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Study on the ichthyofaunal diversity in relation to physicho-chemical characteristics of Tulsi Dam, Mandangad, Dist.-Ratnagiri, Maharashtra, India

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Abstract
Tulsi dam is the freshwater reservoir located at Tulsi village of mandangad taluka in Konkan region. The study of physicochemical characteristics and ichthyofaunal diversity were carried out during January 2024 to December 2024. The physicochemical characters of water found suitable for drinking as well as fish culture. Till date the scientific data on ichthyofaunal diversity not carried out. So, it is attempted to make the study on ichthyofaunal diversity of this dam. For one year study, in the present study, 23 species of fresh water fishes were collected from Tulsi dam and distributed in 6 different order 12 families and 13 genera and presented in Table-2. Among this, Cyprinidae family was dominated with 11 fish species and contributed 48%, followed by Siluridae 1 species with 4%, Bagridae 4 species with 18%, Channidae 2 species with 9%, Gobidae 1 with 4%, Anabantidae 1 species with 4%, Chichlidae 2 species with 9%, and Mastacembelidae was 1 with 4% The data were obtained during study were discussed with recent literature and summerised in table 1 and 2.

Keywords: Tulsi dam, Physicochemical characters, ichthyofaunal diversity

1. Introduction
Fishes are including in the class Pisces. Fishes having great diversity in morphology, physiology and habitat. Healthy and non-polluted aquatic ecosystem plays a significant role in growth and development of fishes as well as other aquatic animals. Freshwater fishes are good source of protein and omega 3 fatty acid (ὼ-3 fatty acid). These fishes easily available in local market. In poor communities especially found in India and Africa, fishes fulfil the protein and energy demand. Fishes also helps in reduction of malnutrition found in children. In India, freshwater dams, lakes, ponds and rivers showed variety of fish species which support grate commercial potential (Krishna and Piska, 2006) [10]. All over the world, fishes are used as a food for proteins and ὼ-3 fatty acids. In India, aquaculture industry increased every year to fulfil the increasing demand of fishes as a food. Over the world annual fish production from all fisheries is about 154 million tons with different species of fishes including Cod, herring, tuna, flounder and salmon (Helfman, 2007 [6]; Gawande and Patki, 2023) [4]. Approximately, 22,000 fish species have been recorded in globe, out of which 11% (2,425) are found in India (Ubarhande *et al*, 2016) [17]. In India, 1570, fishes live in marine water and 930 found in freshwater (Kar D, 2003) [9]. Globally, fish farming is considered as an income source. In Maharashtra, People form rural area mostly, depends on the freshwater bodies for food and as an income source. Hence, ichthyofaunal studies having greater interest of the researchers in all time. (Day, 1978 [2]; Hamilton, 1922 and Menon, 1992) [12].

Tulsi dam is freshwater body located near the Tulsi village. Most of the people of this village depends on this water body for water and fish food and income source also. The freshwater ecosystem is under threatened due to many factors like environmental alteration, human activity, pollution etc. (Gawande and Patki, 2023) [4]. Overfishing is major threats to edible freshwater as well as marine fishes. Because of pollution and natural calamities responsible for less fecundity rate due to these new young ones are not replace dead fishes. Hence, extinction of fishes occurs more, and it is directly affecting fishing industry sustain longer time (Mathew, 2022) [11].

Materials and Methods

Tulsi dam is present near the Tulsi village of Mandangad taluka, Dist.-Ratnagiri (M.S.). Dam is found in longitude 73.2202^{0}E and Latitude 17.9686^0 N. water sample and fish species were collected first week of every month from different sampling station of Tulsi dam during the period of January, 2024 to December, 2024. Physicochemical characters of water such as water temperature (Thermometer), Turbidity (Nephello Turbidity Meter), pH (pH meter), DO (Winkler method by titration), Phosphate and Nitrate (Spectrophotometer) were analysed by using standard methods of APHA (1985) [1], Trivedi and Goel (1984). Fish samples were collected from dam with the help of local fisherman by using suitable nets such as dragnet, cast net, gill net etc. The information of the captured fishes collected from local fisherman and local market. Captured fishes were identified by using standard keys (Jhingran 1991 [8]; Dutta and Shrivatava 1988; and Jayaram 2010) [7]. Easily identified fishes quickly photographed and released back to the water and other fishes were brought to the Zoology laboratory of the college, which is away from 4 Km to the Tulsi dam. These unidentified fishes cleaned and fixed in 10% formalin for further study.

Fig 1: Satellite image of the Tulsi Dam, Mandangad

Results and discussion

During one year study period from January, 2024 to December, 2024 water samples were collected from four different stations of Tulsi dam and analysed in Zoology Laboratory of the college which is 4 km away from the dam. All the results of the physicho-chemical parameters are presented in Table-1. The physicho-chemical parameters are found suitable and helpful for fish culture. Water temperature ranges from 19.6^{0}C to 27.4^{0}C, average temperature was 22.7^{0}C. In the present investigation turbidity ranges from 42 NTU to 78 NTU and average turbidity was found 60.16 NTU. Zweigh R. (1989) [19], reported that 20-30 NTU is suitable for fish culture. But in present investigation it is found that little more turbidity comparatively Zweigh findings. Dissolved oxygen (DO) ranges from 4.1 to7.6 mg/l and average DO was 5.8 mg/l. This range of the DO is indicated that Tulsi dam was not polluted and healthy water body favourable for fish culture. These findings correlated with findings of Sushma R. (2019). pH of the dam water was ranges from 7.1 to 8.3 and average pH was 7.4. The ideal pH for fish growth of fresh water is between 7.5 to 8.5, above and below this affects the growth to the fishes. The obtained results correlated with the

results of Sushma R. (2019) who reported the pH range 7.0 to 8.1. In the present study the value of phosphate ranges from 0.23mg/l to 0.76 mg/l and average value 0.43 mg/l. Although phosphate present in trace quantity in water is essential for the phytoplankton production which is the food for fishes. The nitrate ranges from 0.12mg/l to 0.60 mg/l and average count was 0.38 mg/l. This value is ideal for fish culture and desirable limit is 0 to 2 mg/l and acceptable limit is less than 4 mg/l. These findings of physicochemical parameters are clearly indicated that, the water of tulsi dam is less polluted and favourable for aquaculture and fishery.

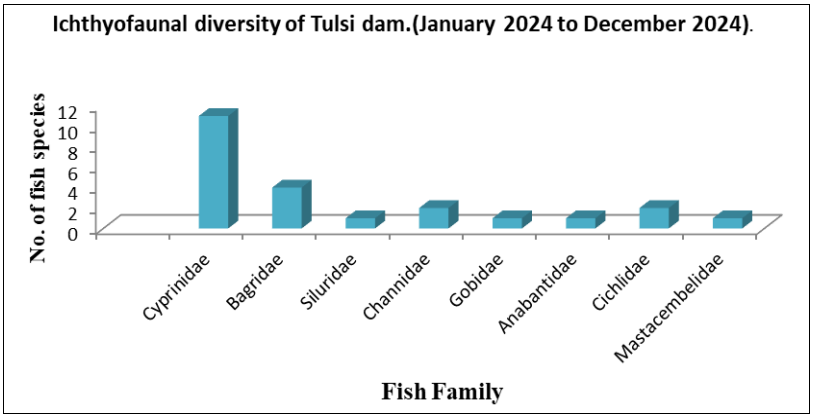
In the present study, 23 species of fresh water fishes were collected from Tulsi dam and distributed in 6 different order 12 families and 13 genera and presented in Table-2. Among this, Cyprinidae family was dominated with 11 fish species and contributed 48%, followed by Siluridae 1 species with 4%, Bagridae 4 species with 18%, Channidae 2 species with 9%, Gobidae 1 with 4%, Anabantidae 1 species with 4%, Chichlidae 2 species with 9%, and Mastacembelidae was 1 with 4%. Due to greater adaptability in surrounding atmosphere, Cyprinidae was found dominated fish species during study (Mohan et.al 2013) [13]. These findings are correlated with the findings of Jabhulkar P. and Kamdi R. (2023), on Naleshwar dam, Sindhewahi, they found that 35 fish species of 11 different family, 6 order and 23 genera. Ubrande,S. et.al; (2016) studied on Khadepura dam, Buldhana and found that 23 fish species under 21 genera, 12 families and 7 orders were observed. Gavande and Patki (2023), studied fish diversity of Saikhed dam, Yawtmal, Maharashtra and found that 36 species belongs to 6 orders and 11 families. In this study also Cyprinidae family was dominated among all captured fish species of Tulsi dam.

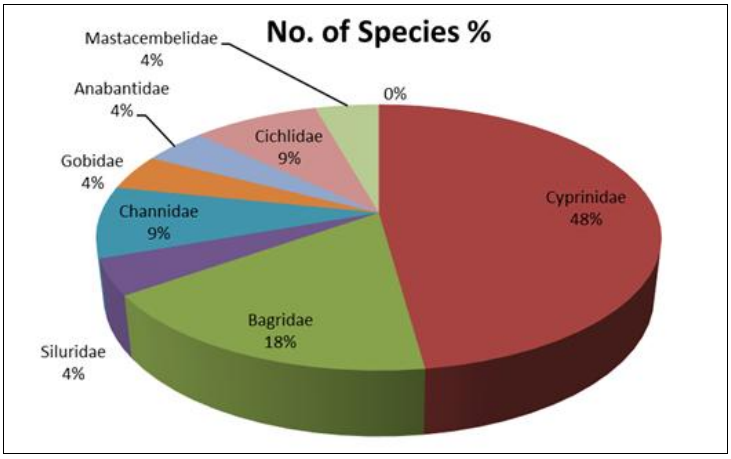
Table 1: Physicho-chemical Parameters of Tulsi dam during January 2024 to December 2024.

Parameter	Unit	Jan.	Feb.	Mar.	April	May	Jun	July	Aug.	Sept.	Octo.	Nov.	Dec.	Min.	Max.	Avg.
Water Temp.	0C	19.6	20.4	21.8	25.1	27.4	23.5	23.7	21.9	20.5	26.3	21.2	21.3	19.6	27.4	22.7
Turbidity	NTU	42	46	48	54	51	70	76	78	71	62	64	60	42	78	60.16
pH	-	7.2	7.3	7.5	7.7	8.3	7.6	7.5	7.3	7.4	7.5	7.3	7.2	7.1	8.3	7.4
Do	Mg/l	7.6	7.2	6.5	5.8	5.2	5.1	4.3	4.2	4.1	5.6	6.4	7.6	4.1	7.6	5.8
Phosphate	Mg/l	0.21	0.34	0.37	0.43	0.56	0.72	0.77	0.62	0.48	0.19	0.25	0.28	0.21	0.77	0.43
Nitrate	Mg/l	0.12	0.34	0.49	0.53	0.58	0.60	0.52	0.42	0.37	0.31	0.23	0.12	0.12	0.60	0.38

Table 2: Ichthyofaunal diversity of Tulsi dam. (January 2024 to December 2024)

Order	Family	Genus	Species	Local Name
1. Cypriniformes	Cyprinidae	Puntius	*Puntius puntius (Hamilton, 1822)* [5]	Karwali
			Puntius chola (Hamilton, 1822) [5]	Karwali
			Puntius sophore (Hamilton, 1822) [5]	Khawal
		Pethia	*Puntius ticto (Hamilton, 1822)* [5]	Khawal
		Mola carplet	*Amblypharyngodonmola (Hamilton, 1822)* [5]	Udan
		Garramullya	*Garramullya* (Sykes, 1839)	Malay
		Catla	*Catla catla (Hamilton, 1822)* [5]	Catla
		Mrigala	*Cirrhinus mrigla (Hamilton, 1822)* [5]	Mrigal
		Reba carp	*Cirrinus reba (Hamilton, 1822)* [5]	Khawal
		Rohu	Labeo rohita *(Hamilton, 1822)* [5]	Rohu
		Rohu	Labeo bata *(Hamilton, 1822)* [5]	Khawal
2.Siliriformis	Bagridae	*Mystus*	*Mystus vittatus (Bloch,1822)* [5]	Valanji
			Mystus cavasius (Hamilton, 1822) [5]	Shingti
			Mystus nigriceps (Valevinnes,1840)	Chichya
			Hemibagrus nemurus (Valevinnes,1840)	Valanji
	Siluridae	*Wallago*	*Wallago attu (Schneider, 1839)*	Shivara
3.Channiformis	Channidae	*Channa*	*Channa punctatus (Bloch, 1793)*	Dakoo
		Channa	*Channa stratus (Day, 1878)*	Dakoo
4.Perciformis	Gobidae	*Glosogobius*	*Glosobius giuris giuris (Hamilton,1822)* [5]	Kharbi
	Anabantidae	*Anabus*	*Anabus testudinues (Bloch,1792)*	Koi
	Cichlidae	*Tilapia*	*Oreochromis mossambicus (Peters, 1852)*	Tilapi, kalamasa
		Perl spot green chromide	*Etroplus suratensis (Bloch,1790)*	Tilapi
	Mastacembelidae	*Mastacembelus*	*Mastacembelus armatus (Lecepede, 1800)*	Vam





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