natural resources present and identify those, which are important and most irreplaceable (Groombridge & Jenkins 1998). Areas that are rich in diversity for these species are assumed to be rich in general.

The absence of some important fishes (*B. bagarius*, *S. senghala*, *C. chitala* and *S. aor*) from these river systems and nearby reservoirs shows great variability in species composition e.g. presence of carnivorous fishes declines of the population small fish groups as it frequently seen in Kangsaboti river where as it is reverse in Darkeswar river. This may be due to a shift in hydrological regime through river regulation, obstruction to free movement of fish, pollution, or change in landscape use.

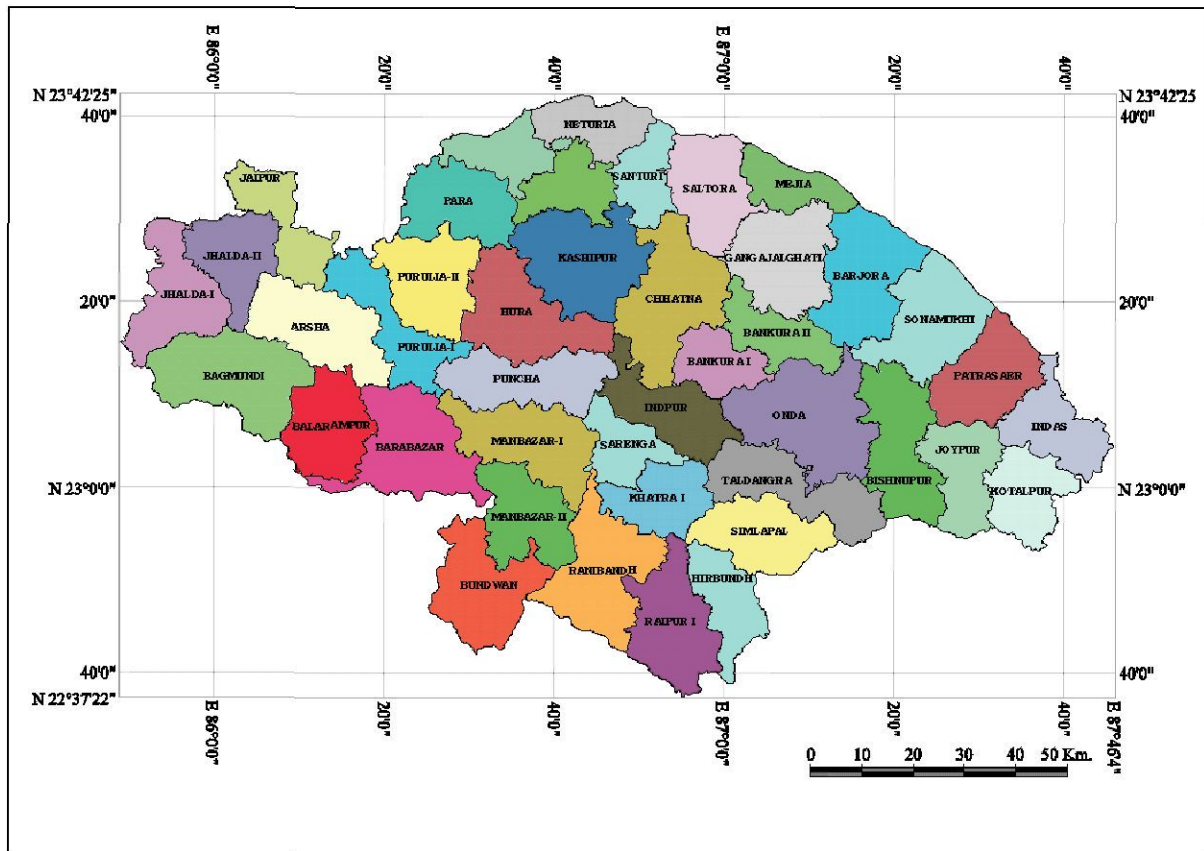
Reservoir, river and in stream naturalness is more concise to natural breeding fishes where as artificial stocking of selected species in ponds and tanks not happen frequently. For running water system middle stretch of the river, reservoir and 'daha' (deep pool in the path of river, colloquial term used in Bankura and Purulia) has been selected where maximum number of fish species has been assembled after monsoon. These water bodies are the prime source of water as well as survival for wild varieties of fishes in this region.

Qualitatively Cyprinidae are the most common and Anguillidae are most rare family

found in this region. Few anandromus and diadromus fishes through migration come across the river during monsoon that capture affects the economic profit to bank dwelling fisher.

Familial distribution of fresh water fishes is remarkably good enough in comparison to state (Kar *et al.*, 2000; Prasad *et al.*, 2002). 100 species under 26 families under 9 orders have been recorded from this region of which the Cyprinidae family is the most predominant (CAMP, 1998, Reyjol *et al.*, 2007). Finally 8 families were representing each only one species (Synbranchidae, Pangasiidae, Heteropneustidae, Mugilidae, Clupeidae, Belonidae, Anguillidae and Anabantidae). Maximum threat found in Cyprinidae (family 14 nos.) and catfish group. Similar findings have also been reported by other workers (Hossain *et al.*, 2008; chakrabarti *et al.*, 2009). In the present study, maximum family was recorded in Bankura district (26). According to Heda (2009) the varieties are commonly found in natural system like river Channels and reservoir rather than in ponds and tanks. This may be due to naturalness of the ecosystem.

Analysis shows that the blocks with high fish richness are found at Bankura due to suitable condition for their diversity e.g. middle stretch of river Kangsaboti and Darkeswar. Similar observations were also made by (Mishra *et al.*, 2009, Mukherjee *et al.*, 2005). Further Kangsaboti reservoir shows great diversity of fish richness and this district acts as a buffer zone in this region. Large water body shows high richness of fish species in comparison to small water bodies. Small water bodies are usually used for culture based fisheries in this region. Some fishes like *C. chitala*, *O. pabda*, *G. dorsalis* decline steadily and are likely to disappear. Similar observations were also made by other workers (Menon, 1989; Yadava and Chandra, 1994; Prasad, 1994; Das, 1998; Mishra *et al.*, 2001a,b,c; Mukherjee *et al.*; 2002; Mishra *et al.*, 2009) from this region. Sixty nine (69) of 227 species as classified in IUCN criteria, 2003 (CAMP, 1998) except *Cirrhinus mrigala* and *Cirrhinus cirrhosus* is the same species as described in Fishbase and 39 of 83 at state level



Location of the Study Area

(Mukherjee *et. al.*, 2002; West Bengal Doc on NBSAP, 2003; Ghosh, 2007; State report, 2005) species have been identified as threatened. This demonstrates that this region is definitely an area to be preserved. Currently 51 of 69 species have been detected as locally threatened species. As more and more surveys will be conducted in this region much more information on these threatened fishes will be revealed.

Certain species are not recognized as hill stream fishes but their adaptive nature (developing adaptive organs) has enabled them to be referred to as hilly variety. Possibly the junction between hilly steps of Purulia merged into alluvial plain of Bankura make an edge effects in the western parts of Bankura where a number of algae feeder and sucker fishes living year after year, such fishes are rare in other rivers and streams in this region.

CONCLUSION

Identifying fish diversity is a vital source of fish information. A large number of species which

are earlier not reported has been revealed from this region. Out of 171 species known from West Bengal 100 species have been found which might be more than 58.4% of the total fresh water fish diversity in the state. In this region 47 species are being commercially important, 10 are categorized under ornamental fishes, 21 under catfish, 41 are exclusively riverine fishes and 51 species have been identified locally threatened species. Some of which are already nationally established; compare to FishBase in context to India it is only 17%. A considerable number of 26 fish families have been identified. Maximum fish diversity found in Bankura district because of edge effects and suitable climatic conditions.

The fish fauna in the region considered presently is highly diverse with an estimated cumulative total of 100 species. The diversity of freshwater fish species in the region was significantly related to the adjoining land and channel of the different parts of this region. This is to be explained better if rivers and reservoirs are surveyed systematically.

SUMMARY

The Bankura and Purulia districts lying in the south western part of West Bengal, is considered as a heaven of sweet water resources, nourishing a variety of fresh water fishes. Due to adverse condition of this region intensive survey to reveal information on fish diversity was not done earlier. During 2005-2008 a sample survey was conducted to inventorise fin fishes and nearly 100 species under 26 families were recorded from 625 nos. of closed water bodies and 37 nos. of stretch under 2 main river systems. Many of these fishes are

under threat and are not recorded earlier. Some fishes exhibit special adaptive features to survive in this region. Maximum fish diversity was found in the adjoining parts of both districts where undulating terrain merge into fluvial plains which might be an edge effect of this area. District Bankura shows highest number of 100 fish species where as in Purulia 88 species. 69 species were identified as threatened on the basis of CAMP report (1998) of which 51 were detected as locally threatened.

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