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Distribution and Abundance of Ichthyofaunal Diversity in the Bais River, Vidisha, Madhya Pradesh, India

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Abstract: Rivers are the chief sources of freshwater for living organisms. Rivers are lifeline and due to the impact of urbanization converting in to the vulnerable freshwater systems that are critical for the existence of any kind of life. Fishes are important and they play role of a keystone species in the water body which decides the dispersion and majority of other organisms in the ecosystem they represent and are good indicators of the water quality. Present study was done from January 2023 to December 2023 on Ichthyofaunal diversity of river Bais in which a total of 31 fish species were recorded belonging to 12 families, 7 orders and 18 genera. Their taxonomic account, IUCN status of threat and Local status were also measured. This is the first effort on the diversity of Bais river, Vidisha, Madhya Pradesh, India.

Keywords: Bais river, IUCN, Cyprinidae, *Channa*, *Catla catla*, Ichthyofaunal diversity

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Introduction

Water is one of the basic and essential substances for the survival of life and development of any kind of civilization. It covers seventy five per cent of Earth's surface. Today, the problem of water scarcity and declining of its quality is of great concern in the worldwide not only in rural as well as urban areas also. Rivers are the chief sources of freshwater for living organisms. Anthropogenic

activities, urbanization, and accelerated industrialization rigorously deteriorated majority of lotic and lentic water bodies. Rivers, the major sources of irrigation are also used for disposal of domestic sewage, industrial effluents containing toxic element such as heavy metals. They are non-degradable and often accumulate through trophic level causing a deleterious effect on the body

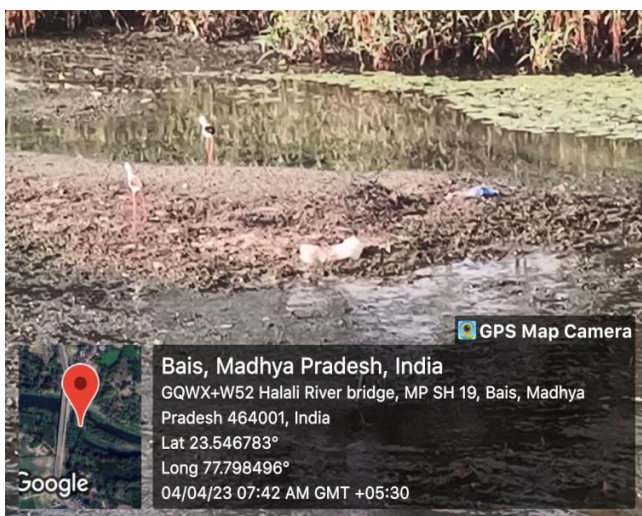


Fig. 1: showing selected site of Bais river.

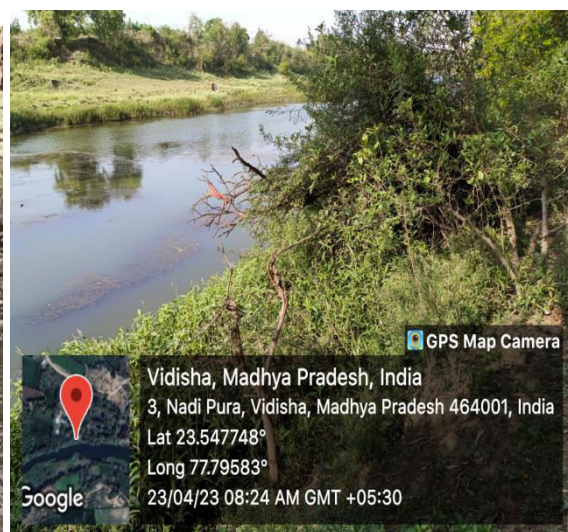


Fig. 2: showing selected site of Bais river.

organs. Scientific community and civil society know that aquatic pollution is an old phenomenon, the rate of urbanization and consequently, industrialization has intensified its effect on the environment. Rivers are lifeline and due to the impact of urbanization converting into the vulnerable freshwater systems that are critical for the existence of any kind of life. The maintenance and stability of healthy aquatic ecosystem is depending on the physico-chemical characteristics and biological diversity.

Biodiversity describes the differences among biological organisms in a given habitat, area, or ecosystem. It contains several components involving variation in species, ecosystems, and genetics. Biodiversity is essential for stabilization of ecosystem, protection of overall environmental quality for understanding intrinsic worth of all species on the earth where as in aquatic ecosystem the fishes form major link in the energy transfer at secondary and tertiary level in aquatic as well as terrestrial ecosystem.

Fishes are important and they play role of a keystone species in the water body which decides the dispersion and majority of other organisms in the ecosystem they represent and are good indicators of the water quality. About twenty per cent of the world's freshwater fish fauna is already extinct or is on the verge of extinction (Ali, 2010).

In India there are more than 2,500 species of fishes of which 930 live in freshwater (Jayram, 1999) and 1,570 are marine (Kar, 2003). Fish represents as a crucial resource which can be used as food for the mankind' worldwide (Fagbuaro *et al.*, 2019).

Many researchers have worked on the ichthyofauna of different water bodies of Madhya Pradesh and various other parts of India. Vyas *et al.* (2012) observed 48 fish species from sacred ghats of river Betwa, Madhya Pradesh. Sharma *et al.* (2021) on the Chandrakeshar, a tributary of river Narmada in Dewas district. Ahirrao (2014) has studied fish diversity in the various water bodies of Maharastra, India. Present study was done from January 2023 to December 2023 on Ichthyofaunal diversity of Bais river, Vidisha, Madhya Pradesh, India,

Materials and Methods

Study Area:

Halali river is known as Bais river in Vidisha because this river passes near the ancient city named historical Bais Nagar. This river is just 2.5 km away from Vidisha railway station and Bus stand also. The Bais river is one of the important tributaries of river Betwa, it merges into Betwa river in Vidisha itself. This river water is mainly used for irrigation in nearby villages. Moreover, in



Fig. 3: Bais River (courtesy- google map).

addition to irrigation, the water is also used for drinking as well as other domestic purposes. This is lifeline for the people of Vidisha.

Fish samples were collected by using various mesh size fish nets viz. cast nets and gill nets with the help of local fishermen from different selected sites (Figs.1,2,3). Collected fish fauna was instantly fixed in 10% formalin in plastic jars and brought to the laboratory for the identification. Fish fauna was identified by the help of taxonomic keys given by Jayaram (1981), Talwar and Jhingran (1991) and Srivastava (2002).

Results and Discussion

Present study was performed from January 2023 to December 2023 on Ichthyofaunal diversity of river Bais. 31 fish species were recorded belonging to 12 families, 7 orders and 18 genera. Their taxonomic account, IUCN status of threat and Local status as well as relative abundance is given in Table 1. Maximum number of families were represented by order Siluriformes that is 4, order Cypriniformes represents 2 families and

same contribution shown by order Perciformes. Moreover, Osteoglossiformes, Beloniformes, Mastacembeliformes and Ophiocephaliformes are represented by 1 family from each order (Fig. 4).

The most abundant and diverse family of the fishes in the river bais, was Cyprinidae represented by 12 species contributing about 38.70% of the fish diversity. On the basis of the assessment of various families present in the river Bais, Cyprinidae was dominant. The per cent and number contribution of other families is shown in Figure 5.

According to IUCN 2014 report only one species are vulnerable, two species are near threatened and 28 evaluated as least concern.

During the present study period *Catla catla*, *Channa striata* and *Channa marulius* were found in abundance or very common at local status. Moreover, *Notopterus notopterus*, *Puntius ticto*, *Cirrhinus mrigala*, *Labeo rohita*, *Labeo calbasu*, *Labeo bata*, *Cyprinus carpio*, *Mystus bleekari*, *Heteropneustes fossilis*, *Nandus nandus*,

Table 1: Fish diversity with their relative abundance and IUCN status in the River Bais, Vidisha. Abbreviation- VCS – Very Commonly Seen, CS- commonly Seen, OS- Occasionally Seen

S. No.	Scientific Name of Fish	Order/ Family	Abundance	IUCN Status	local Status
1.	<i>Notopterus notopterus</i>	Osteoglossiformes/Notopteridae	++	LC	CS
2.	<i>Notopterus chitala</i>	Osteoglossiformes/Notopteridae	+	NT	OS
3.	<i>Xenentodon cancila</i>	Beloniformes / Belonidae	+	LC	OS
4.	<i>Puntius sarana</i>	Cypriniformes/Cyprinidae	+	LC	OS
5.	<i>Puntius ticto</i>	Cypriniformes/Cyprinidae	++	LC	CS
6.	<i>Puntius guganio</i>	Cypriniformes/Cyprinidae	+	LC	OS
7.	<i>Catla catla</i>	Cypriniformes/Cyprinidae	+++	LC	VCS
8.	<i>Cirrhinus mrigala</i>	Cypriniformes/Cyprinidae	++	LC	CS
9.	<i>Labeo rohita</i>	Cypriniformes/Cyprinidae	++	LC	CS
10.	<i>Labeo calbasu</i>	Cypriniformes/Cyprinidae	++	LC	CS
11.	<i>Labeo gonius</i>	Cypriniformes/Cyprinidae	+	LC	OS
12.	<i>Labeo bata</i>	Cypriniformes/Cyprinidae	++	LC	CS
13.	<i>Cyprinus carpio</i>	Cypriniformes/Cyprinidae	++	LC	CS
14.	<i>Noemacheilus botia</i>	Cypriniformes/Cobitidae	+	LC	OS
15.	<i>Cirrhinus fulungee</i>	Cypriniformes/Cyprinidae	+	LC	OS
16.	<i>Cirrhinus reba</i>	Cypriniformes/Cyprinidae	+	LC	OS
17.	<i>Mystus bleekari</i>	Siluriformes/Bagridae	++	LC	CS
18.	<i>Mystus cavasius</i>	Siluriformes/Bagridae	+	LC	OS
19.	<i>Mystus seenghala</i>	Siluriformes/Bagridae	+	LC	OS
20.	<i>Ompok bimaculatus</i>	Siluriformes/Siluridae	+	NT	OS
21.	<i>Wallago attu</i>	Siluriformes/ Siluridae	+	VU	OS
22.	<i>Heteropneustes fossilis</i>	Siluriformes/Heteropneustidae	++	LC	CS
23.	<i>Clarias batrachus</i>	Siluriformes/Clariidae	+	LC	OS
24.	<i>Chanda nama</i>	Perciformes/Ambassidae	+	LC	OS
25.	<i>Chanda ranga</i>	Perciformes/Ambassidae	+	LC	OS
26.	<i>Nandus nandus</i>	Perciformes/ Nandidae	++	LC	CS
27.	<i>Channa punctata</i>	Ophiocephaliformes/Channidae	+	LC	OS
28.	<i>Channa striatus</i>	Ophiocephaliformes/Channidae	+++	LC	VCS
29.	<i>Channa marulius</i>	Ophiocephaliformes/Channidae	+++	LC	VCS
30.	<i>Mastacembalus armatus</i>	Mastacembeliformes/Mastacembelidae	++	LC	CS
31.	<i>Mastacembelus pancalus</i>	Mastacembeliformes/Mastacembelidae	++	LC	CS

Mastacembalus armatus, and *Mastacembelus pancalus* were commonly recorded.

Some fish species such as *Notopterus chitala*, *Xenentodon cancila*, *Puntius sarana*, *Puntius guganio*, *Labeo gonius*, *Noemacheilus botia*, *Cirrhinus fulungee*, *Cirrhinus reba*, *Mystus*

seenghala, *Ompok bimaculatus*, *Wallago attu*, *Clarias batrachus*, *Chanda nama*, *Chanda ranga* and *Channa punctata* were occasionally seen at the local status at the selected sites. Diversity among these fishes in the Bais river may be due to the dense vegetation or aquatic weeds as well as

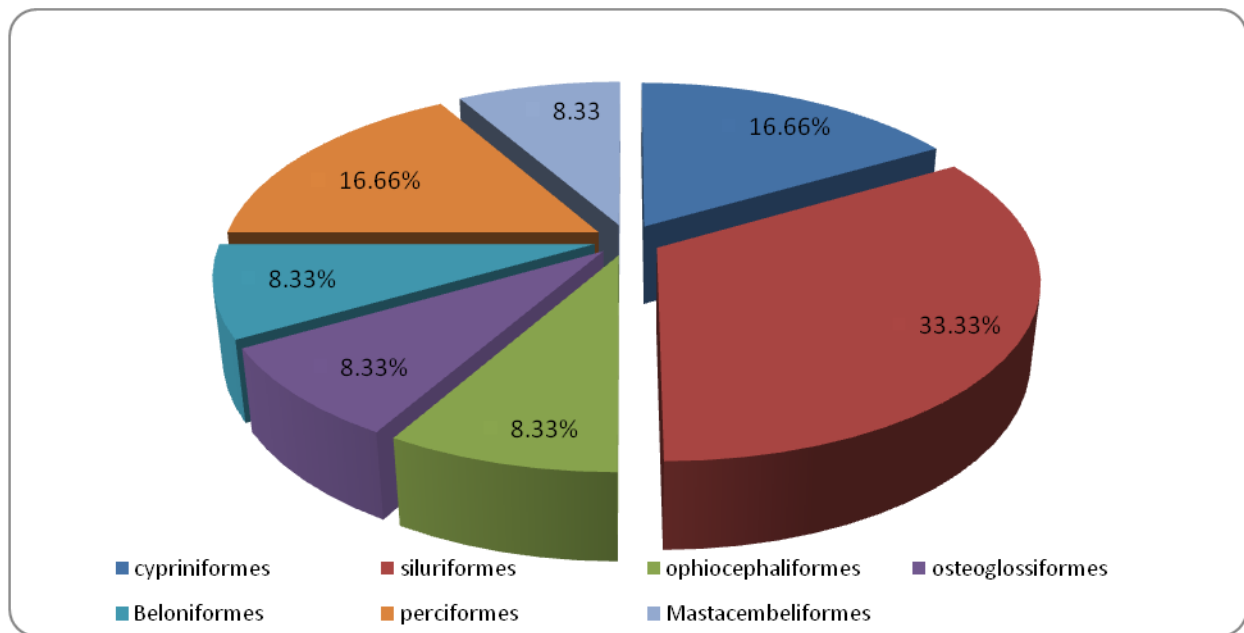


Fig. 4: Percentage contribution of different orders.

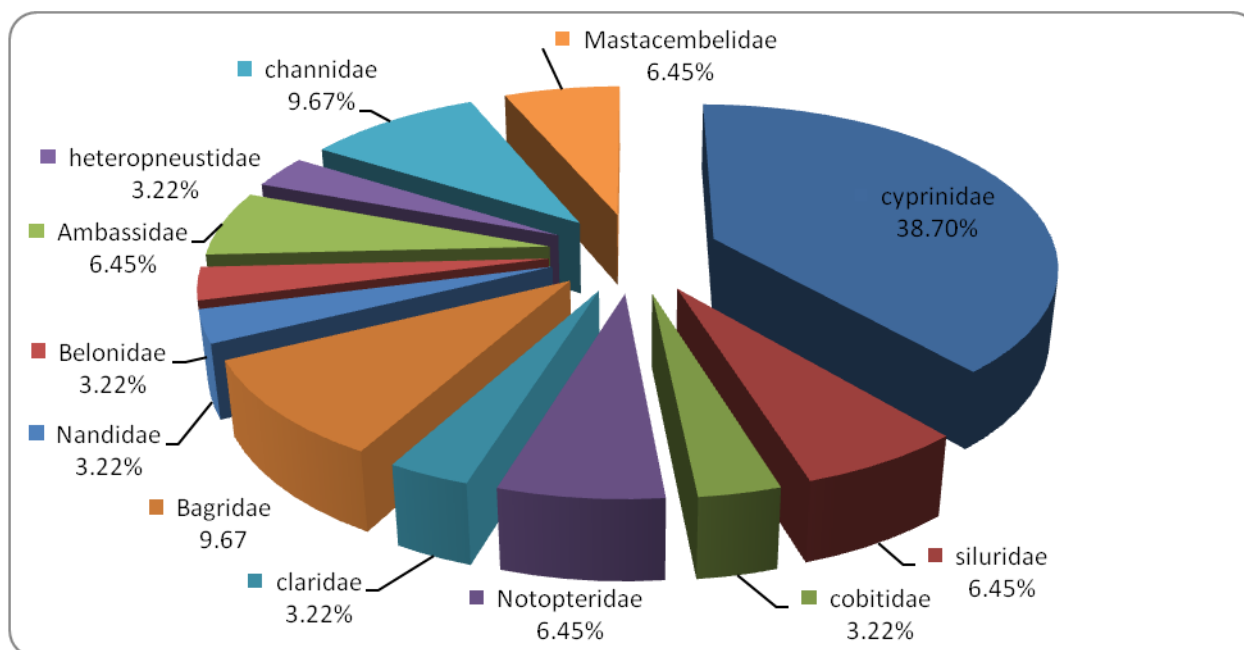


Fig. 5: Percentage contribution various families.

different depth of the river. We observed illegal fishing at the river sites possibly affecting the fish fauna present over there. Similar type of studies have been done by various researchers during the last few decades in Madhya Pradesh as well as in India (Kapoor *et al.*, 1998; Mishra *et al.*, 2003; Sharma *et al.*, 2007; Sharma *et al.*, 2021). Vyas *et al.* (2012) studied the diversity of fishes of sacred ghats of river Betwa. They observed total 60

species belonging to 18 families and 36 genera which suggests that there is high variability among the fish species.

Sharma *et al.* (2021) documented 35 freshwater fish species from Chandrakeshar dam belonging to 20 genera, 5 orders, and 13 families in which, the Cyprinidae family was dominant group represented by 17 fish species. *Puntius ticto* and *Puntius guganio* were considered least

concern in the IUCN status by Dhanukar (2010, 2015).

Shukla *et al.* (2016) worked on the fish fauna of Benisagar dam Satna (M.P.) where they found 31 species belonging to 11 families and by their conservation status 16 species retain Least Concern, 3 species found Near Threatened and 2 species shown in the Not Evaluated status of IUCN. Sarkar (2021) performed a survey to assess the cold water fish diversity in the west Bengal, they observed 71 cold water fishes. The present study, we have provided information about the diversity of fishes which will be important for future researchers also.

Conclusion

Results of the present investigation revealed that conservation status of the fishes and their diversity at the proposed site in Bias river, Vidisha. 31 fish species were recorded belonging to 12 families, 7 orders and 18 genera. Some of the fishes were observed very common while others seen occasionally. At the river site, excavation of local sand also observed which might cause serious damage to the aquatic diversity and their habitats. Illegal fishing and over exploitation of water for agriculture is becoming the biggest threat to the biodiversity of this river.

Acknowledgements

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References

- Ahirrao KD. (2014) Fish diversity of the Bori dam at Tamaswadi, Parola, district Jalgaon, Maharashtra state. *Golden Res Thoughts* 3(12): 1-5.
- Ali H. (2010) Studies on haematological and biochemical changes in food fishes of some water bodies of Balrampur due to the effects of common ecto and endoparasites, Ph.D. Thesis, Dr. R.M.L. University, Faizabad, India.
- Chaudhry S, de Alwis Goonatilake S, Fernando M and Kotagama O. (2019) *Channa punctata*. The IUCN Red List of Threatened Species 2019 e.
- Dahanukar N. (2015). *Pethia ticto*. The IUCN Red List of Threatened Species 2015: e.
- Fagbuaro O, Ola-Oladimeji FA, Ekundare OV and Akinyemi O. (2019) Length-weight relationship and condition factor of two species of Tilapia and one species of Mormyrops from a tropical dam in a Southwestern state, Nigeria. *J Zool Res*. 3: 1-5.
- Freyhof J and Kottelat M. (2008) *Cyprinus carpio*. The IUCN Red List of Threatened Species 2008: e.
- Jayaram KC. (1999) The fresh water fishes of Indian region. Narendra Publication House, Delhi 110006 (India).
- Jayaram KC. (1981) The fresh water fishes of India. Zoological Survey India, Kolkata.
- Kar D, Kumar A, Bohra C and Singh LK. (2003) Fishes of Barak drainage, Mizoram and Tripura. APH Publishing Corporation, New Delhi, pp. 604.
- Kapoor D, Mahanta PC and Pandey AK. (1998) Ichthyodiversity of India: Status and conservation. In: Fish Gen. Biodiversity Conservation, (eds.) Ponniah A.G., Das P. and Verma S.R., Natcon, Daya Publishing House, New Delhi.
- Mishra S, Pradham P, Kar S and Chakraborty SK. (2003) Ichthyofauna diversity of Midnapore, Bankura and Hooghly districts of South West Bengal. *Rec Zool Surv India Occ. Paper* 2220: 1-66.
- Sarkar T. (2021) Cold water fish diversity and their conservation status in the Teesta, Jaldhak, Torsa, Kaljani and Sankosh rivers of the Dooars region, West Bengal, India. *Asian J Conserv Biol*. 10(1): 146-152
- Sharma R, Devaliya AK and Sharma S. (2021) Status of fish population from Chandrakeshar dam Dewas (M.P.). *Int J Fisheries Aquat Stud*. 9(3): 190-193.
- Sharma S, Mudgal LK, Sharma P and Belsare DK. (2007) Biodiversity of fish fauna of Kishanpura lake, Indore (M.P.). *Environ Conserv J*. 8(1&2): 109-113.
- Srivastava GJ. (2002) Fishes of U.P. & Bihar. 9th edn., Vishwavidyalaya Prakashan, Varanasi (India).
- Shukla N, Tripathi NP and Tiwari AK. (2016) Fish species diversity of Benisagar Dam, Turki, Satna (M.P.) India. *Int J Res Appl Sci Engineer Technol*. 4 (3): 27-31.
- Talwar PK and Jhingran AG. (1991) Inland fishes of India and adjacent countries. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
- Vyas V, Damde D and Parashar V. (2012) Fish biodiversity of Betwa river in Madhya Pradesh, India with special reference to a sacred ghat. *Int J Biodiversity Conserv*. 4(2): 71-77.