

STUDIES ON FISH DIVERSITY OF BIKHMA POND OF RATANPUR AREA, DISTRICT BILASPUR, CHHATTISGARH, INDIA

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ABSTRACT

The present study was conducted to document the Ichthyofaunal diversity of the Bikhama pond of Ratanpur area district Bilaspur Chhattisgarh India in the year July 2020 to August 2021. The Bikhama pond, is situated just below the hill named Ram Tekri in Ratanpur, is an ancient pond spread over an area of 22 acres.

In the present study 30 species of 17 genera has been identified, which are belonging to 11 families of 6 orders. Cypriniformes has been found to be a dominant order with 13 species and has 43.33% contribution. Maximum 13 species are belonging to order Cypriniformes. Catla catla was a major contributor among carp species. A part from the Indian major carps threatened and endangered species Chitala chitala was recorded from the pond. the commercial value of the observed fishes was also studied

The study indicates that Bikhama pond of Ratanpur district Bilaspur (C.G.) is a suitable place for shelter of large number of fish diversity. This freshwater body may provide congenial for conservation of regional Piscean faunal diversity, especially for local indigenous Pisces species. Suitable conservation measures should follow immediately to sustain the fish diversity in the region.

Keywords : – Ichthyofauna, Diversity, Ratanpur, Conservation, Piscean fauna, Indigenous species.

INTRODUCTION

The Freshwater ecosystem is the natural habitat for numerous organisms. Fishes are the highly visible and most important aquatic species. They can survive in all types of aquatic habitats. They play a significant role in the trophic guild of the aquatic ecosystem.

Fishes are highly sensitive to environmental changes (Simon and Lyons, 1995). Fishes plays a significant role in maintaining and existence of Aquatic ecosystem. Fishes act as a biomonitoring tool due to their prolonged existence and Septo-temporal effect (Karr, 1981). According to IUCN 868 species are found in freshwater ecosystem of India, out of which 192 species are endemic and 327 species are in threatened category (Lakra et al., 2010)

Environmental DNA (eDNA) technique is a new emerging and useful technique to assist with monitoring and protecting fish resources. eDNA is non-invasive technique for monitoring invasive, protected and target species (Jia et al., 2020). This method is also used to assess the diversity of macro-organismal community in natural system and study of species distribution, population dynamics and Ecosystem health (Thomsen, 2015 and Thalinger, 2019).

The natural calamities, anthropogenic activities and pollution may destroy or modify the habitat of freshwater fishes (Sarkar, 2021). These are the major threats for aquatic ecosystem (Cowx, 2002, Lyubov, 2011).Over

fishing or indiscriminate fishing (use of mosquito net, dynamite and electro fishing) causes mass mortality of fish species and huge reduction of their population size (Sarkar et al., 2008, Singh, 2019) and introduction of exotic fish may cause the introduction of new diseases and parasites in new habitat. They also increase the conflict between exotic and Indigenous fishes and finally the introduced exotic fishes may reduce the population size of indigenous fish species (Singh and Lakra, 2011).

The Bikhama pond is located in Bilaspur-Ambikapur pathway at a distance of 5 km from the holy city of Ratanpur, famous for ruins of forts and served as the capital of Chhattisgarh once. The Bikhama pond, is situated just below the hill named Ram Tekri in Ratanpur, is an ancient pond spread over an area of 22 acres.

Ratanpur is situated in the central Indian state of Chhattisgarh. Ratanpur has a long historical and cultural record. The city was established by Ratnaraja (grandson of Kalingaraja) (Koshale and Mahato, 2020). The optimal natural environmental condition, undulating landscape, rich forest, the agricultural field, large number of Ponds, makes Ratanpur a biodiversity hotspot area.

Various studies have been conducted on the wetland and aquatic faunal diversity of Ratanpur area (Pandey P. and Jha, Y. N. (2016), Dwivedi, and Singh, (2017), Porte and Gupta (2017), Mishra, R. and Sing, R. K., (2020). But no study has been conducted on fish diversity in Bikhama pond, so an attempt was made to study and access the present scenario of fish diversity in Bikhama pond, a reservoir of the Ratanpur area.

STUDY SITE

The present work was conducted in two different end of the Bikhama pond of Ratanpur. The geographical status of Study site A. is 22.3015960, Long. 82.153987⁰ and site B. is Lat. 22.28935⁰, Long. 82.17634⁰ (Fig. 2 and 3).



Fig. 1. Showing geographical status of Ratanpur area,



Fig. 2. Study site A.



Fig. 3. Study site B.

2 and 3, - Showing the geographical status of study site A. and B

MATERIAL AND METHODS

Sampling was carried out from July 2020 to August 2021. Samples were collected at regular intervals with the help of fishermen and by using standard protocols. The collected samples were cleaned thoroughly and all colors, color patterns, Spots, numbers, and designs have been noted when they are in fresh condition. Then they reserved in specimen jar by using standard protocol for further systematic and taxonomic identification and confirmation of species. The Specimens of fish were identified on the basis of their morphology, fin formula and morphometric characteristics.

The systematic and scientific identification of the fish species was conducted with the help of standard keys provided by standard literature Jhingran (1982), Jayaraman (1999 and 2002).

Table No. 1 List of Fishes collected and Identified from the Bikhama pond of Ratanpur, Bilaspur (C.G.) India along with their commercial value and IUCN Status

Order	Family	S. No.	Name of Fish	Local Name	Commercial Value	IUCN Categorization (CAFF 2006)
Osteoglossiformes	Notopteridae	1.	<i>Chitala chitala</i> (Hamilton-Buchanan)	Chital	Food Fish	EN
		2.	<i>Notopterus notopterus</i> (Pallas)	Patola /	Food Fish	EN
Cypriniformes	Cyprinidae	3.	<i>Catla catla</i> (Hamilton-Buchanan)	Catla	Food Fish	LRnt
		4.	<i>Cirrhinus mrigala</i> (Hamilton-Buchanan)	Mrigal	Food Fish	LRnt
		5.	<i>Cirrhinus reba</i> (Hamilton-Buchanan)	Borai/ Reba	Food /Ornamental Fish	VU
		6.	<i>Cyprinus carpio</i> (Linn.)	Komal carp	Food Fish	VU
		7.	<i>Labeo bata</i> (Hamilton – Buchanan)	Bata	Food Fish	LRnt
		8.	<i>Labeo calbasu</i> (Hamilton-Buchanan)	Kamach / Kariya	Food Fish	LRnt
		9.	<i>Labeo rohita</i> (Hamilton-Buchanan)	Rohu	Food Fish	LR-Ic
		10.	<i>Labeo gonius</i> (Ham.)	-	Food Fish	LRnt
		11.	<i>Labeo boggut</i> (Sykes)	Bata	Food Fish	LRnt
		12.	<i>Labeo dyocheilus</i> (McClel.)	Amachaini	Food /Ornamental Fish	
		13.	<i>Puntius chola</i>	Kotri	Food Fish	LRnt
		14.	<i>Puntius sarana sarana</i> (Hamilton-Buchanan)	Puthia/ Kotra	Food Fish	VU
		15.	<i>Puntius sophore</i> (Hamilton-Buchanan)	Jarhi kotri	Food Fish	LRnt
Siluriformes	Claridae	16.	<i>Clarias batrachus</i> (Linnaeus)	Mongri / Mangur	Food Fish	VU
	Saccobranchidae	17.	<i>Heteropneustes fossilis</i> (Bloch)	Singhi	Food Fish	VU
	Bagridae	18.	<i>Mystus gulio</i> (Ham.)	Tengna	Food Fish	LRnt
		19.	<i>Mystus cavasius</i> (Hamilton-Buchanan)	Jaliya Tengna	Food Fish	LRnt
	Siluridae	20.	<i>Ompok bimaculatus</i> (Bloch)	Botia	Food /Ornamental Fish	EN
		21.	<i>Ompok pabda</i> (Ham.)	Pabda	Food Fish	LRnt
		22.	<i>Wallago attu</i> (Block & Schneider)	Padhan/ Lonch	Food Fish	LRnt
Heteropneustidae	23.	<i>Heteropneustes fossilis</i> (Bloch)	kewai	Food /Ornamental Fish	VU	
Synbranchiformes	Mastacembelidae	24.	<i>Mastacembelus armatus</i> (Lacepede)	Bami	Food Fish	VU
		25.	<i>Mastacembelus pancalus</i> (Ham-Buch)	Choti Bami	Food Fish	LRnt
Ophiocephaliformes	Channidae	26.	<i>Channa (Ophiocephalus) marulius</i> (Ham-Buch)	Sanwal / Sol	Food Fish	VU
		27.	<i>Channa (Ophiocephalus) punctatus</i> (Bloch)	Khoksi	Food Fish	LRnt
		28.	<i>Channa (Ophiocephalus) striatus</i> (Bloch)	Bhunda	Food Fish	LRnt
	Anabantidae	29.	<i>Anabus testudineus</i> (Bloch)	Kevai	Food Fish	LRnt
Cichliformes	Cichlidae	30.	<i>Oreochromis mossambicus</i> (Peters)	Tilapia	Food Fish	LRnt
Abbreviations - EN = Endangered species; LR-Ic = Lower risk least concern; LRnt = Lower risk near threatened; VU = Vulnerable						

Table 2. Composition of genera and species under different in orders

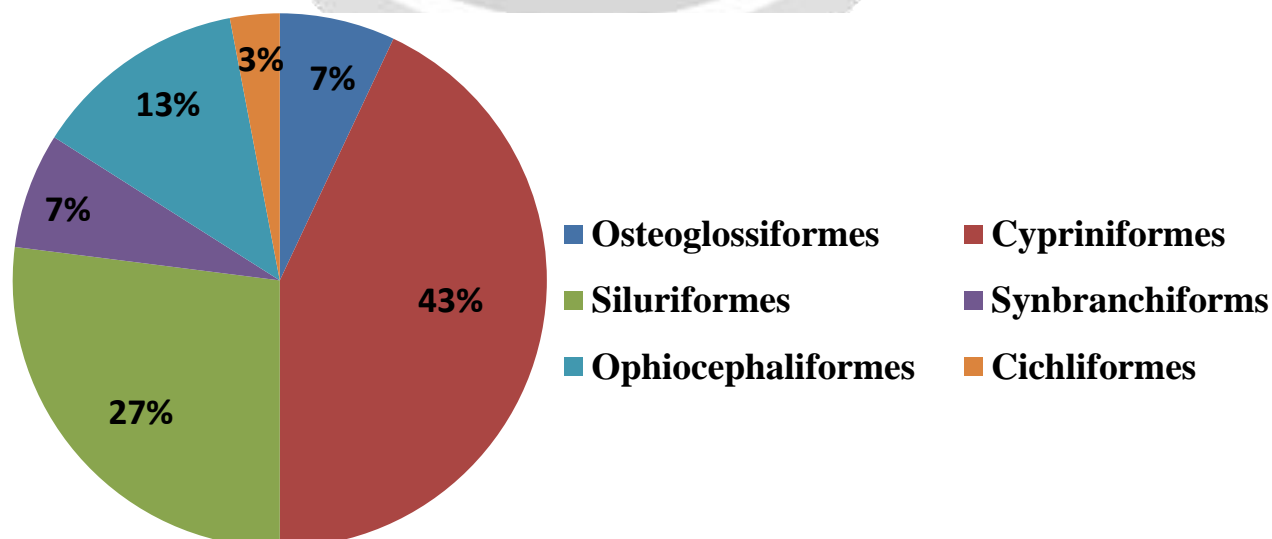
S. No.	Order	Genera	% of Genera in order	Species	% of Species in orders
1.	Osteoglossiformes	2	11.76	2	06.66
2.	Cypriniformes	5	29.41	13	43.33
3.	Siluriformes	6	35.29	8	26.66
4.	Synbranchiforms	1	05.88	2	06.66
5.	Ophiocephaliformes	2	11.76	4	13.33
6.	Cichliformes	1	05.88	1	03.33

Table 3. Composition of genera and species under different in Families

S. No.	Families	Genera	% of Genera in Family	Species	% of Species in Families
1.	Notopteridae	2	11.76	2	06.66
2.	Cyprinidae	5	29.41	13	43.33
3.	Claridae	1	05.88	1	03.33
4.	Saccobanchidae	1	05.88	1	03.33
5.	Bagridae	1	05.88	1	03.33
6.	Siluridae	2	11.76	3	10.00
7.	Heteropneustidae	1	05.88	1	03.33
8.	Mastacembelidae	1	05.88	2	06.66
9.	Channidae	1	05.88	3	10.00
10.	Anabantidae	1	05.88	1	03.33
11.	Cichlidae	1	05.88	1	03.33

Table 4. Status of fishes of Bikhama Pond of Ratanpur according to IUCN Categories

S. No.	IUCN Categories	Abbreviations	CAFF 2006	Percentage of fishes
1.	Endangered	EN	3	10
2.	Vulnerable	VU	9	30
3.	Lower risk near Threatened	LRnt	17	56.66
4.	Lower risk least concern	LRlc	1	03.00

Fig. 4. Diagrammatic representation of percentage or species fall under different orders

RESULT AND DISCUSSION

The collected and identified fishes are categorized on the basis of their habitat (depth) and feeding habit (Sahu, K. R., 2015). The main shallow water fishes are *Labeo rohita*, *Labeo gonius*, *Ompok bimaculatus* and deepwater fish are *Catla catla*, *Chitala chitala* and *Notopterus notopterus* etc. On the basis of their feeding habit, the collected fishes have been categorized into three categories viz. surface feeder *Catla catla*, middle feeder *Labeo rohita*, *Wallego attu*, *Mystes sps.* and Bottomfeeder *Labeo calbasu*, *L.bata*, *Labeo gonius*, *Cirrhinus mrigala*. Due to human interventions, some exotic species are also identified.

The species diversity is at its peak in the post-monsoon period due to the availability of favorable survival conditions such as sufficient oxygenated water and ample food resources. After monsoon. The observations also revealed that the species diversity was gradually declining and was at peak during the pre-monsoon period due to shrinkage of wetland and water area.

The collected and identified fishes from the Bikhama pond Reservoir has been shown in the table number 1.

CONCLUSION

From ancient to recent times, aquatic resources have been providing quality food to large populations. Blue culture is the better option for this purpose. The present study will provide preliminary and baseline data regarding fish diversity of Bikhama pond of Ratanpur District Bilaspur (C.G.) India for further research activities.

Due to anthropogenic activity, over and indiscriminate fishing the optimal natural environmental condition of the pond is gradually declining. Therefore, there is an urgent need for conservation measures to manage the potential of fish resources for long-term benefits and the climatic conditions of the pond. The Fisheries and Irrigation Department can develop a conservation strategy for the conservation of the aquatic fauna as well as the optimum natural environmental condition of the pond and the biodiversity of the fish.

These conservation measures will play an important role in the conservation and maintenance of indigenous fish stocks and their diversity. The cooperation and participation of local communities can play a significant role in the continuous monitoring and assessment of faunal diversity and environmental conditions of the pond area. Conservational strategies of the pond area can play an important role in different activities including commercial fishing, educational and research activities. This activity can also help in raising the social and economic status of the local people. This activity also supports increasing the socioeconomic status of the local people.

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