

Original Research

Ichthyofaunal diversity of different reservoirs of Purulia District, West Bengal, India

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ABSTRACT:

India has 19,370 reservoirs spread over 15 states with an estimated 3.15 million hectare surface area at full capacity, and this is expected to increase due to execution of various water projects in the country. Ichthyofaunal diversity of the different reservoirs of Purulia district, West Bengal was studied in between January 2014 and December 2014. Fish species available at different reservoirs of the district essentially represented the fish faunal diversity and their abundance. The study revealed that thirty seven species (37) belonging to seven orders and fifteen families were recorded in the sampling sites of reservoirs of district. In spite of natural stocks, the reservoirs are usually stocked with fingerlings of Indian major carps and exotic carps. The order Cypriniformes was the most dominant group with 16 species, followed by Perciformes (7species), Siluriformes (6species) and, Channiformes (3 species), Osteoglossiformes and Synbranchiformes (each of 2 species), and Anguilliformes (1 species). Regarding their conservation status, 26 species were of least concern, 1 species was vulnerable, 6 species were near threatened, 1 species was data deficient, and 4 species were not evaluated (IUCN-Version 2014.1). Economical values and their seasonal abundance have also been evaluated. It was concluded that fish species gradually declining in the different Reservoirs of district due to habitat degradation, siltation, and lack of proper management practices and over exploitation could influence the percentage of fish abundance in these reservoirs.

Keywords:

Fish Diversity, Abundance, Reservoirs, IUCN status

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## INTRODUCTION

Reservoirs can emerge as one of the most vital components of inland fishery resources of India with gargantuan potential not only to enhance the country's inland fish production but also in providing food and nutritional security to the people, besides providing opportunities for livelihood and employment generation. According to Desai, reservoirs are habitats in almost all major river basins which are engineered by human (Desai, 2006). Reservoirs conserve a variety of native riverine fish species as well as introduced species which leads and supports commercial fisheries. In India potential of fish culture is yet to be fully exploited. In the state of West Bengal the area under reservoir fisheries are 0.17 lakh ha. In fresh water aquaculture, the West Bengal is among the front runner states of India where the average productivity (around 5 tonnes /ha/yr) is significantly higher in comparison to the national average of 2.2 tonnes/ha/yr (Tripathy, 2003). The state West Bengal has 21 districts but the western most districts like Purulia have large no of water bodies mainly in the forms of reservoirs and pond. The district Purulia have a total of 36 no's reservoir covering 5557.74 ha water area (Hand Book of Fisheries Statistics, Govt of West Bengal, 2012 - 13). The main purpose for constructing these reservoirs is not only to supply water for irrigation purpose but also to increase fish production from those water bodies through the introduction of local fishermen communities with the help of Fishery Department, Government of West Bengal. In the present study, our main aim was to observe the Ichthyofaunal diversity along with abundance of fish species of the reservoirs spread over in Purulia District.

## MATERIALS AND METHODS

The study was conducted every last week of each month between 6.00 and 8.00 a.m. in between January 2014 to December 2014. Fish samples were collected

from the various sampling stations (Table 1) and other valuable information were collected from the local fisherman and resident adjacent to the selected sites of different reservoirs of the district. Fishing was carried out with the help of local skilled fishers using cast net and drag net. The samples were photographed, immediately prior to preservation as formalin (8%) decolorizes the fish colour on long preservation (Bagra and Das, 2010).

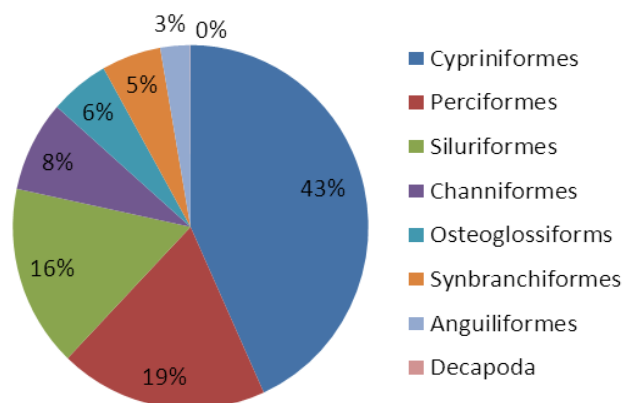
### Sampling stations

Fish samples were collected from various sampling stations i.e. reservoirs of Purulia Districts of West Bengal, India. The geographical co-ordinates of the major reservoirs of the district are given in Table 1. The specimen study was confined to the listed reservoirs (Table 1) of the district.

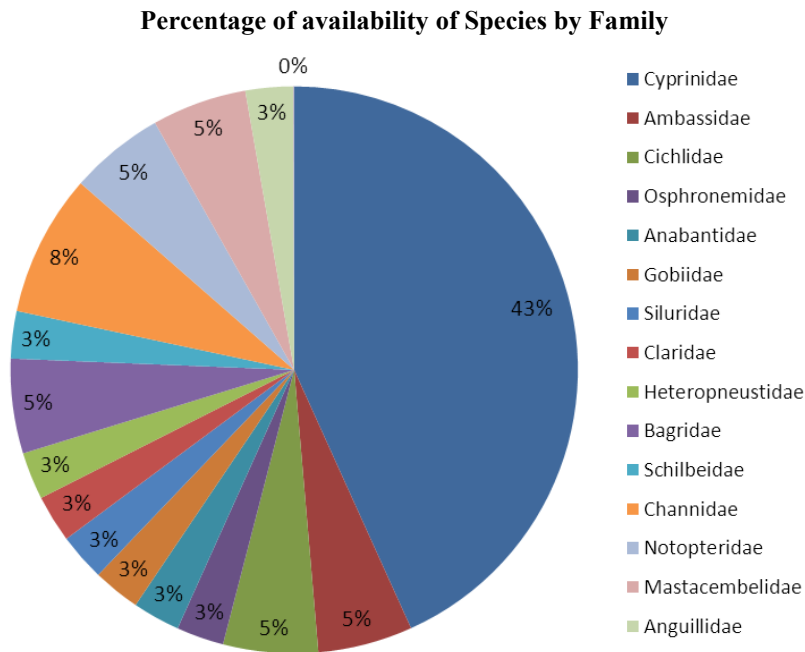
### Sampling and analysis

The sampling and data collection was done in between January 2014 and December 2014. The fish samples which were caught by the local fishermen from the preselected sampling sites (Table 1) of the district were used for the identification as well as analytical purposes. Fish samples were randomly collected from the reservoirs. Castanets and Dragnets were used for capturing the fishes. All fish species were preserved in 4

**Percentage of Species availability by Order**



**Figure 1. Pie Distribution of commonly available fish species (By Order) present in reservoirs of Purulia District**



**Figure 2. Pie Distribution of commonly available fish species (By Family) present in reservoirs of Purulia District**

**Table 1. Name of the sampling sites with geographical location**

Serial No	Name of the reservoir	Situated in block	Latitude	Longitude
01	Bandu	Arsha	23.280079	86.138258
02	Upper Bandu	Arsha	23.283942	86.129503
03	Kestabazar	Baghmundi	23.184305	86.086753
04	Khairabera	Baghmundi	23.251473	85.980614
05	Turga	Baghmundi	23.196787	86.067903
06	Kulbera	Baghmundi	23.234226	85.988777
07	Kumari	Balarampur	23.163572	86.284794
08	Hanumata	Balarampur	23.116453	86.258015
09	Barabhum	Balarampur	23.116453	86.258015
10	Tatko	Bandawan	22.927363	86.510351
11	Futiary	Hura	23.384333	86.558475
12	Patloi	Purulia II	23.368918	86.478018
13	Golamarajore	Purulia II	23.425932	86.371236
14	Pithajore	Purulia II	23.464154	86.459297
15	Jamunajore	Purulia II	23.313687	86.397705
16	Rupai	Jhalda - I	23.374381	85.997418
17	Kariordih	Jhalda - I	23.366366	85.981894
18	Narohara	Jhalda - I	23.342836	85.985114
19	Saharjore	Jhalda - II	23.314962	86.049423
20	Kumari Kangsabati	Manbazar - I	22.968329	86.684893
21	Panchet	Neturia	23.635369	86.724523
22	Taragonia	Para	23.475051	86.38908
23	Lipania	Para	23.464913	86.460745
24	Chaka	Puncha	23.167557	86.449809
25	Tara	Purulia I	23.243245	86.348706
26	Moutorjore	Raghunathpur - II	23.533629	86.652741
27	Bero	Raghunathpur - II	23.547703	86.713287
28	Ramchandrapur	Santuri	23.581478	86.837151

Table 2. Fish species availability in the reservoirs of Purulia District

Sl. No.	Order	Family	Scientific name	Common name	Local name	IUCN status	Seasonal abundance	Economic value
1			<i>Labeo rohita</i> (Ham.)	Rohu	Rui	LC	TY	Food fish
2			<i>Labeo calbasu</i> (Ham.)	Black rohu/ karnataka labeo	Kalbose	LC	TY	Food fish
3			<i>Labeo bata</i> (Ham.)	Bata labeo/ minor carp	Bata	LC	SM	Food fish
4			<i>Puntius ticto</i> (Ham.)	Ticto barb	Tit punti	LC	SM	Ornamental, food fish
5			<i>Puntius sophore</i> (Ham.)	Pool barb	Jatpunti	LC	SM	Ornamental
6			<i>Puntius gelius</i> (Ham.)	Golden dwarf barb	Dor punti	LC	SM	Ornamental
7			<i>Catla catla</i> (Ham.)	Catla	Catla	LC	TY	Food fish
8			<i>Amblypharyngodon mola</i> (Ham.)	Mola carplet	Mourala	LC	SM	Ornamental
9			<i>Amblypharyngodon microlepis</i> (Bleeker)	Indian carplet	Mourala	LC	SM	Ornamental
10			<i>Rasbora daniconius</i> (Ham.)	Slender rasbora	Siram punti	LC	TY	Ornamental
11			<i>Cirrhinus mrigala</i> (Ham.)	Mrigal	M r i g a l / Mrig	LC	RS	Food fish
12			<i>Cirrhinus reba</i> (Ham.)	Reba carp	Bhangon-bata	LC	SM	Food fish
13			<i>Cyprinus carpio</i> (Linn.)	Wild common carp	Cyprinus	VU	TY	Ornamental/food fish
14			<i>Esomus danricus</i> (Ham.)	Flying barb	Darkya	LC	TY	Ornamental
15			<i>Hypophthalmichthys molitrix</i> (Val.)	Silver carp	Silver carp	NT	TY	Food fish
16			<i>Ctenopharyngodon idella</i> (Val.)	Grass carp	Grass carp	NE	TY	Food fish

17		<i>Chanda ranga</i> (Ham.)	Indian glassy fish	Ranjan chanda	LC	WN	Ornamental
18	Ambassidae	<i>Chanda nama</i> (Ham.)	Elongate glass-perchlet	Kanta chanda	LC	TY	Ornamental
19		<i>Oreochromis niloticus</i> (Linn.)	Nile tilapia	Nilontica	NE	TY	Food fish
20	Perciformes	<i>Oreochromis mossambicus</i>	Mozambique tilapia	Tilapia	NT	TY	Food fish
21	Osphroneimidae	<i>Trichogaster lalius</i> (Ham.)	Dwarf gourami	Khoira	LC	SM	Ornamental
22	Anabantidae	<i>Anabas testudineus</i> (Bloch)	Climbing perch	Koi	DD	TY/ RS	Ornamental
23	Gobiidae	<i>Glossogobius giuris</i> (Ham.)	Bareye goby	Bele	LC	WN	Ornamental/ food fish
24		<i>Ompok pabda</i> (Ham.)	Pabda catfish	Pabda	NT	SM	Food fish
25	Siluridae	<i>Wallago attu</i> (Bl. & Schn.)	Fresh water shark	Boal	NT	WN	Food fish/ ornamental
26	Claridae	<i>Clarias batrachus</i> (Linn.)	Air breathing catfish	Magur	LC	WN	Ornamental/ food fish
27	Siluriformes	<i>Heteropneustes fossilis</i> (Bloch)	Stinging catfish	Singhi	LC	SM	Ornamental/ food fish
28	Heteropneustidae	<i>Mystus vittatus</i> (Bloch)	Striped dwarf catfish	Tangra	LC	WN	Ornamental/ food fish
29	Bagridae	<i>Mystus tengara</i> (Ham.)	Tengara catfish	Tangra	LC	WN	Food fish/ ornamental

30	Synbranchiiformes	Mastacembelidae	<i>Macrognaathus pancalus (Ham.)</i>	Barred spiny eel	Pacal	LC	WN	Food fish
31			<i>Macrognaathus aculeatus (Bloch)</i>	Lesser spiny eel	Pacal	NE	WN	Ornamental/ food fish
32			<i>Channa punctata (Bloch)</i>	Spotted snakehead	Lata	LC	SM	Food fish/ ornamental
33	Channiformes	Channidae	<i>Channa striata (Bloch)</i>	Stripped or Snakehead murrel	Shol	LC	SM	Food fish/ ornamental
34			<i>Channa orientalis (Bl. &amp; Schm.)</i>	Walking snakehead	Cheng	NE	SM	Food fish
35			<i>Notopterus notopterus (Pallas)</i>	Bronze featherback	Folui	LC	WN	Ornamental/ food fish
36	Osteoglossiformes	Notopteridae	<i>Notopterus chitala/Chitala chitala (Ham.)</i>	Humped featherback	Chital	NT	WN	Ornamental/ food fish
37	Anguilliformes	Anguillidae	<i>Anguilla bengalensis (Gray)</i>	Indian mottled eel	Ban fish	NT	RS	Ornamental

LC = least concern, VU = vulnerable, NT = near threatened, NE = not evaluated, DD = data deficient;  
WN = winter, SM = summer, TY = throughout the year, and RS = rainy season.

**Table 3. Composition of the fish community by order**

Serial No	Order	Number of species	Percentage (%)
1	Cypriniformes	16	43.26
2	Perciformes	7	18.93
3	Siluriformes	6	16.21
4	Channiformes	3	8.10
5	Osteoglossiformes	2	5.40
6	Synbranchiiformes	2	5.40
7	Anguilliformes	1	2.70
<b>Total</b>		37	100.00

**Table 4. Composition of the fish community by family**

Serial No	Family	Number of Species	Percentage (%)
1	Cyprinidae	16	43.26
2	Ambassidae	2	5.41
3	Cichlidae	2	5.41
4	Osphronemidae	1	2.7
5	Anabantidae	1	2.70
6	Gobiidae	1	2.70
7	Siluridae	1	2.70
8	Claridae	1	2.70
9	Heteropneustidae	1	2.70
10	Bagridae	2	5.41
11	Schilbeidae	1	2.70
12	Channidae	3	8.10
13	Notopteridae	2	5.40
14	Mastacembelidae	2	5.41
15	Anguillidae	1	2.70
<b>Total</b>		37	100.00

Table 5: IUCN Status of commonly available fish species in the Reservoirs of Purulia District

Least Concern (LC)	Vulnerable (VU)	Near threatened (NT)	Not evaluated (NE)	Data deficient (DD)
<i>Labeo rohita</i>	<i>Cyprinus carpio</i>	<i>Hypophthalmichthys molitrix</i>	<i>Tenopharyngodon idella</i>	<i>Anabas testudineus</i>
<i>Labeo calbasu</i>		<i>Oreochromis mossambicus</i>	<i>Oreochromis niloticus</i>	
<i>Labeo bata</i>		<i>Ompok pabda</i>	<i>Macrornathus aculeatus</i>	
<i>Puntius ticto</i>		<i>Wallago attu</i>	<i>Channa orientalis</i>	
<i>Puntius sophore</i>		<i>Notopterus chitala/Chitala chitala</i>		
<i>Puntius gelius</i>		<i>Anguilla bengalensis</i>		
<i>Catla catla</i>				
<i>Amblypharyngodon mola</i>				
<i>Amblypharyngodon microlepis</i>				
<i>Rasbora daniconius</i>				
<i>Cirrhinus mrigala</i>				
<i>Cirrhinus reba</i>				
<i>Esomus danricus</i>				
<i>Chanda nama</i>				
<i>Chanda ranga</i>				
<i>Trichogaster lalius</i>				
<i>Glossogobius giuris</i>				
<i>Clarias batrachus</i>				
<i>Heteropneustes fossilis</i>				
<i>Mystus vittatus</i>				
<i>Mystus tengra</i>				
<i>Macrornathus pancalus</i>				
<i>Channa punctata</i>				
<i>Channa striata</i>				
<i>Notopterus notopterus</i>				
<i>Cirrhinus reba</i>				
<i>Esomus danricus</i>				
<i>Chanda nama</i>				
<i>Chanda ranga</i>				
<i>Trichogaster lalius</i>				
<i>Glossogobius giuris</i>				
<i>Clarias batrachus</i>				
<i>Heteropneustes fossilis</i>				
<i>Mystus vittatus</i>				
<i>Mystus tengra</i>				
<i>Macrornathus pancalus</i>				
<i>Channa punctata</i>				
<i>Channa striata</i>				
<i>Notopterus notopterus</i>				

**Table 6. Season wise distribution status of commonly available fish species in the Reservoirs of Purulia District**

Throughout the year (TY)	Summer (SM)	Rainy season (RS)	Winter (WN)
<i>Labeo rohita</i>	<i>Labeo bata</i>	<i>Cirrhinus mrigala</i>	<i>Chanda ranga</i>
<i>Labeo calbasu</i>	<i>Puntius ticto</i>	<i>Anabas testudineus</i>	<i>Glossogobius giuris</i>
<i>Catla catla</i>	<i>Puntius sophore</i>	<i>Anguilla bengalensis</i>	<i>Wallago attu</i>
<i>Rasbora daniconius</i>	<i>Puntius gelius</i>		<i>Clarias batrachus</i>
<i>Cyprinus carpio</i>	<i>Amblypharyngodon mola</i>		<i>Mystus vittatus</i>
<i>Esomus danricus</i>	<i>Amblypharyngodon microlepis</i>		<i>Mystus tengra</i>
<i>Hypophthalmichthys molitrix</i>	<i>Cirrhinus reba</i>		<i>Macrognathus pancalus</i>
<i>Ctenopharyngodon idella</i>	<i>Trichogaster lalius</i>		<i>Macrognathus aculeatus</i>
<i>Chanda nama</i>	<i>Ompok pabda</i>		<i>Notopterus notopterus</i>
<i>Oreochromis mossambicus</i>	<i>Heteropneustes fossilis</i>		<i>Notopterus chitala/</i> <i>Chitala chitala</i>
<i>Oreochromis niloticus</i>	<i>Channa punctata</i>		
<i>Anabas testudineus</i>	<i>Channa striata</i>		
	<i>Channa orientalis</i>		

-10% formaldehyde solution as per the size for identification to genus and species using taxonomic keys and standard literatures. Fishes were identified based on the standard taxonomic literature (Talwar and Jhingran, 1991; Jayaram, 1999; [www.fishbase.org](http://www.fishbase.org) var. 02/2015), grouped into four categories based on their abundance viz., abundant, moderate, low and very low and categorized according to Red Book of International Union for Conservation of Nature (IUCN).

## RESULTS

The reservoirs of the district showed rich Ichthyofauna diversity. The data on the fish community of the reservoirs of Purulia district are presented in Tables 2, Table 3 and Table 4. The periodical survey of the ichthyofauna revealed the occurrence of 37 species belonging to 26 genera, 15 families and 7 orders. On the basis of species composition, Cypriniformes were dominant (16 species) followed by Perciformes (7 species), Siluriformes (6 species) and Channiformes (3 species), Osteoglossiformes and Synbranchiformes (each of 2 species), and Anguilliformes (1 species). The fast growing Indian major carps, occupy a prominent place in Indian reservoirs (Sugunan, 1995) supporting the finding for the study.

## DISCUSSION

In the present study a total of 37 species belonging to seven orders, 15 families and 26 genera are reported in the reservoirs of Purulia Districts. On the basis of species composition, Cypriniformes were dominant (16 species) followed by Perciformes (7 species), Siluriformes (6 species) and Channiformes (3 species), Osteoglossiformes and Synbranchiformes (each of 2 species), and Anguilliformes (1 species) (Table 3 and Fig. 1). Species belong to family Cyprinidae were found to be more abundant (43.26%) followed by Channidae (8.10%), Ambassidae (5.41%), Cichlidae (5.41%), Bagridae (5.41%), Mastascembellidae (5.41%), Osphronemidae (2.7%), Anabantidae (2.7%), Gobidae (2.7%), Siluridae (2.7%), Claridae (2.7%), Schilbeidae (2.7%), Heteropneustidae (2.7%), Anguillidae (2.7%) (Table 4 and Fig. 2). The fish recorded from the reservoirs of the Purulia District were *Labeo rohita*, *Labeo bata*, *Labeo calbasu*, *Puntius ticto*, *Puntius sophore*, *Puntius gelius*, *Catla catla*, *Amblypharyngodon mola*, *Rasbora daniconius*, *Cirrhinus mrigala*, *Cirrhinus reba*, *Cyprinus carpio*, *Esomus danricus*, *Hypophthalmichthys molitrix*, *Ctenopharyngodon idella*, *Chanda ranga*, *Chanda nama*, *Oreochromis niloticus*, *Oreochromis mossambicus*, *Trichogaster lalius*, *Anabas*





**Figure 3. Photograph of some of the identified fishes from the reservoirs of Purulia district**

*giuris*, *Ompok pabda*, *Wallago attu*, *Clarias batrachus*, mainly because of unending anthropogenic pressure. *Heteropneustes fossilis*, *Mystus vittatus*, *Mystus tengra*, Habitat loss and environmental degradation has seriously affected the fish fauna which is also supported by Saha *et al.* *Macroglyptus pancalus*, *Macroglyptus aculeatus*, *Channa punctata*, *Channa striata*, *Channa orientalis*, *Notopterus notopterus*, *Notopterus chitala*, *Anguilla bengalensis* (Table 2). The average of fish abundance obtained in the reservoir showed that the species *Labeo rohita* recorded the highest catch by the number. Fish diversity and its abundance are being eroded every day

## CONCLUSION

This ichthyofaunal study indicates that these reservoirs are rich in diversified fish fauna consists of native species, economical, cultivable and rare species of fishes. Now a day's habitat loss and environmental degradation has seriously affected the fish fauna. Conservation of fish diversity assumes top most priority under changing circumstances of gradual habitat degradation. Therefore, a sustainable strategies needs to explore more fish species, utilization and save fish community of these reservoirs. The study will provide future strategies for development and fish conservation.

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