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Preliminary study of fish diversity in Borda Dam, Taluka Wani, District Yavatmal (M.S.), India

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ABSTRACT

Fresh water is essential to human society and the survival of all terrestrial ecosystems. Despite the fact that India possesses a diverse range of fresh water resources, most systems are under pressure from anthropogenic activity, posing major threats to fish diversity. As a result, conservation and management are vital to the interests of all persons, nations, and governments, and thus the current research. Present research work done from November 2021 to October 2022. Approximately 17 species were collected and identified during the study of the Borda dam, belonging to 7 orders, 9 families, and 16 genera. Among them, 5 species were belong to the Order Cypriniformes, and Siluriformes each, 3 species to Order Perciformes, while the Orders Osteoglossiformes, Synbranchiformes, Beloniformes and Cichliformes comprises single species. As a result, the findings of our current study will provide significant information about the diversity of fish fauna in the Borda dam, which will be used in the future for monitoring, fisheries management, and conservation.

Introduction

Inland waterways and freshwater biodiversity are rich natural resources in terms of economics, culture, aesthetics, science, and education (Vijayalaxmi *et al.,* 2010). One of the fascinating areas of biological research is the study of fish biodiversity and identification, which helps us understand the morphological changes and population variety of fauna in both contaminated and nonpolluted sites in any given environment (Napit, 2013). The diversity of fish is extremely high, with 35,300 species (Froese and Pauly, 2023), approximately half of all vertebrates in the world. India has a diverse range of freshwater resources, including rivers, canals, reservoirs, lakes, and so on, with approximately 10.86 million people relying on these systems and associated fisheries (Sarkar *et al.,* 2015). Apart from its economic value, fish have the highest species diversity of any vertebrate group. In aquatic ecosystems, fish are thought to be useful biological indicators of environmental quality and human activity (Vijayasree and Radhakrishnan, 2014). Numerous commercially relevant creatures can be found in aquatic habitats, particularly fish, which are major sources of protein and play key roles in the socioeconomic development of South Asian nations (Lodhi *et al.,* 2020). As a result, effective planning for biodiversity conservation and management techniques is required to achieve sustainable utilization of these resources. Thus, obtaining scientific information about the species as well as their environments is critical for progressing toward biodiversity conservation. Many researchers, such as Mahor *et al.* (2014), Shinde *et al*. (2009), Wani and Gupta (2015), Bhalerao (2012), and Mishra and Pandey (2016), have studied the fish fauna of different reservoirs in Maharashtra and various other parts of India. There are no publicly available data regarding the diversity of fishes in the Borda Dam. Therefore, the objective of the present study was to make some preliminary observations about the variety of fish species present in the Borda dam, which will help in the future planning of fish culture.

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Materials and Methods

Study area

The Borda dam is located approximately 2 km from Borda village in Wani Taluka of Yavatmal District, Maharashtra. The latitude and longitude of the study area are 19.9805 N and 78.8348 E, respectively. The length of the Borda dam is 759 m, while the height above the lowest foundation is 12.41 m (Figure 1 & 2).

Figure 1: Google Map of the Borda Dam

Figure 2: Overall view of the Borda dam

Fish samples were collected from dam water using fish nets—cast nets and gillnets—with the assistance of fishermen. Fish were collected from November 2021 to October 2022, and the collected fish were fixed in 9 to 10% formalin. After fixation, the fish were washed with water and then transferred to 70% alcohol. Fishes were identified with the help of the standard literature of Day (1878) and Jayaram (2010). To obtain further information on many facets of fish fauna, we visited the FishBase website of Froese and Pauly (2023).

Results and Discussion

The present study was carried out to establish the current state of freshwater fish biodiversity in the Borda Dam. According to Abell *et al.* (2008), fish are the best-known species of aquatic organisms and are the only food source harvested from natural populations. They are the most studied group of species and the best indicators of geographical patterns. Approximately 17 species belonging to 7 orders, 9 families, and 16 genera were collected and identified during the study of the Borda dam (Table 1, 2 & 3). Among them, 5 species belonged to the order Cypriniformes and 3 to the order Siluriformes, while the orders Osteoglossiformes, Synbranchi formes, Beloniformes and Cichliformes contained a single species. The 5 species of the order Cypriniformes include *Labeo bata*, *Labeo rohita, Catla catla, Cirrhinus mrigala, and Puntius sarana,* and *the* order Siluriformes includes *Mystus bleekeri, Sperata seenghala, Ompok bimaculatus, Wallago attu,* and *Clarias batachus,* while the 3 species, i.e., *Chanda nama, Pseudambassis baculis,* and *Parambassis ranga*, belong to *the* order Perciformes. The remaining 4 orders, however, were represented by only a single species, such as *Notopterus notopeterus* (Osteoglossiformes), *Mastacembelus armatus* (Synbranchiformes), *Xenentodon cancila* (Beloniformes) & *Tilapia mossambicus* (Cichli formes). Similar findings were noted by Dange *et al.* (2017), who recorded 11 species of fish from the Benetura Reservoir in Murum, Maharashtra. Eight of these species of fish were abundant, 1 had a moderate abundance, and 2 had a low prevalence. Twenty-three fish species from 6 orders were identified by Kadam and Gayakwad (2006) at the Masooli Reservoir in the Maharashtra district of Parabhani. Wani and Gupta (2015) identified a total of 21 species of freshwater fish belonging to 6 orders, 11 families, and 17 genera in Sagar Lake, Madhya Pradesh, India. Uchchariya and Sharma (2020) recorded 21 species belonging to 6 orders, 9 families, and 17 genera from the Pagara Dam in the Morena District of Madhya Pradesh. Sivakumar *et al.* (2018) reported that Cypriniformes was the most dominant order, comprising approximately 63.3% of the total fish population from the Lower Anicut Reservoir, Tamil Nadu.

Table 1: List of fish species associated with the order, family and genera of the Borda Dam

S.N.	Species Name	Order	Family	Genera
1	*Labeo bata*	Cypriniformes	Cyprinidae	Labeo
2	*Labeo rohita*	Cypriniformes	Cyprinidae	Labeo
3	*Catla catla*	Cypriniformes	Cyprinidae	Catla
4	*Cirrhinus mrigala*	Cypriniformes	Cyprinidae	Cirrhinus
5	*Punctius sarana*	Cypriniformes	Cyprinidae	Punctius
6	*Mystus bleekeri*	Siluriformes	Bagridae	Mystus
7	*Sperata seenghala*	Siluriformes	Bagridae	Sperata
8	*Ompok bimaculatus*	Siluriformes	Siluridae	Ompok
9	*Wallago attu*	Siluriformes	Siluridae	Wallago
10	*Clarias batrachus*	Siluriformes	Clariidae	Clarias
11	*Chanda nama*	Perciformes	Ambassidae	Chanda
12	*Pseudambassis baculis*	Perciformes	Ambassidae	Pseudambassis
13	*Parambassis ranga*	Perciformes	Ambassidae	Parambassis
14	*Notopterus notopterus*	Osteoglossiformes	Notopteridae	Notopterus
15	*Mastacembelus armatus*	Synbranchiformes	Mastacembelidae	Mastacembalus
16	*Xenentodon cancila*	Beloniformes	Belonidae	Xenentodon
17	*Tilapia mossambicus*	Cichliformes	Cichlidae	Tilapia

Table 2: Percentage contributions of orders of fish species to the Borda Dam

SN	Order	Total Species	% Contribution
1	Cypriniformes	5	29%
2	Siluriformes	5	29%
3	Perciformes	3	18%
4	Osteoglossiformes	1	6%
5	Synbranchiformes	1	6%
6	Beloniformes	1	6%
7	Cichliformes	1	6%

Table 3: Percentage contributions of different families of fish species to the Borda Dam

SN	Order	Total Species	% Contribution
1	Cyprinidae	5	29%
2	Bagridae	2	12%
3	Siluridae	2	12%
4	Clariidae	1	6%
5	Ambassidae	3	17%
6	Notopteridae	1	6%
7	Mastacembelidae	1	6%
8	Belonidae	1	6%
9	Cichlidae	1	6%

The family Cyprinidae is dominant over other families because, as noted by a number of researchers, According to Patra *et al*. (2011), fish in this family grow quickly, are resilient to pollution and are hardy. A comparison of the fish fauna in the present study with that of others revealed comparable results with the studies of Pawar (2017), Salve *et al.* (2006), and Shinde *et al*. (2009). Thus, the present study revealed that a high number of species in the Borda dam belonged to the order Cypriniformes, and that of Siluriformes, comprising 29% each; moreover, the fish species composition of the order Perciformes was moderate, i.e., 18%, whereas, the fish composition of other orders, namely, Osteoglossiformes, Synbranchiformes, Beloniformes and Cichliformes, was the lowest. This vast distribution could be related to the dam's substrate, which could provide adequate habitat for nest construction.

Conclusion

The results of the present study indicated that the fish fauna of the Borda dam exhibited significant diversity in terms of species composition, which might be attributed to the influence of numerous environmental conditions. In response to the aforementioned consequences for inland fisheries, special augmentation initiatives should be implemented to commence the sustainable use of fisheries resources. Stocking natural water resources with fish seeds generated in hatcheries is a frequent

technique for improvement. Therefore, in situ conservation and protection must be necessary for the fish species under consideration.

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Conflict of interest

The authors declare that they have no conflicts of interest.

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