



ICHTHYODIVERSITY IN MALANGAON WATER RESERVOIR IN KHANDESH REGION OF MAHARASHTRA, INDIA

Khodake, S. P. and Petare, R. K.

Department of Zoology,

K. A. M. P. and K. N. K. P. College, Pimpalner, 424306, Dist. Dhule, Maharashtra, India

Abstract: The ichthyodiversity were studied during January to December 2012 from Malangaon water reservoir in Khandesh region of Maharashtra state, India. The results revealed that occurrence of 17 species of 15 different genera, 07 families and 05 orders were recorded. The member of order *Cypriniformes* were dominated by 12 species with relative abundance 73%, *Perciformes* 02 species with relative abundance 16%, *Siluriformes* 01 species with relative abundance 08%, *Synbranchiformes* 01 species with relative abundance 01% and *Osteoglossiformes* 01 species with relative abundance 01%. Fish diversity was assessed by calculating the various diversity indices such as Shannon – Wiener diversity index (H), Simpson’s Dominance index (D), Simpson’s index of diversity (1- D), Evenness index (J).

Index Term- Ichthyodiversity, Malangaon water reservoir, Khandesh, *Cypriniformes*

I. INTRODUCTION

Fish are an important ecological link in the food chain. They have good taste and are easily digestible and growth promoting value. Fishes have a rich source of proteins and other essential nutrients to tide over the nutritional deficiency of man. The demand for seafood and fresh fish is increasing as more people are realizing the health and fitness value of eating fish. Fishes are one of the important elements in the economy of many nations as they have been stable items in the diet of many people. Fishes occupy a significant position in the socio-economic fabric of our country by providing the population not only the nutritious food but also income and employment opportunities.

Fish exhibit the greatest biodiversity of the vertebrates with over 22,000 species. Of these, about 58 percent are marine, 41 percent are freshwater species and 1 percent move back and forth between salt and freshwater. As expected, marine fishes are the most diverse because salt water covers 70 percent of the earth. Only 1 percent of the earth is covered by freshwater. This small area is home to 8,000 species of fresh water fishes (Helfrich and Neves, 2009). Various workers have studied the fish diversity in different regions of Maharashtra, including Shinde *et al.*, (2009) studied ichthyofaunal diversity of Harsool Savangi Dam, Aurangabad. Shaikh *et al.*, (2011) worked on, ichthyofauna diversity in upper Dudhana water reservoir in Jalna District. Joshi *et al.*, (2012) studies ichthyological fauna of District Buldhana. Jaiswal and Ahirrao (2012) studied ichthyodiversity of the Rangavali Dam, Nandurbar District. Kharat *et al.*, (2012) studied freshwater fish fauna of Krishna river at Wai, Northern Western Ghats, India.

In terms of habitat diversity fishes live in almost every conceivable aquatic habitat. There is hardly any water body which does not have fish. The rich diversity of fish is due to the diversity of aquatic habitats and range of water quality in which they can live. In the present work an attempt has been made to study the ichthyodiversity in Malangaon water reservoir in Khandesh region of Maharashtra state, India.

II. RESEARCH METHODOLOGY

For the study of ichthyodiversity, fishes were collected from Malangaon water reservoir in Khandesh region of Maharashtra (India) during January to December 2012 using different types of nets and bharjal by fisherman and also from local fish market. They were immediately photographed with the help of digital camera (Sony DSC W830 Cyber-shot 20.1MP). The fishes were identified by local name and common name as named by local fisherman; and also by Zoological Survey of India (ZSI) Pune.

For determination of diversity indices, total number of species, total number of individuals in a sample and total number of individuals of a species were determined. From these data, Shannon - Weiner Index (H), Simpson’s Dominance Index (D), Simpson’s Index of Diversity (1-D), Pielou’s evenness Index (J) was determined using the following equations.

1. Shannon - Weiner Index (H): It depends on both the number of species present and the abundance of each species.

$$H = \sum P_i (\ln P_i), \quad P_i = A/T$$

Where: P_i is the proportion of each species

A is number of each species in the sample,
T is the total number of individuals of all species in the sample.

2. Simpson's Dominance Index (D): is determined using the following equations.

$$D = \frac{n_1 (n_1 - 1) + n_2 (n_2 - 2) + \dots + n_{20} (n_{20} - 1)}{N (N - 1)}$$

Where: n is the total number of individual of a particular species.

N is the total number of individuals of all species.

3. Simpson's Index of Diversity = 1 - D

Where: D is the Simpson's Dominance Index

$$4. \text{Pielou's evenness Index (J)} = \frac{H}{\ln \times S}$$

Where: H is the Shannon – Weiner Index and

S is the number of species.

Physiography of Malangaon water reservoir

The Malangaon water reservoir is situated on Kan River near Malangaon village. It is 14 km away from Pimpalner, District Dhule, Maharashtra (India). It is manmade reservoir constructed in 1967. Geographically, Malangaon water reservoir is located at latitude 21° 05' 15.73''N and longitude 74° 05' 53.99''E. The total capacity of dam is 11,325 Km³. The surface area of dam is 248 Km³. The dam is earthen type and the length of it is 1091 meters. The maximum height is 23 meter. It has left canal of 25 kms long which covers about 9 villages. The water of this reservoir is reserved for drinking and irrigation purposes.

III. RESULTS AND DISCUSSION:

Table 1: List and abundance of Fish fauna recorded from Malangaon water reservoir.

Sr. No	Order	Name of the Fish	Vernacular / Local Name	Relative abundance
01	Cypriniformes	<i>Labeo rohita</i>	Rohu	09
		<i>Cyprinus carpio</i>	Kombada	11
		<i>Catla catla</i>	Catla	13
		<i>Tor khudree</i>	Khavalya	02
		<i>Cirrhinus mrigala</i>	Mrigal	07
		<i>Punctius sophore</i>	Debari	13
		<i>Punctius sarana</i>	Umbarfodya	03
		<i>Salmophasia bacaila</i>	Barachi/Chal	41
		<i>Garra mullya</i>	Malya	18
		<i>Rasbora daniconius</i>	Kajalimasa	35
		<i>Lepidocephalichthys guntea</i>	Vam	05
		<i>Lepidocephalichthys thermalis</i>	Muri	12
02	Perciformes	<i>Chanda nama</i>	Kach	31
		<i>Channa marulius</i>	Dok	07
03	Siluriformes	<i>Ompok bimaculatus</i>	Papada	19
04	Synbranchioformes	<i>Macrognathus pancalus</i>	Vam	03
05	Osteoglossiformes	<i>Notopterus notopterus</i>	Patola	02

Table 2: The Fish species richness and diversity indices from Malangaon water reservoir.

Sr. No.	Index	Value
01	Species Richness	17
02	Species abundance (N)	231
03	Shannon - Weiner Index (H)	1.3780
04	Simpson's Dominance Index (D)	0.097
05	Simpson's Index of Diversity (1-D)	0.903
06	Pielou's evenness (J)	0.486

Ichthyodiversity from the Malangaon water reservoir containing 17 species of 15 different genera, 07 families and 05 orders were recorded. The member of order Cypriniformes were dominated by 12 species with relative abundance 73%, Perciformes 02 species with relative abundance 16%, Siluriformes 01 species with relative abundance 08%, Synbranchiformes 01 species with relative abundance 01% and Osteoglossiformes 01 species with

relative abundance 01%. Order Cypriniformes contained 12 species namely *Labeo rohita*, *Cyprinus carpio*, *Catla catla*, *Tor khudree*, *Cirrhinus mrigala*, *Punctius sophore*, *Punctius sarana*, *Salmophasia bacaila*, *Garra mullya*, *Rasbora daniconius*, *Lepidocephalichthys guntea*, and *Lepidocephalichthys thermalis*. Order Perciformes contained 02 species namely *Chanda nama* and *Channa marulius*. Order Siluriformes contained 01 species namely *Ompok bimaculatus*. Order Synbranchioformes contained a single species namely *Macrognathus pancalus*. Order Osteoglossiformes contained a single species namely *Notopterus notopterus*. The ichthyodiversity and relative abundance in Malangaon water reservoir are shown in Table 1.

As far as abundance of the species is concerned in Malangaon water reservoir, certain species like *Cyprinus carpio*, *Catla catla*, *Punctius sarana*, *Salmophasia bacaila*, *Garra mullya*, *Rasbora daniconius* and *Chanda nama* were most commonly found. While some species such as *Labeo rohita*, *Tor khudree*, *Cirrhinus mrigala*, *Punctius sophore*, *Lepidocephalichthys guntea*, *Lepidocephalichthys thermalis*, *Channa marulius*, *Ompok bimaculatus*, *Macrognathus pancalus* and *Notopterus notopterus* were found occasionally. In present study species abundance was 231, Shannon - Weiner Index (H) recorded 1.3780. The Simpson's Dominance Index (D) was recorded 0.097 and the Simpson's Index of Diversity (1-D) was recorded 0.903. The Pielou's evenness (J) value was recorded 0.486 (Table 2).

These results were corroborating with many earlier researchers including; Sakhare (2001) reported 23 species belonging to 07 orders where Cyprinidae family is dominant with 11 species from Jawalgaon reservoir, Solapur District Maharashtra. Lohar and Borse (2003) recorded, 24 fish species belonging to 16 genera and 07 families from river Tapi. Hiware and Pawar (2006) recorded 43 fish species from Nath sagar dam, Paithan, in Aurangabad District. Shaikh *et al.*, (2011), studied ichthyofauna diversity in Dudhna project water reservoir, Jalna (M.S.). During the study 27 fish species belong to 07 order, 15 genera and 09 families were recorded. Rankhamb (2011) studied ichthyofaunal diversity of Godavari River at Mudgal, Dist. Parbhani. The study reveals the occurrence of 26 fish species belonging to 05 orders, 07 families and 15 genera. Order Cypriniformes were dominated by 15 species. Amrutsagar and Lohar (2011) studied diversity of Mollusca and Fish in Gondoor and Nakane Lakes, in Dhulia, Northwest Maharashtra. They recorded 18 fish species from both lakes. Both lakes were dominated by major carps with 10 members belonging to Cypriniformes. The composition, abundance and distribution of aquatic organisms over a period of time provide an index of the ecosystem. The fishing operation goes on throughout the study period by the local fisherman. The fish fauna is subjected to over fishing for consumption. It is under threat as a result of several anthropogenic interferences. The agricultural activities are important threat to the ichthyofaunal diversity.

It is concluded that Malangaon water reservoir providing a habitat for 17 Fresh water fishes of diverse type. *Salmophasia bacaila* was found to be located in abundant. State Fishery Department should adopt legislative measures on illegal fishing; check on the fishing activities especially during breeding season. The fisherman's should make aware about fishing of larval fish, juveniles and immature should avoided, which may help in high yield of fish production in the Malangaon water reservoir.

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REFERENCES

- [1] Amrutsagar, M. V. and P. S. Lohar (2011). Diversity of mollusca and fish in Gondoor and Nakane Lakes in Dhulia, Northwest Maharashtra, India. *Journal of Ecobiotechnology*, 3(6): 16-20.
- [2] Helfrich, L. A. and R. J. Neves (2009). Freshwater Fish Biodiversity and Conservation. *Virginia Tech. Pub.*, 420-525.
- [3] Hiware, C. J., and R. T. Pawar (2006). Ichthyofauna of Paithan Reservoir (Nath Sagar dam) in Aurangabad district of Marathwada region Maharashtra. *Ecology and Environment*, APH Publishing Corporation New Delhi.
- [4] Jaiswal, D. P., and K. D. Ahirrao (2012). Ichthyodiversity of the Rangavali Dam, Navapur, District Nandurbar, Maharashtra State. *Journal of Research in Biology*, 3: 241-245.
- [5] Joshi, P. S., S. A. Tantarapale, V. T. Tantarapale, K. M. Kulkarni (2012). Ichthyological Fauna of Buldhana District, Maharashtra (India). *Online International Interdisciplinary Research Journal*, 2 (2): 111-115.
- [6] Kharat, S. S., M. Paingankar., and N. Dahanukar (2012). Freshwater fish fauna of Krishna River at Wai, Northern Western Ghats, India. *JoTT Short Communication*, 4(6): 2644-2652.
- [7] Lohar, P. S. and S. K. Borse (2003). Diversity of fish fauna in river Tapi. Maharashtra. *J. Aqua. Biol.*, 18: 47-49.
- [8] Pielou, E. C. (1966). The measurement of diversity in different types of biological collection. *J. of Theoretical biology*, 13: 131-144.
- [9] Rankhamb, S. V. (2011). Ichthyofaunal Diversity of Godavari River at Mudgal Tq. Pathri, Dist. Parbhani. *Recent Research in Science and Technology*, 3(12): 11-13.
- [10] Sakhare, V. B. (2001). Ichthyofauna of Jawalgaon reservoir. Maharashtra, Fishing Chimes, 19 (8): 45-47.
- [11] Shaikh, H. M., S. M. Kamble and A. B. Renge (2011). The study of Ichthyofauna diversity in upper Dudhna project water reservoir near Somthana in Jalna District (MS), India. *Jour. of Fisheries and Aquaculture*, 2(1): 08-10.
- [12] Shannon, C. E. and W. Weiner (1964). The mathematical theory of communication. The University of Illinois, press Urbana.
- [13] Shinde, S. E., T. S. Pathan, R. Y. Bhandare and D. L. Sonawane (2009). Ichthyofaunal Diversity of Harsool Savangi Dam, District Aurangabad, (M.S.) India. *World Journal of Fish and Marine Sciences*, 1(3): 141-143.
- [14] Simpson, E. H. (1949). Measurement of Diversity. *Nature*, 163: 688.

Fish fauna recorded from Malangaon water reservior



Labeo rohita (Ham-Buch)



Cyprinus carpio (Linnaeus)



Catla catla (Ham-Buch)



Tor khudree (Sykes)



Cirrhinus mrigala (Ham-Buch)



Punctius sophore (Ham-Buch)



Punctius sarana (Ham-Buch)



Salmophasia bacaila (Ham-Buch)



Garra mullya (Sykes)



Rasbora daniconius (Ham-Buch)



Lepidocephalichthys guntea (Ham-Buch)



Lepidocephalichthys thermalis (Val)



Chanda nama (Ham-Buch)



Channa marulius (Ham-Buch)

Fish fauna recorded from Malangaon water reservior



Ompok bimaculatus (Bloch)



Macrognathus pancalus (Ham-Buch)



Notopterus notopterus (Pallas)

