



FISH FAUNAL DIVERSITY AND PLANKTON COMPOSITION AND SOME LIMNOCHEMICAL PARAMETERS OF THE BHANWAR SEMLA RESERVOIR, DISTRICT PRATAPGARH, RAJASTHAN, INDIA.

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Abstract

The survey was carried out for study of fish faunal diversity in the Bhanwar Semla Reservoir of District Pratapgarh. The survey was focused on fish faunal diversity, 18 Species of fishes belongs to 6 orders and 8 families were recorded during the study period. Family Cyprinidae was most dominant group represented by 8 species, Siluridae with 2 species, Bagridae with 1 species, Channidae with 3 species, Cichlidae, 1 species, Heteropneustidae, 1 species, Notopteridae, 1 species and Mastacembelidae, 1 specie. In the present study on fish faunal diversity of the Bhanwar Semla Reservoir suggest that Cyprinidae family exhibits the most abundant fish population among others family. Study of some limnochemical parameters of water and plankton composition indicate that Bhanwar Semla reservoir has less fish faunal diversity because of the lesser plankton abundance. Thus the result revealed that aquatic environment of Bhanwar semla reservoir is conducive for fish farming and augmentation of fish faunal diversity can be possible by adding some supplementary feeding.

Key words: Abundant, Fish faunal Diversity, Species, Plankton, Limnochemical, Bhanwar Semla.

INTRODUCTION

Fishes are important protenious food for rmankinds. Bhanwar Semla Reservoir is situated in the district Pratapgarh. The reservoir has rich fish fauna and need to study along with plankton composition and some limnochemical parameters. The Study has been considered to prepare a list of the fish resources in the fresh water body, Bhanwar Semla Reservoir of district Pratapgarh. Fish faunal diversity studies made so far on various fresh water bodies in India during last few decades¹⁻⁴. Day⁵, Mathew et al.,⁶, Jhingran², Talwar and Jhingran⁷, Jayaram⁸, Menon⁹, Goswami¹⁰, Muley et al.,¹¹ have observed fish fauna in Pethwadaj Dam of Nanded. Kulkarni et al.,¹² have suggested fish and fisheries of Derala Tank, Nanded (Maharashtra). Ravindar¹³ has reported the biodiversity of fishes in Dharmasagar Dam, Warangar (AP). The aquatic eco systems have been subjected to various forms of environmental stress, during the past few decades. Most of such environmental problems are man-made and thus increased human activities in the catchment area of various aquatic systems have affected the natural processes of these systems adversely thereby threatening the survival and growth

of biotic communities¹⁴. The fish faunal diversity was related to the plankton composition of the particular water bodies along with their limnochemical condition Bhaumik²⁵ et al., (2005) studied the ecology, production potential of L. L. and Sarang N.,²⁸ (2004) also reported the physicochemical limnology and productivity of Jaisamand Lake, Udaipur Rajasthan. Keeping in view the above facts the present study depicts the fish faunal diversity of this reservoir in relation to plankton composition and some limnochemical properties of Bhanwar Semla reservoir of district Pratapgarh.

MATERIALS AND METHODS

Sampling Station:

The Bhanwar semla reservoir (latitude 23⁰59'00", longitude 74⁰44'00") is situated in the district Pratapgarh of Rajasthan. The reservoir has water spread area of 4266 Acre. Sampling for estimating limnochemical parameters was conducted in three different sites of the water body Bhanwar semla (Fig.1) reservoir of district Pratapgarh. At each sites 3 surface water samples were randomly collected in different depth. The study was conducted from October 2017 to August 2018. The important physicochemical parameters of water including air temperature, water temperature, transparency, pH, Sp. conductivity, dissolved oxygen, free carbon dioxide, total alkalinity, were analyzed following methods given by (APHA 1985)²⁷ and (Jhingran et al 1969)²⁹. Sample for phytoplankton and zooplankton were also collected along with water sample. The samples were collected by filtering 50 l of water through plankton net of bolting silk No. 30-micron mesh size and concentrated up to 50 ml. The concentrated sample was preserved immediately with the help of 4% formalin solution and adds two drops of glycerin. The samples were observed under the microscope and qualitative and quantitative analysis was done as per the standard keys procedure. The zooplankton species have been identified with the help of standard keys procedures. The quantitative estimation was done by using Sedge wick - Rafter Cell and expressed as numbers per liter. The quantitative analysis of phytoplankton was done using a hemocytometer. The biotic parameters were analyzed following the method of Wetzel and Likens (2006)²³.



Fig.1: Location Map Bhanwar Semla Reservoir of District Pratapgarh.

RESULT AND DISCUSSION

In the present study a total of 18 species of freshwater fishes belonging to 8 Families and 6 orders were recorded from different sampling sites. Number of species and their relative abundance is given in Table. 2. In the assemblage structure, Cyprinidae constituted the dominant group and the cyprinid *Labeo rohita*, *Catla catla* and *Cirrhinus mrigala* are represent in all study sites. The family Cyprinidae dominated with 8 species followed by Channidae with 3 species and Siluridae with 2 species, beside other family such as Bagridae, Mastacembelidae, Cichlidae, Heteropneustidae and Notopteridae (Table-1& Fig.2).In these studied fishes, Cyprinidae family was more dominant in the dam site area of Bhanwar Semla reservoir. Fish faunal population in village area site showed lesser number of species as compare to dam sampling site perhaps because of increased anthropogenic activities by the villagers that support the similar study performed in Udaisagar reservoir¹⁴. Many researchers have also reported the similar strong dominance of Cyprinidae family in their investigation on fish faunal diversity. Perhaps rich availability of phytoplankton and zooplankton results the maximum abundance of fish fauna in dam site to as compare to village area of Bhanwar Semla reservoir. In support to our observation Sakhare¹⁶ reported 23 species belonging to 7 orders where Cyprinidae family was dominant with 11 species in Jawalgaon reservoir Solapur district Maharashtra. Khedkar and Gynanath¹⁷ documented 37 species from Issapur dam in district Yavatmal where Cyprinidae family was dominant with 20 species. Similar type of observation was illustrated by Sharma¹⁸ that 87 species under 36 genera belonging to Cyprinidae family from freshwater of Nepal. Afterwards Dongre et al.,¹⁹ reported 68 species of fishes in Tribal District Satpura valley, Betul of Madhya Pradesh in India where the order Cypriniformes was dominated among other. These reports strongly support our present observation. Choubey and Qureshi²⁰ recorded 45 species in a rajnandgaon town of CG, India, where Cyprinidae was the largest dominant family contributing 20, species and Bagridae formed the sub in dominant family. In the same year Narasimha and Benarjee²¹ reported 30 species in Nagaram Tank of Warangal, Andhrapradesh where order Cypriniformes were dominant by contributing 13 species. Nagmaand Khan²² also studied the fresh water fish fauna of district Bijnour in Uttar Pradesh where order Cypriniformes was dominating with 18 species. In southern Rajasthan Rathore et al.,¹⁴ that study support our present observation.

However, physico-chemical parameters influence the phytoplankton distribution in head water stream of Garhwal Himalayas(Sharma R.C. and Chauhan A.,2016)³⁰. In Bhanwar Semla reservoir depth wise limnochemical(Table.1) study revealed that Phytoplankton contributed 62.3 to 70.2% among the total plankton. Maximum planktons were recorded in the monsoon followed winter and summer. *Bacillariophyceae* was predominant among phytoplankton followed by *Chlorophyceae* and *myxophyceae* in the all the reservoirs. The important algal genera were *Navicula sp*, *Synedra sp*, *diatoma sp* (*Bacillariophyceae*), *Spirogyra sp*, *Characiopsis*, *Pediastrum sp*(*Chlorophyceae*), *Microcystis sp*, *Oscillatoria sp*, *Anabina sp*, *Nostoc sp*(*Myxophyceae*). Paturez, Ewa (2016)²⁶ reported the effect of physico-chemical parameters on zooplankton in brackish coastal vistula lagoon. Zoo-plankton were mainly dominated by copepods (Diaptomus, Cyclops and Naupli) which formed 12.9% Bhanwar Semla of the total plankton. Rotifers (Keratella, Brachionus, Polyarthra) constituted 10.1% plankton in Bhanwar Semla reservoir (Fig.3).A. R. Zafar 1986²⁴ also reported that planktons exhibit seasonality in south Indian Lakes. Our findings coincide with the report of Bhaumik et al.; (2005)²⁵ on planktons are essential factor for production potential of Barnoos reservoir in Madhya Pradesh. The composition of planktons in reservoir forms various trophic status of the reservoir. Thus dominance of Cyprinidae family indicates the more phyto and zooplankton availability in the reservoir.

Table.1: Depth Profile of Bhanwar Semla Reservoir.

Depth (m)	Water temperature (°C)			pH			D.O.(ppm)		
	Summer	Post-Monsoon	Winter	Summer	Post-monsoon	Winter	Summer	Post-monsoon	Winter
1	2	3	4	5	6	7	8	9	10
Surface	33.6	31	17.9	7.3	7.83	7.14	6.7	7.1	7.6
1	33.4	31	17.5	7.2	7.84	7.15	6.8	6.8	7.8
Depth (m)	Free CO ₂			Total Alkalinity (ppm)			Sp.conduitiivity(µmhos/cm)		
	Summer	Post-Monsoon	Winter	Summer	Post-monsoon	Winter	Summer	Post-monsoon	Winter
1	2	3	4	5	6	7	8	9	10
Surface	Nil	Nil	Nil	88.2	96	90.2	162	174	182
1	Nil	Nil	Nil	86.9	95.8	94.5	-	176	181

Table.2: Showing the diversity of fishes in Bhanwar Semla Reservoir in the year October 2017- August2018

S. No.	Species	Local Name	Order	Family	Relative abundant
1.	<i>Mystus seenghala</i> (Sykes, 1839)	Singhara	Siluriformes	Bagridae	C
2.	<i>Channa striata</i> (Hamilton, 1822)	Kabra	Anabantiformes	Channidae	C
3.	<i>Channa marulius</i> (Hamilton, 1822)	Sawal	Anabantiformes	Channidae	C
4.	<i>Channa punctatus</i> (Bloch, 1793)	Girhi	Perciformes	Channidae	C
5.	<i>Oreochromis mossambicus</i> (Peters, 1852)	Tiapia	Perciformes	Cichlidae	C
6.	<i>Catla catla</i> (Hamilton, 1822)	Catla	Cypriniformes	Cyprinidae	D
7.	<i>Cirrhinus Mrigala</i> (Hamilton, 1822)	Mrigal	Cypriniformes	Cyprinidae	D
8.	<i>Labeo rohita</i> (Hamilton, 1822)	Rohu	Cypriniformes	Cyprinidae	D
9.	<i>Labeo calbasu</i> (Hamilton, 1822)	Kalaunt	Cypriniformes	Cyprinidae	D
10.	<i>Puntius ticto</i> (Hamilton, 1822)	Puthi	Cypriniformes	Cyprinidae	D
11.	<i>Puntius sarana</i> (Hamilton, 1822)	Puthi	Cypriniformes	Cyprinidae	D
12.	<i>Ctenopharyngodon Idella</i> (Cuvier & Valenciennes, 1844)	Grasp carp	Cypriniformes	Cyprinidae	D
13.	<i>Hypophthalmichthys molitrix</i> (Valenciennes , 1844)	Silver carp	Cypriniformes	Cyprinidae	D
14.	<i>Heteropneustes fossilis</i> (Bloch, 1794)	Singhi	Siluriformes	Heteropneustidae	R
15.	<i>Mastacembelus armatus</i> (Lacepede, 1800)	Bam	Synbranchiformes	Mastacembelidae	C
16.	<i>Notopterus notopterus</i> (Pallas, 1769)	Patola	Osteoglossiformes	Notopteridae	R
17.	<i>Ompok bimaculatus</i> (Bloch, 1794)	Pabda	Siluriformes	Siluridae	C
18.	<i>Wallago attu</i> (Bloch & Schneider, 1801)	Lanchi	Siluriformes	Siluridae	C

CONCLUSION

Based on these results, it can be suggested that some fish species are like *Notopterus notopterus* and *Heteropneustes fossilis* are rare in number. The present observation is the first ever documentation of fish faunal diversity in the Bhanwar Semla Reservoir in Pratapgarh district recorded with 18 species of fish fauna where Cyprinidae occupying the dominant position because, they are usually plankton

feeders. Thus less availability of benthic animal carnivorous species is lesser in number. Therefore, from the present study it can be concluded that fish faunal diversity directly or in directly correlated with trophic status as well as limnochemical nature of the rain fed water body Bhanwar Semla Reservoir.

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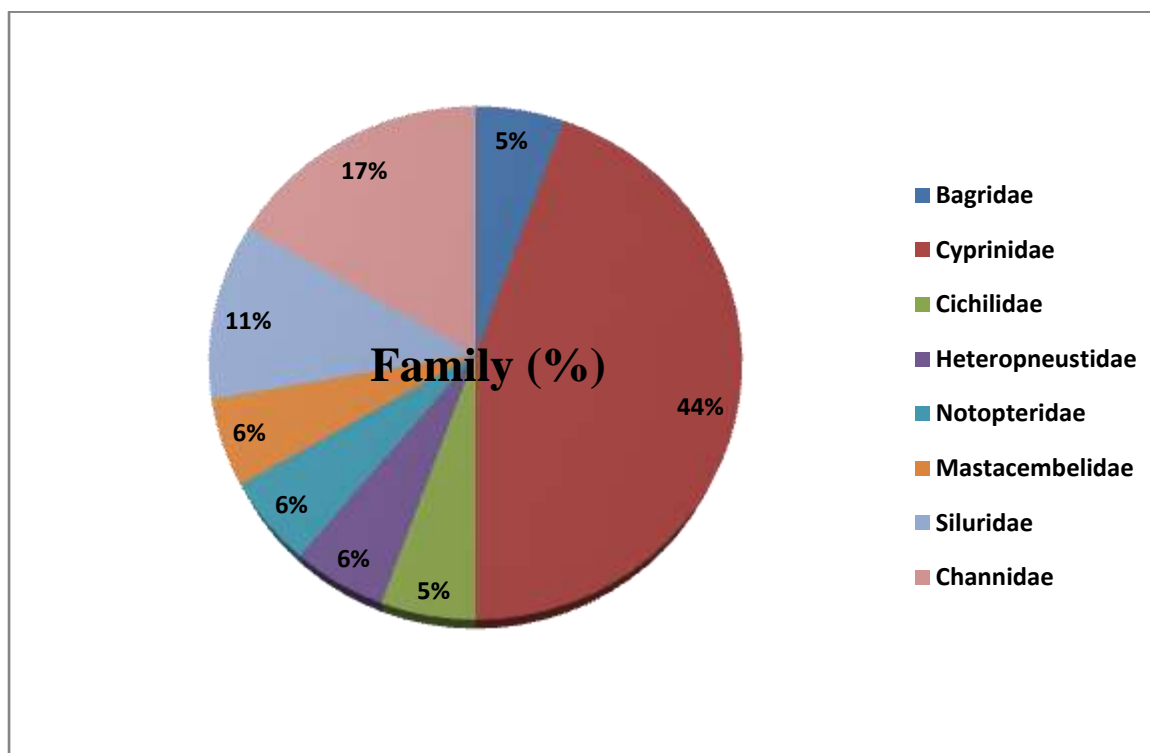


Fig.2. Pie chart showing Composition of different families of fish fauna.

Plankton Composition (%)

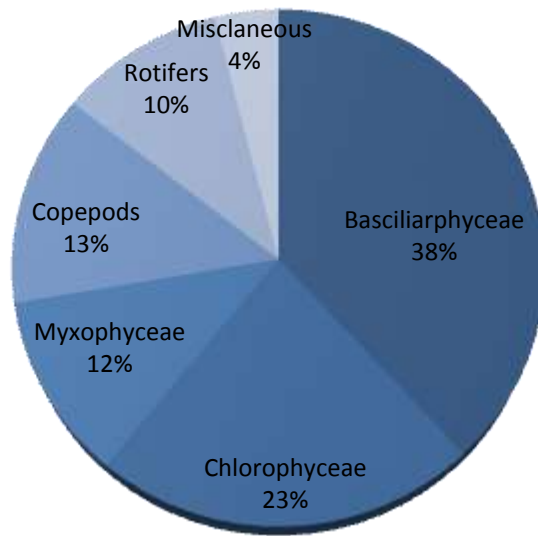


Fig.3: Pie chart showing composition of in the Bhanwar Semla Reservoir of District Pratapgarh