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Ichthyofaunal Diversity and Fishery Potential of Mandohol Reservoir, Ahmednagar District, Maharashtra, India

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Abstract: Over the past 50 years, there has been a significant rise in global fish yield. Despite an increase in fish output globally, the variety of freshwater fish has been steadily declining as a result of change in the water quality and habitat loss. India has around 19 thousand reservoirs but only a few of these have been studied scientifically. This gives an opportunity of increasing fish production from such reservoirs through scientific management studies and proper utilization of the natural resources. The ongoing research had been carried out between September 2020 and August 2021 to assess the ichthyofauna and fisheries potential of the Mandohol reservoir. Altogether 10 fish species from 9 genera, 7 families, together with 5 orders were confirmed. The most predominant family in the assemblage composition was the Cyprinidae family. IUCN conservation status of species showed that 70% of fish species were of Least Concern, 20% were Near Threatens and only 10% of species were Vulnerable. Three predatory fish species were present in the Mandohol Reservoir; as a result, the population of these fish should be kept under control for pisciculture operations. The fish yield potential of the reservoir was estimated by using Morpho-edaphic Index (MEI) and found that the reservoir has a potential fish yield of 69.14 Kg/ ha/ year. Moderate fish fauna and fish yield potential of the reservoir favour the fish culture but a necessary step for reducing investment losses and sustaining floral and faunal protection are important.

Keywords: Ichthyofauna, Fishery potential, Cyprinidae, Mandohol reservoir, Morpho-edaphic Index, Fish culture, IUCN

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Introduction

In the last 50 years, there has been a significant rise in global fish output. The predicted worldwide fish production is 179 million tonnes, of which aquaculture alone produced 82 million tonnes valued at USD 250 billion. In terms of overall fish output, 156 million tonnes, or 20.5 kg per person were used for human consumption. In the previous 57 years, fish consumption has increased per person from 9.0 kg to 20.5 kg, an increase of almost 1.5 per cent per year (FAO, 2020).

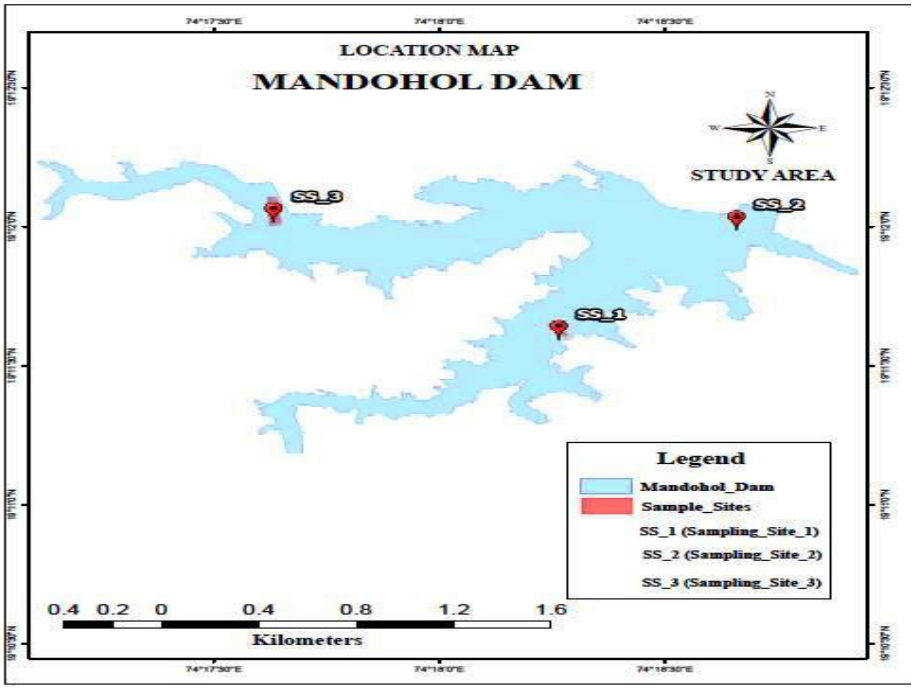

Fig. 1: Location map showing sampling sights of the reservoirs.

India is the world's second-largest aquaculture fish producer. Estimates place the overall fish production for 2020–21 at 14.73 million metric tonnes. (Department of Fisheries, GOI, and Annual Report, 2021-22).

21,723 fish species are documented in the world, of which 8,411 species are from freshwater. Altogether, 2.5 thousand fish species have been recorded in India; 930 of them are freshwater (Jayaram, 1999). Although fish production has increased globally, habitat loss due to various natural and anthropogenic factors has led to a steady decline in current freshwater ichthyofaunal diversity.

Fish serve as primary indicators of water pollution. Sewage, domestic waste, industrial effluents, agricultural non-biodegradable chemicals, and residents' laundry are responsible for changes in water quality and its aquatic diversity. (Pawar *et al*., 2011)

The presence of diverse fish fauna is a sign of the aquaculture capacity of a water body. Earlier studies on the diversity of different freshwater fishes were done by several workers (Ahirrao and Mane, 2000; Kadam and Gaikwad, 2006; Pawar, 2009; Pawar and Pandarkar, 2010; Kalyankar *et al*., 2012; Bhatnagar and Devi, 2013, Sarkar *et al*., 2015; Kawade and Pandarkar, 2016; Kale *et al*., 2018; Shukla, 2021).

India has around 19,000 reservoirs but only a few of these have been studied scientifically. This leaves ample scope for increasing fish production from such resources through scientific studies and management. Since the fish diversity of the Mandohol reservoir has not yet been investigated, a fish fauna study is necessary to aid in the design of their efficient use for fish production. A water body's potential for fish culture, present diversity status, and dispersion of the fish fauna were all factors considered in this study. Almost the physiochemical parameters of the reservoir are favorable for the fish culture (Dalavi and Pawar, 2021)

Materials and Methods

A man-made reservoir called Mandohol Reservoir was built in 1982 on the Mula River's tributary Mandohol River (Fig. 1). It was created for drinking water, irrigation, and domestic purposes.

This is in the northern part of Parner near Dhokeshwar village. Many tourists visit this place to enjoy the beauty of the reservoir and Ruichonda Falls. The land near the dam is unsuitable for agriculture. People of tribal society catch fish with handmade equipment and hook. For these people, scientific studies can be a foundation and help in their improvement.

Fishes were collected from local fishermen communities from September 2020 to August 2021. The fishes were immediately photographed to get proper characters and color pigmentations for identification. According to the size of the species, fish transported to the lab were fixed in different bottles of 10% formalin solution. Larger fish had their abdomens sliced open while smaller fish were preserved directly in the formalin solution. Serial numbers, the date of collection, and the regional name were all listed on the specimen labels. Fish identification was carried out with the use of reference books. (Day, 1994; Jayaram, 1999) and confirmed by Dr. S. Jadhav, FBRC, Zoological Survey of India, Hyderabad, India.

Studies on the reservoir's morphology have been conducted and utilized to estimate its fisheries potential using the morpho-edaphic index (MEI).

Results and Discussion

The existence of a variety of fish species indicates that the body of water has the potential for fishing (Pawar *et al*., 2011). During the current study, 10 fish species which belonged to 9 genera, 7 families, together with 5 orders were reported from the Mandohol reservoir (Table 1). In the assemblage composition (40 %), the most predominant family was Cyprinidae, whereas other families Channidae, Cichlidae, Claridae, Bagridae, Siluridae, and Mastacembelidae each with 10% (Fig. 2). Other freshwater sites were also observed to have a majority of fish species from the family Cyprinidae. (Pawar, 2014; Shukla, 2021).

In the present investigation, reported fish species were categorized based on IUCN conservation status, and found that 70% of species were of Least Concern, 20% were Near Threatens and 10% were Vulnerable (Table 1). Exotic species *Oreochromis mossambicus* is threatened by hybridization with the rapidly spreading *Oreochromis niloticus*, which is being spread by anglers and for aquaculture (IUCN, 2022).

Based on their economic significance, the study's gathered fish species (Table 1) were further categorized as commercial, fine food, coarse food, and aquarium fish (Lagler, 1956). From observed fishes, 6 species were commercially important prolific breeders that can be grown and have a good market price, 2 species can be used as fine food because of their good taste and protein value, 2 Species were found to have less food value and were preferred as food by poor people and 3 species were found that can be maintained in an aquarium for aesthetic and recreational value.

All carnivorous species are hazardous to the fisheries since they continue to hunt the fingerlings of other fishes (Rajbanshi, 1996; Kunjir and Kawade, 2021). The most hazardous carnivorous fish species are *Channa* and *Garra*. Fingerlings suffer significant losses because of the presence of predatory fish in the nursery and raising ponds. The reservoir contains 3 predatory fish species; hence, for enhancing the pisciculture in the waterbody efforts should be increased, and the presence of predatory and weed fish population species should be minimum.

Age, mean depth, water level fluxes, morphometric characteristics, benthos, geography, temperature, terrain, and various physiochemical parameters are the key biotic as well as abiotic elements that affect a water body's productivity. The limnological characteristics of the collecting sites also indicate a more significant role for fisheries production. (Thirumala *et al*., 2011).

In this study the fishery potential of the reservoir was determined by using the morpho-edaphic index (MEI), which can be used to

Table 1: Systematic report on Icthyfaunal diversity, Conservation status, Feeding habits, and economic significance of fish Species from the Mandohol reservoir

Name of fish	Common name	Feeding habits	Economic importance	IUCN status
I. Order: Anabantiformes **i. Family: Channidae**				
➢ *Channa gachua* (Hamilton, 1822)	Dwarf Snakehead	C	CO, AF	LC
II. Order: Cichliformes ii. **Family: Cichlidae**				
➢ *Oreochromis mossambicus* (Peters, 1852*)*	Tilapia	O	CO, CF,	VU
III. Order: Cypriniformes iii. **Family I: Cyprinidae**				
➢ *Labeo rohita* (Hamilton)., 1822	Rohu	O	CO, FF	LC
➢ *Labeo catla* (Hamilton., 1822)	Catla	O	CO, FF	LC
➢ *Garra mullya* (Sykes., 1839)	Sucker fish	C	AF	LC
➢ *Rasbora daniconius* (Hamilton.,1822)	Slender Rasbora	O	CO, CF, AF	LC
IV. Order- Siluriformes **iv. Family-Claridae**				
➢ *Clarias gariepinus (*Burchell., 1822**)**	African sharp-tooth catfish	O	CO, CF	LC
v. Family- Bagridae				
➢ *Mystus malabaricu* (Jerdon, 1849)	Jerdon's Mystus	O	CO, FF	NT
vi. Family: Siluridae				
➢ *Ompok bimaculatus* (Bloch.,1794)	Butter catfish	O	CO, FF	NT
V. Order- Synbranchiformes **vii. Family- Mastacembelidae**				
➢ *Mastacembelus armatus* (Lacepède., 1800)	Zig zag Eel	C	CO, AF	LC

C- Carnivorous, H- Herbivorous, O-Omnivorous, CO- Commercial, FF-Fine Food, CF-Course food, AF-Aquarium fish, LC-Least Concern, NT-Near Threatens, VU-Vulnerable

Table 2: Estimation of the fish production potential of the Mandohol Reservoir

Overall Specific Conductivity (µmhos/ cm)	Mean Depth of Reservoir (M)	Fish Yield Potential
266.0	12.5	69.14 kg/ ha/ year

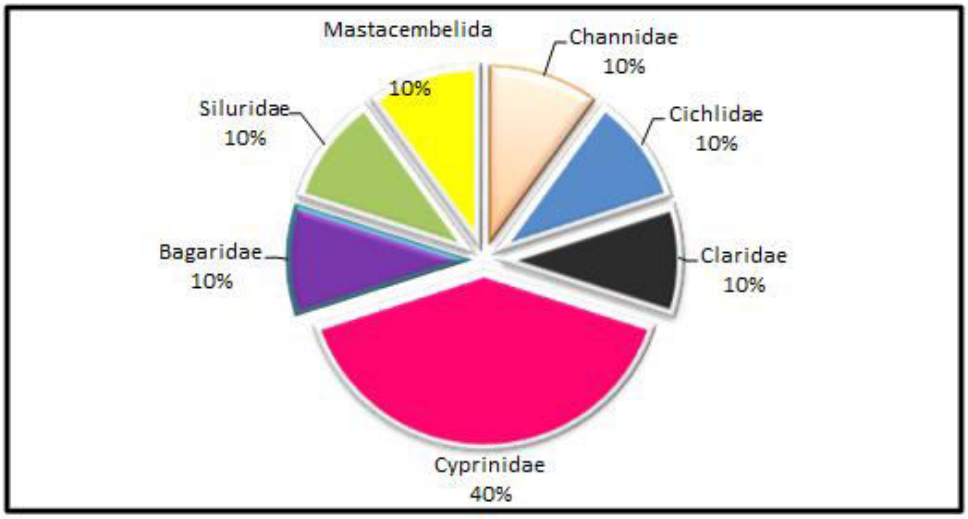

Fig. 2: Percentage composition of reported fish families from Mandohol reservoir.

estimate the fish yield potential of the reservoir (Table 2). Morpho-edaphic index is division of conductivity and mean depth of reservoir.

Fish yield potential "C" (kg/ha/year) = 0.9897* 12.28 $^{1.3888}$ as per (Sugunan *et al*., 2002).

Conclusion

As per the fish yield potential of the reservoir, 69.14 kg/ha/year fishes can be obtained from the reservoir. This revealed that all biotic and abiotic factors are suitable for fish culture.

The results of the current investigation showed that: (i) The existence of a total of 10 fish species suggested a modest variety of fish. (ii) The waterbody was dominated by fishes of the family Cyprinidae and order Cypriniformes, and (iii) The majority of the fish species that were seen were significant commercially, but the abundance of weed and predatory fishes has to be kept under check. Since the fishes are the essential resources of food and ornament, it is necessary to conserve and improve the fish fauna by adopting conservation strategies. Reservoirs indicated an opportunity for fish culture but a necessary step for reducing investment losses and sustaining wildlife protection is important.

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References

Ahirrao SD and Mane AS. (2000) The diversity of ichthyofauna, taxonomy and fisheries from fresh waters of Parbhani district, Maharashtra state. J Aquat Biol. 15 (1,2): 40-43.

Bhatnagar A and Devi P. (2013) Water quality guidelines for the management of pond fish culture. Int J Environ Sci. 3(6): 1980-2009.

Dalavi SD and Pawar BA. (2021) Studies on Water Quality Index of Mandohol Reservoir, Ahmednagar district, and Maharastra. Res J Int E-Res J 279(A): 90-95.

Day F. (1994) The fishes of India; being a natural history of the fishes known to inhabit the seas and fresh waters of India, Burma, and Ceylon. Vol. 1, Jagmander Book Agency, New Delhi, pp. 778.

Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India. Annual Report 2021-22. https://dahd.nic.in/sites/default/filess/Annual%20Report%20English.pdf.

FAO. (2020) The State of World Fisheries and Aquaculture 2020. Sustainability in action. Rome. https://doi.org/10.4060/ca9229en.

IUCN. (2022) The IUCN Red List of Threatened Species. Version 2022-1. https://www.iucnredlist.org.

Jayaram KC. (1999) The freshwater fishes of the Indian region. Narendra Publishing House, New Delhi.

Kadam SU and Gaikwad JM. (2006) Ichthyofauna of Masoli reservoir, district Parbhani, Maharashtra- A

study of inland reservoir fishery in India. J Aquat Biol. 21(2): 59-61.

Kale CA, Pandarkar, AK and Kawade SA. (2018) Study of ichthyofauna of Lonimavla reservoir in relation to aquaculture practice, Ahmednagar district, Maharashtra. Int J Res Biosci Agricult Technol. 6 (Special Issue 2): 113-118.

Kalyankar VB, Nalage DN, Dhondage B, Akhade S and Jamdar SV. (2012) Study of fish biodiversity from lower Dudhana Project at Parbhani district, India. World J Zool 7(4): 320-322.

Kawade SA and Pandarkar AK. (2016) Study of Ichthyofaunal diversity of Kalu dam in relation to fish culture, Ahmednagar district, Maharashtra. J Exp Zool India 19(1): 341-345.

Kunjir L and Kawade SA. (2021) Ichthyofaunal studies of Ghod reservoir in relation to fish culture. J Emerg Technol Innov Res. 8(3): 296-299.

Lagler KF. (1956) Freshwater fishery biology. William C. Brown, Dubugue.

Pawar BA. (2009) Studies on water quality and fish diversity of Sadatpur lake in Ahmednagar district Maharashtra. J Indian Fish Assoc. 36: 93-100.

Pawar BA and Pandarkar AK. (2010) Fish and insect diversity of Kelewadi Lake in relation to fish culture, Ahmednagar district, Maharashtra. Flora Fauna 16(1): 105-110.

Pawar BA, Pandarkar AK and Shendge AN. (2011) Ichthyofauna of Pravara river in relation to pisciculture, Ahmednagar district, Maharashtra. J Exp Zool India 14(1): 129-132.

Pawar RT. (2014) Ichthyofauna of Majalgaon reservoir from Beed district of Marathwada Region, Maharashtra state. Discovery 20(60): 7-11.

Rajbanshi KG. (1996) ANNEX III, Hand Book on Fish Culture. PAK/94/005. https://www.fao.org/ fishery/ docs/CDrom/aquaculture/a0845t/volume2/docrep/ field/373987/3739870P.HTM.

Sarkar UK, Sharma J and Mahapatra BK. (2015) A review on the fish communities in the Indian reservoirs and enhancement of fisheries and aquatic environment. J Aquacult Res Develop. 6: 297.

Shukla MK. (2021) Species diversity of fishes in relation to the physicochemical status of the Yamuna at Kalpi (UP) India. World J Adv Res Rev. 10(02): 206-213.

Sugunan VV, Mandal SK and Rao D. (2002) Fish yield prediction through morpho-edaphic index and estimation of stocking density for Indian reservoirs. Indian J Fish. 49(4): 369-378.

Thirumala S, Kiran BR and Kantaraj GS. (2011) Fish diversity in relation to Physico-chemical characteristics of Bhadra reservoir of Karnataka, India. Adv Appl Sci Res. 2 (5): 34-47.