

FISH DIVERSITY OF GARGA RESERVOIR OF BOKARO (JHARKHAND)

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ABSTRACT : The fish diversity of the Garga reservoir was studied. Garga reservoir of Bokaro has been constructed on river Garga. The water of the reservoir is used for irrigation, fishery and drinking purposes. Fish collections were done with gillnets of standardized dimensions with several mesh sizes. 25 fishes were identified during the study belonging to Cyprinidae 11 species, Channidae and Notopteridae of 2 species, Bagridae with 4 species and a species each of Mastacembelidae, Cichlidae, Anabantidae, Siluridae, Saccobranchidae and Claridae. The species diversity is peak in post monsoon, coinciding with favourable conditions such as sufficient water and ample food resources whereas the diversity was low in pre-monsoon probably due to the shrinkage of the water spread of the reservoir.

Key words : Garga reservoir, Fish diversity, Physico-chemical.

INTRODUCTION

Fishes have high nutritive value and are of great benefit from commercial point of view. Fish faunistic diversity of a reservoir at a given time is the result of the impact of a series of man-made and natural changes on the native fauna of the parent river. Riverine fish fauna is subjected to a series of habitat changes such as water current, turbidity levels, fishing pressure, loss of breeding grounds and the changes in fish food organisms due to lake formation. The original fauna changes and hardy fish species take advantage of the vacant niches. In many reservoirs, transplantation of fishes from other basins and introduction of exotic species have led to further radical changes in the species set up.

In India it is estimated that about 2500 species are found within which around 930 species are freshwater species. These are distributed among 20 orders, 100 families, 300 genera. River Garga is a hillstream tributary of river Damodar. The area selected for the present study is Garga reservoir of Bokaro which has been constructed on river Garga.

MATERIAL AND METHODS

Study site : The area selected for the present study is Garga reservoir of Bokaro. It is 12 km from the City centre (23.67°N 86.10° E) near to the railway station on the NH 23 (Fig. 1). The investigation was carried out from 2013-2016.

Fish diversity : The specimens were collected with the help of different kinds of fish catching appliances and devices used catch fishes by the fishermen in and around Garga and the employees of fishery department. After the collection of fishes, were identified by using the standard keys of Day (1889), Jayaram (1999) and Krishnamurthy (2003). The specimens were fixed in 8% formalin, Smaller specimens were directly put in formalin, while medium size one prior to fixation were given a longitudinal incision along the abdomen, 4. Fixed specimens were kept in containers with proper labeling and the tail pointing upward to avoid damage to the caudal fin.

RESULTS AND DISCUSSION

Fisheries in Jharkhand : The fisheries sector in Jharkhand has been witnessing a phenomenal growth after Jharkhand became a separate state bifurcating Bihar in 2000. When in 2001-2002, the production of fish in the state had been only 14,000 metric tones. In 2010-2011, eighty government fish firms produced 71,886 metric tones. The fish seed production was increased from 32 crore to 67 crore, along with construction of 116 new fish seed hatcheries in private and government sector. The department of fisheries aims to produce fish of 1,40,000 tones during 12th plan. The department of fisheries earning in the year 2001-2002 had been only Rs. 67 lakh, which in 2008-2009 rose to Rs. 191 lakh.

It may be mentioned that Jharkhand is predominantly an agriculture state. The major dependence of farming and its allied activities on rainfall has resulted in a meager income from the small holdings of the community and has constrained the development of rural areas. The fisheries is an integral part of rural households more so, for the traditional fishermen whose livelihood is inseparably linked with fishing. An estimated 1.35 lakh fishermen in Jharkhand traditionally depend on fisheries and the activity provides secondary source of income and employment to all these rural households. The existing demand for fish in Jharkhand is partly met through supplies from outside as internal production is not adequate to meet the demand. On the other hand, the state has a large number of vast and diverse water bodies, developed for multiple purposes supplementing and complementing agriculture and allied activities. Fishing operations in Garga reservoir is under Bokaro Steel Limited (BSL).

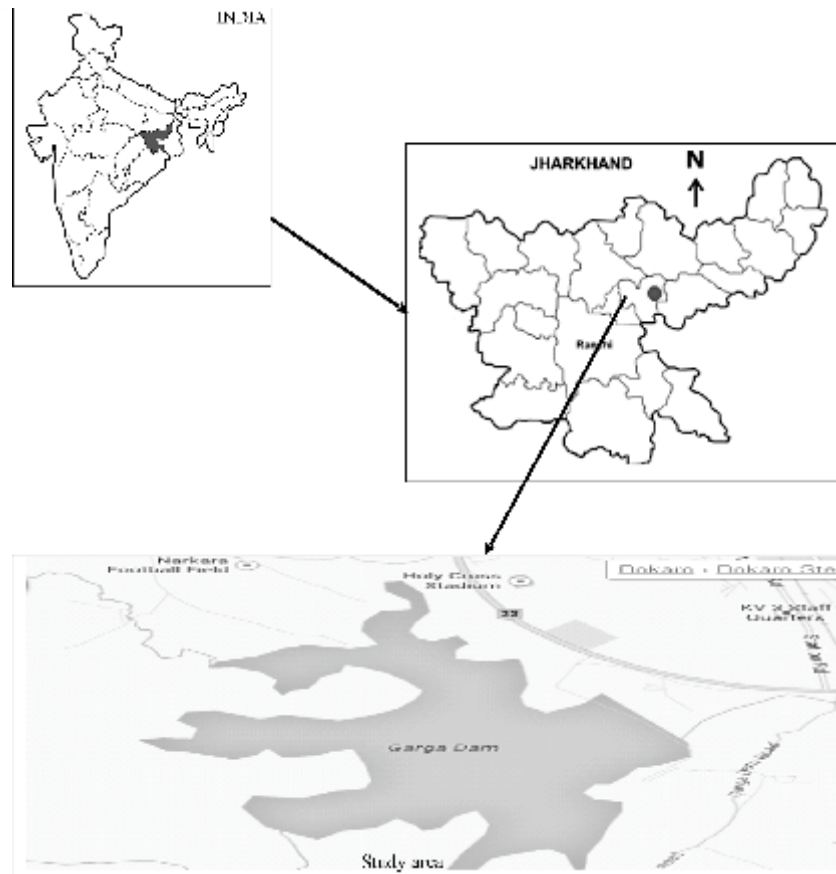


Fig. 1 Family wise variation in number of fish species of Garga reservoir.

Fishing contract is given on a bid at the rate fixed by the BSL Govt. from time to time. The contractor engages 18-20 fisher men. Besides these 25-30 fisher men from the nearby villages are generally engaged. Fishermen normally use current net, hand moving circle net and Tube fishing. Fishing is done nine months in a year. 25 species of fishes were observed belonging to 10 families. The important fishes in order of abundance were 1. *Catla catla*, 2. *Labeo rohita*, 3. *Ctenopharyngodon idella*, 4. *Cirrhinus mrigala*, 5. *Labeo calbasu*, 6. *Oreochromis mossambicus*, 7. *Cirrhinus reba*, 8. *Cyprinus carpio*, 9. *Puntius sarana* and 10. *Channa marulius* (Table.1&Fig.2). Fish production and yield for Garga reservoir from 2013-2014 to 2015-2016 has been given in Table.2. The catch of fishes oscillated around 35.5 t to 36 t between 2013-2014 to 2015-2016. On an average 35.33t was observed.

Yearly variation in fish yield : Species wise catch during 2013-2014 to 2015-2016 has been presented in Table.3. It shows that *C.catla* increased from 36.62% to 38.33%. *L.rohita* declined from 18.31-17.78%. The catch of *C.idella* remained almost same (19.44%). *C.mrigala* declined from 9.86-9.44%. *L.calbasu* (5.63-5.63%) and *O.mossambicus* (4.51-5.26%) showed marginal difference. *C.reba* and *C.carpio* declined from 0.7 and 0.5-1.11%. *P.sarana* increased from 0.5-0.83%. *C.marulius* increased 0.3% to 1.11%. Others fishery fluctuated from 0.4% to 1.67%.

Common fish diseases : Common fish diseases found in Garga reservoir are white spot, fin rot, fish fungus and pop eye. It was featured by several ulcerative skin lesions fin rotting and protruded eyes which ultimately lead to fish death. Mainly *Wallago attu*, *Mystus senghala* and *Channa* species were affected and it lead to their severe decline. Indian major carps like *Catla*, *Rohu*, *Mrigal* were not much affected.

Impact of physico-chemical parameters on fish culture : Although temperature showed significant fluctuations, it remained around lower limits of range of temperature (17-29°C) conducive for optimum growth of fish in tropical waters (Farhad and Sadhu,2015). Similarly, the DO content although showed significant monthly variations, in both the years, it remained well above the minimum level (>5ppm, Banerjea,1967) to support good fish production, throughout the year.

Phosphate concentration was not much than the normal range (0.1-0.2 mg/liter, Sreenivasan,1965) for the sustenance of phytoplankton density, which form food for fish. However, in a few months (July, August, September, October,) it exceeded

much than the normal range, resulting in dense phytoplankton growth, which might be either due to phosphate rich agricultural runoff reaching the reservoir (monsoon) or prevalence of low temperature (winter) resulting in slower utilization by phytoplankton. On the other hand monthly significant variations in total alkalinity and pH were undesirable, as they were higher than levels conducive for fish culture (alkalinity, less than 100 mg/liter and pH>9 and 5.5-6.5, not suitable (Banerjea, 1967).

Nitrate concentration showed a similar pattern of variation and its concentration was much higher than the minimum level (0.1 mg/lit), during the the study period, which might be a cause for algal growth at times. The present study shows that Garga reservoir harbours potential commercial fishes. Till now there is no scientific data available about fisheries in Garga reservoir. Thus it is of prime importance to maintain at least data pertaining to total yield statistics, species wise yield, diseases affecting and physicochemical analysis of reservoir water which will help in taking remedial steps towards conservation of the valuable fish resources in Garga reservoir (Fig.3).

Table. 1 List of fishes observed in the Garga reservoir.

S.	Species	Local Name
Family : Cyprinidae		
Sub family : Cyprininae		
1.	<i>Labeo rohita</i> (Ham)	Rohu, Rui
2.	<i>Labeo calbasu</i> (Ham)	Kalbasu, Kalbans
3.	<i>Labeo boga</i> (Bloch)	Bhagan, Rohu, Bata
4.	<i>Catla catla</i> (Ham.)	Katla
5.	<i>Cirrhinus mrigala</i> (Ham.)	Mrigal
6.	<i>Cirrhinus reba</i> (Ham.)	Reba, Sunhi
7.	<i>Cyprinus carpio communis</i>	Common carp
8.	<i>Ctenopharyngodon idella</i>	Grass carp
9.	<i>Puntius ticto</i> (Ham.)	Puthi
10.	<i>Puntius sophore</i> (Ham.)	Puthi
11.	<i>Puntius sarana</i> (Ham.)	Puthi
Family : Notopteridae		
12.	<i>Notopterus notopterus</i> (Pallas)	Patra
13.	<i>Notopterus chitala</i> (Pallas)	Chital ,Maya
Family : Bagridae		
14.	<i>Mystus cavasius</i> (Ham.)	Suthawa Tengra
15.	<i>Mystus vittatus</i> (Bloch)	Tengra
16.	<i>Mystus tengra</i> (Ham.)	Tengra
17.	<i>Mystus seenghala</i> (Sykes)	Singhi
Family : Siluridae		
18.	<i>Wallago attu</i> (Bl.&Schn.)	Mangur
Family : Claridae		
19.	<i>Clarias batrachus</i> (Linnaeus)	Mangur
Family : Channidae		
20.	<i>Channa marulius</i> (Ham.)	Sol
21.	<i>Channa punctatus</i> (Bloch)	Donka
Family : Mastacembelidae		
22.	<i>Mastacembelus armatus</i> (Lacepede)	Ture
Family : Cichlidae		
23.	<i>Oreochromis mossambicus</i>	Tilapia
Family : Anabantidae		
24.	<i>Anabas testudineus</i> (Bloch)	Kawai, Sumha
Family : Saccobranhidae		
25.	<i>Heteropneustes fossilis</i> (Bloch)	Singhi

Table. 2 Fish production and yield scenario of Garga Reservoir from 2013-2014 to 2015-2016.

Year	Catch (t)	Yield (kg/ha)
2013-2014	35.5	43.12
2014-2015	34.5	41.9
2015-2016	36	43.73
Average	35.33	42.92

Table. 3 Fish landing (t) of Garga reservoir from 2013-2014 to 2015-2016.

S.	Species	2013-2014		2014-2015		2015-2016	
		Wt	%	Wt	%	Wt	%
1.	<i>Catla catla</i>	13	36.62	12.8	37.1	13.8	38.33
2.	<i>Labeo rohita</i>	6.5	18.31	6.5	18.84	6.4	17.78
3.	<i>Ctenopharyngodon idella</i>	6.5	18.31	6.5	18.84	7.0	19.44
4.	<i>Cirrhinus mrigala</i>	3.5	9.86	3.2	9.28	3.4	9.44
5.	<i>Labeo calbasu</i>	2	5.63	1.6	4.64	1.7	4.42
6.	<i>Oreochromis mossambicus</i>	1.6	4.51	1.4	4.07	1.6	4.44
7.	<i>Cirrhinus reba</i>	0.7	1.97	0.5	1.45	0.4	1.11
8.	<i>Cyprinus carpio</i>	0.5	1.41	0.6	1.74	0.4	1.11
9.	<i>Puntius sarana</i>	0.5	1.41	0.4	1.16	0.3	0.83
10.	<i>Channa marulius</i>	0.3	0.85	0.5	1.45	0.4	1.11
11.	Others	0.4	1.13	0.5	1.45	0.6	1.67
Total		35.5		34.5		36.0	

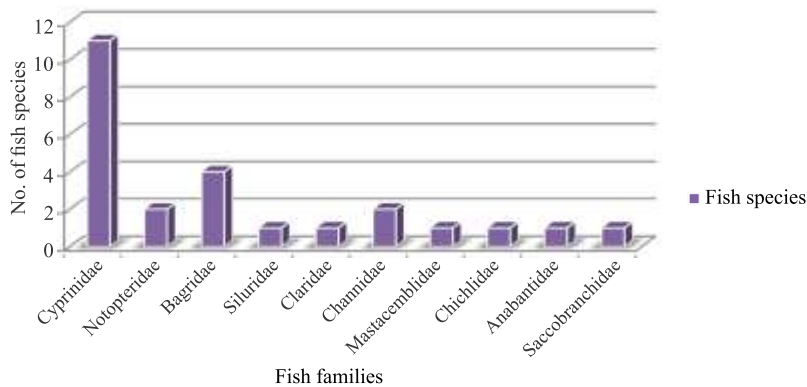


Fig. 2 Family wise variation in number of fish species of Garga reservoir.

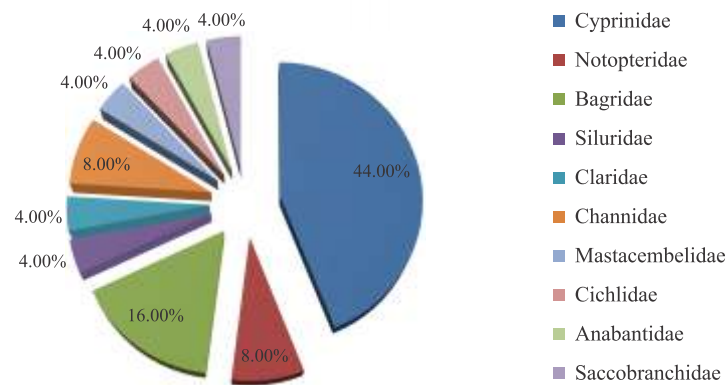


Fig. 3 Family wise percentage composition fish species of Garga reservoir.

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