

STUDY OF FISH DIVERSITY OF BICHHIYA RIVER WATER DISTRICT REWA (M.P.)

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ABSTRACT:- The fish diversity in the Bichhiya River is in no way exceptional from the current impact of global warming and climate change. Although substantial study on fish diversity of the Bichhiya river has been undertaken, classifying the existing diversity of fish species in the Bichhiya River into fishes is an untouched area. It is observed from the information and earlier works done on the fish diversity in the Bichhiya River that a significant number of fish species having potential properties are there amongst them. In all 22 species of fishes belonging to 16 genera, 9 families and 5 orders were identified from Bichhiya river. As far as the genera and families to different orders are concerned, order Cypriniformes consists of 6 genera (37.50%) under one families (10%), Siluriformes of 6 genera (26.09%) under 4 families (40%), Perciformes of 3 genera (18.75%) under 3 families (30%), Osteoglossiformes, Synbranchiformes and Synbranchiformes of single genus (6.25%) under single family each (10%). Order Cypriniformes has been found to be a major order with 10 species and percent contribution of 45.45%. Siluriformes comes next with 6 species and percent contribution of 27.27%, Perciformes with 4 species and percent contribution of 18.18%, Synbranchiformes with 2 species and per-cent contribution of 5.0%, Osteoglossiformes and Synbranchiformes with 1 species each and percent contribution of 4.55%. Although the present situation is not serious and alarming enough, the river water requires intensive monitoring to improve its quality for better and sustainable management.

KEYWORDS: - Fish diversity, Economic value, Nutritive Value, Bichhiya River.

INTRODUCTION:-

Freshwater fishes in the Indian subcontinent have been limited to scattered works on commercial fisheries and even these have been largely restricted to some of major river systems like Ganges and the Yamuna. Out of the

2500 species of fishes that have been recognized in the Indian subcontinent, 930 are categorized as freshwater species. Looking at the history of freshwater fish studies in India, the interest of the British officers working in India in natural history of the region was significant move in this direction. Some early contributions were those of Hamilton-Buchanan in the 'Fishes of the Ganges' (1822) and by others like McClelland, Sykes and Jerdon. Besides, the work of Francis Day in his publication 'Fishes of India' (1875-1878) is a quite significant contribution in this area. Quite a good amount of literature is currently available on Indian fishes especially on identification and systematics of freshwater fishes of India which starts from Hora's contribution during 1920-1950s to very recent texts by Talwar and Jhingran and Jayaram.

In a developing economy context, open water inland fisheries not only plays an important role for the diet and health of the population, but also the livelihood of many people engaged in this activity. Broadly, the open water inland fisheries can be divided into five categories, namely, riverine fisheries, reservoirs, aquaculture water bodies, estuaries, and flood plain lakes. The fishing practices also vary in these ecosystems. Usually, riverine fisheries are based on capture activities where regeneration of fish is left to the nature. The large and medium reservoirs are generally managed as stocking-cum-capture fisheries resources, whereas, small river and aquaculture water bodies are usually managed through culture practices. Estuaries are based on capture fisheries and flood plain lakes have both the components of culture as well as stocking-cum-capture fisheries.

India is one of the countries in the South Asia that has a large share of open water with rich and complex fisheries. She has around 340 million hectares of riverine catchments for fisheries; another six million hectares area is under open water fisheries in different reservoir,

aquaculture in small ponds, estuaries and flood plain system. Over the last fifty years, the extent and share of inland fisheries in total fish production has increased by many folds. Despite the significant increase in inland fish production, it seems impossible to meet the projected demand of 14 million tons by the year 2005, more than twice the amount of current production (Bhattacharya, 2002). Inland fisheries need specific attention in the context of India due to the following reasons.

First, fish production through inland fisheries largely caters the needs of the domestic consumption as against marine fisheries, which is primarily produced for export. An estimate of resource potential by the fisheries division of Ministry of Agriculture, Government of India, suggests that inland sector has a potential of 4.5 million tones as against 3.9 million tons of marine sector (fisheries Statistics, 1993). Therefore, an increase in the production of inland fisheries would bridge the gap between domestic supply and demand while catering to the nutritional requirements of the populace. Second, inland fisheries are an important source of employment. There are about 2 million people in India engaged full time in fishing and another 4 million people as part-time or occasional fisherwomen or men (Fisheries Statistics, 1993). A third dimension relating to open water inland fisheries is that the relative importance of inland capture fisheries is declining with a corresponding increase in the culture fisheries. Government policies are partly responsible for such trend. Fourth, India has a vast potential of open water fisheries, which with proper institutional, technical and financial support could contribute to the fulfillment of multiple developmental goals. The learning process of institutional arrangements and requirements for open water fisheries would provide substantive understanding on the management of this sector, which is for a long time, has been neglected.

The procedure adopted for the fish are the most species – rich of all vertebrates. Valid scientific description exists for about 24600 living species of fishes in 482 families (Nelson 1994). One third of the fish families have at least one member spending at least part of their life in fresh water. Fresh water fish diversity is therefore large compared to other system since fresh water lakes and rivers account for only 0.8% of earth's surface and less

than 0.01% of its water. Approximately 10100 species are fresh water during their life cycles (Helfman et al., 1997).

The 1996 IUCN Red list of threatened animals lists 617 freshwater fishes (Including euryhaline salinity-level tolerant-species), about 7% of known number of fresh water fish species. Studies that take into account of fact that the red list has evaluated only a fraction of freshwater fishes estimate conservatively that 29% of fresh water fishes are extinct, endangered or vulnerable; a more realistic estimate might reach 30-35% (Stiassny, 1996) production study in the reservoir was in accordance with methodology on reservoir fisheries investigation in India (Jhingran V.G. 1969) and APHA (1985).

Qualitative works on the fish diversity of the Bichhiya River have been undertaken specifically classifying them into respective families, but categorizing them as ornamental fishes has not been done so far. Studies on the biodiversity of ornamental fishes in the Bichhiya River along with their economic importance are yet to be undertaken. Categorizing the ornamental fishes from the so far reported fish diversity of the Bichhiya River is a step forwarded in this direction.

Present study is going to centralize on Bichhiya river Rewa which is one of the main tributaries of Beehar river. During their flow in township, industrial, domestic and municipal discharges merge into it at different points. The water of the river is used by urban and peripheral rural population directly at many stations for domestic and agriculture uses. Presently, the utility of river aeration technology has relatively been mature in many countries. Research and practical applications showed that the artificial aeration can improve water quality effectively. Practically, Aeration systems can be utilized as stand-alone systems or as a support for other treatment facilities

OBJECTIVES OF STUDY:- The objectives of the present study are following:

1. To the study of fish diversity of the river.

2. Level of water pollution and their impact the fish life.

MATERIAL AND METHODS:- Bichhiya river is one of the main tributary of Beehar river. It arises from the village Khaira near Kund of Kaimore range and flowing 58 Km. Its location in Rewa district is 24°10' latitude North and 81°15' longitude East. The river originates from Khaira village of Gurh Tehsil and joins in Bihar river behind Rewa fort. The confluence place is known as Rajghat. At the upstream of the Bichhiya river municipal water treatment station is situated after, which it meets with another river called Beehar of Rajghat. Their flows in township, industrial, domestic and municipal discharge merge into it at different points. The water of the river is used by urban and peripheral rural population directly at many stations for domestic and agriculture uses. Samplings were conducted during January 2020 to December 2021, at different stations during the winter, and summer seasons.

RESULT & DISCUSSION:- In all 22 species of fishes belonging to 16 genera, 9 families and 5 orders were identified from Bichhiya river. As far as the genera and families to different orders are concerned, order

Cypriniformes consists of 6 genera (37.50%) under one families (10%), Siluriformes of 6 genera (26.09%) under 4 families (40%), Perciformes of 3 genera (18.75%) under 3 families (30%), Osteoglossiformes, Synbranchiformes and Synbranchiformes of single genus (6.25%) under single family each (10%). Order Cypriniformes has been found to be a major order with 10 species and percent contribution of 45.45%. Siluriformes comes next with 6 species and percent contribution of 27.27%, Perciformes with 4 species and percent contribution of 18.18%, Synbranchiformes with 2 species and per-cent contribution of 5.0%, Osteoglossiformes and Synbranchiformes with 1 species each and percent contribution of 4.55%. They are *Notopterus notopterus* under Osteoglossiformes, *Catla catla*, *Cirrhinus mrigala*, *C. reba*, *Cyprinus carpio*, *Labeo bata*, *L. calbasu*, *L. rohita*, *Puntius amphibious*, *P. ticto*, and *Nemacheilus botia* under Cypriniformes, *Mystus cavasius*, *M. seenghala*, *Ompok bimaculatus*, *Wallago attu*, *Clarias batrachus*, and *Heteropneustes fossilis* under Siluriformes, *Mastacembelus armatus* under Synbranchiformes, *Nandus nandus*, and *Channa marulius*, *C. punctatus* and *Anabas testudineus* under Perciformes. A systematic list of fishes observed from the river has been tabulated in Table 1&2 and Graph 1.

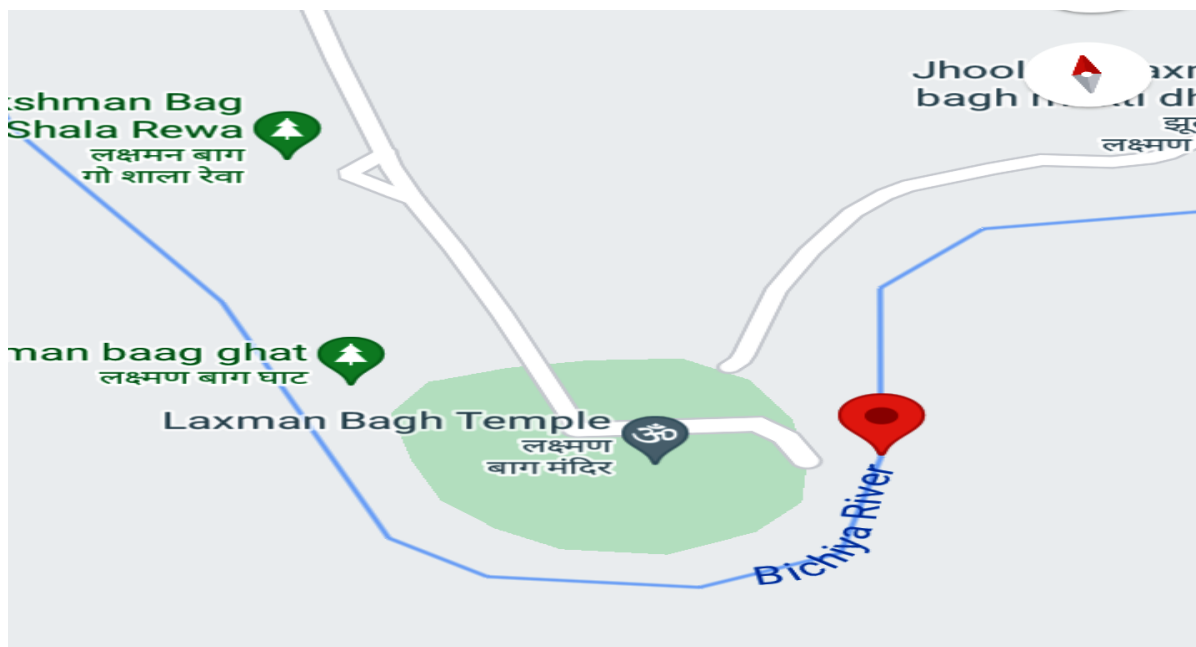


Fig. 1. Location map of Bichhiya River Rewa M.P.

Table No.1- Taxonomic account of fish fauna reported of Bichhiya River Rewa (M.P.)

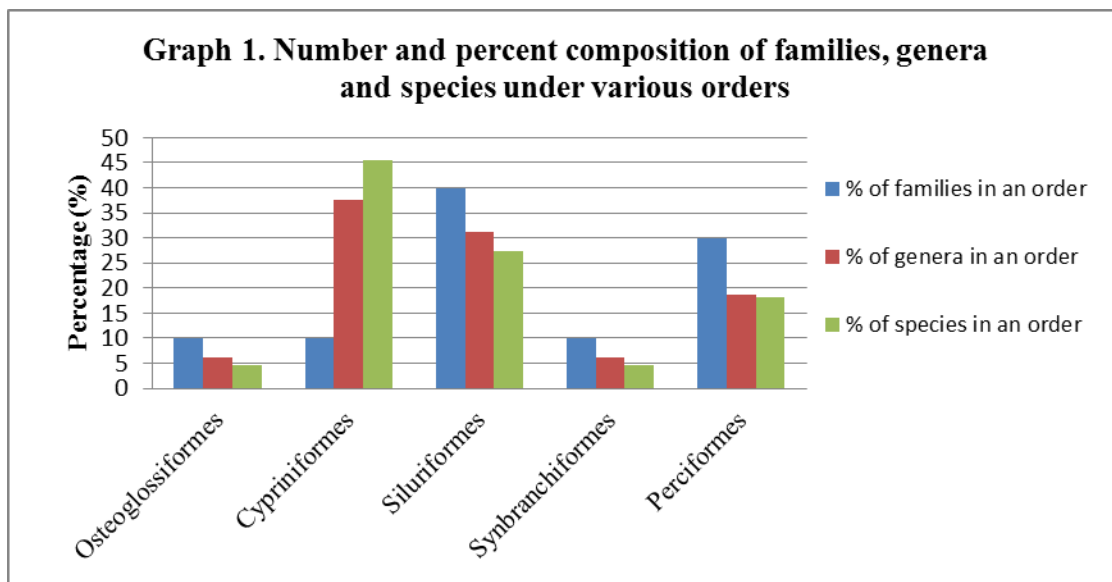
Class/Sub-class/ Order/Division/ Family/Sub-family		Taxonomic Name	Local name	IUCN Category	
				CAMP (1998)	CAFF (2006)
Class	Actinopterygii	1. <i>Notopterus notopterus</i>	Patola	LR-nt	EN
Subclass	Neopterygii				
Division	Teleostei				
Order	Osteoglossiformes				
Suborder	Notopteroidei				
Family	Notopteridae				
Subdivision	Euteleostei	2. <i>Catla catla</i>	Catla	VU	LR-nt
Superorder	Ostariophysii	3. <i>Cirrhinus mrigala</i>	Mrigal	LR-nt	LR-nt
Order	Cypriniformes	4. <i>C. reba</i>	Naren	VU	VU
Family	Cyprinidae	5. <i>Cyprinus carpio</i>	Common carp	LR-nt	LR -lc
Sub-family	Cyprininae	6. <i>Labeo rohita</i>)	Rohu	LR-nt	LR-nt
		7. <i>L. calbasu</i>	Kriya	LR-nt	LR-nt
		8. <i>L. bata</i>	Bata	LR-nt	LR-nt
		9. <i>Puntius ticto</i>	Khadia	NE	DD
		10. <i>Puntius amphibious</i>	Khadia		
		11. <i>Oxygaster bacaila</i>			
Order	Siluriformes	12. <i>Mystus seenghala</i>	Tengara	NE	LR-nt
Family	Bagridae	13. <i>Mystus. Vitatus</i>	Katuwa	VU	VU
Family	Siluridae	14. <i>Ompok bimaculatus</i>	Pauda	EN	EN
		15. <i>Wallago attu</i>	Padin or Lonch	LR-nt	LR-nt
Family	Clariidae	16. <i>Clarias batrachus</i>	Mangur	VU	VU
Family	Heteropneustidae	17. <i>Heteropneustes fossilis</i>	Singhi	VU	VU
Order	Synbranchiformes	18. <i>Mastacembelus armatus</i>	Baam	NE	VU
Sub-order	Mastacembeloidei				
Family	Mastacembelidae				
Sub-family	Mastacembelinae				
Order	Perciformes	19. <i>Nandus nandus</i>	Dhebari	LR-nt	LR-nt
Sub-order	Percoidei				
Family	Nandidae				
Sub-family	Nandinae				

Family	Anabantidae	20. <i>Anabas testudineus</i>	Kabai	LR-nt	LR-nt
Sub-order	Chanoidei	21. <i>Channa marulius</i>	Padam Sauri	LR-nt	VU
Family	Channidae	22. <i>Channa punctatus</i>	Sauri	LR-nt	LR-nt

EN=Endangered, Vu (Vulnerable), LR-nt= Lower risk near threatened, LR-lc (Lower risk least concern), NE (Not evaluate), DD (Data deficient), *Exotic fish.

Table No.2. Number and percent composition of families, genera and species under various orders

S. No.	Order	Families	Genera	Species	% of families in an order	% of genera in an order	% of species in an order
1.	Osteoglossiformes	1	1	1	10	6.25	4.55
2.	Cypriniformes	1	6	10	10	37.50	45.45
3.	Siluriformes	4	5	6	40	31.25	27.27
4.	Synbranchiformes	1	1	1	10	6.25	4.55
5.	Perciformes	3	3	4	30	18.75	18.18



Dubey (2007) had been worked on the Ichthyofaunal status of Madhya Pradesh and given a list of Endangered, Vulnerable and Near threatened fish species of M.P. region as per criteria defined by NBFGR, Lucknow. Literature reveals that abiotic and biotic factors play an important role in fish diversity in

freshwater ecosystems. Sivakami et al. (2014). A perusal of literature reveals that Shukla and Pandey (2019) while studying a lake in Rewa district recorded a maximum diversity of Cyprinidae followed by Channidae, Anabantidae and Bagridae while Saket and Pandey (2019) while analyzing the fish diversity in

Bansagar pond reported maximum diversity to occur in Cyprinidae followed Clariidae. These results are in conformity with the present observation.

CONCLUSION:-

The work has been concluded with future strategies for development of fish diversity of Bichhiya River at Rewa, Dist. (M.P.) India. Recent data regarding Fish diversity of the Bichhiya, aiming to contribute a better knowledge of the fish diversity planning of aquatic environments in this region. To maintain fish biodiversity has an immense importance as it is not always possible to identify individual species critically to sustain aquatic ecosystem.

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