



STUDIES ON FISH BIODIVERSITY OF NAWARGAON LAKE IN MAREGAON TALUKA, DISTRICT YAVATMAL, (M.S.) INDIA.

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ABSTRACT:

In the rural area of Maharashtra so far as aquatic food is concerned the fish plays an important role in the delicious food preferred by the common people for locally available fishes found in the nearby fresh water bodies for nutrition among the essential food constituents. Natural stagnant fresh water bodies provide a self-employment for poor fisherman and social, economical conditions of various places in Yavatmal district. Various types of fishes are found in the Nawargaon lake available for the local rural poor fisherman for their fulfillment of basic needs of life by selling in the weekly market of nearby places and get money. In the Nawargaon lake found locally available fish species for weekly market easily get the common people food requirement in Maregaon Taluka, District Yavatmal. Keeping in the view, the diversity of fish fauna of the Nawargaon lake in Maregaon Taluka in Yavatmal District, Maharashtra, Central India has been studied from the period Feb.2016 to March. 2017. The aim of the study was to explore the fish fauna of Nawargaon Lake. In the course of investigation, four sampling spots were selected viz., SPOT-A, SPOT-B, SPOT-C and SPOT-D of Nawargaon lake. The fish diversity is a good indicator of health of aquatic ecosystem. During the research work most of the fresh water fish species are easily available for the maintain of ecological equilibrium of Nawargaon lake which indicates various different Indian major carps such as *Catla catla*, *Labeo rohita* and *Cirrhina mrigala* found in the lake along with cat fishes from the period Feb.2016 to March. 2017. Nawargaon lake is huge and spread over area about 2740m and catchment area is 9.663 thousand hectors.

Keywords: Fish diversity, Nawargaon Lake, ecosystem.

INTRODUCTION:

Biodiversity is one of the important cornerstones of sustainable development and represent the biological wealth of particular nation (Tiple et al., 2012). Biodiversity is essential for stabilization of ecosystem, protection of overall environmental quality for understanding intrinsic worth of all species on the earth (Ehrlich and Wilson, 1991). Presently, the Ichthyofaunal diversity refers to variety of fish species. Fishes are the keystone species which determine the distribution and abundance of other organism in the ecosystem, they represent and are good indicator of water quality and aquatic ecosystem (Shivshankar and Venkataramana, 2012). Day (1994) described 1418 species of fish under 342 genera from British India.

The Yavatmal district of Maharashtra found various fresh water fish species variety among the locally available lakes such as Saikheda, Wai, Maisdodaka, Arunavati respectively which yields a lot of production of fishes available for the common people those who resides nearby villages in the weekly market at affordable rate. So, now a days there is a lot of demand for the locally available fresh water fishes from these water bodies by the people because of due to delicious taste and contain high vitamins, minerals, proteins etc.

The richness of fish species has attracted the attention of eminent researchers and state has a good contribution in enriching the data bank on the aquatic biodiversity of the nation. Some of the earliest studies on the aquatic biodiversity of the Maharashtra states was already done by the Hora and Nair (1941). Hora (1949) reported 42 species

of fishes in Rihand River of state. Motwani and David (1957) reported 95 various different fish faunal variety related with 20 families from some drainage. Dubey and Mehra (1962) recorded 70 fish species in River Chambal. Vyas et al., (2010) recently studied the aquatic biodiversity of ponds and Rivers of Jabalpur and Bhopal reported the presence of 86 fish species in different River basin of Madhya Pradesh.

Nawargaon lake is by far the most important valuable source of water of the Yavatmal district of Maharashtra. The Nawargaon Lake is the most important ecological hub for aquatic biodiversity in Yavatmal District and has therefore been the epicenter of the biodiversity studies.

There is practically not much information available in the literature regarding the recent fish fauna of the Nawargaon Lake in Maregaon Taluka, District Yavatmal in Maharashtra State, India. Further, no attempt seems to have been made so far to research work on variety among the fish species of this Nawargaon lake, in Maregaon taluka of Yavatmal district of Maharashtra state. Fish sampling was conducted at four selected locations in the Nawargaon Lake namely SPOT-A, SPOT-B, SPOT-C and SPOT-D respectively. The Nawargaon Lake is the lifeline of the people resides in nearly villages mostly for various domestic activities. Fishing for livelihood and food is a common practice of the local community. The fish diversity of the Nawargaon Lake is still unexplored and not documented.

MATERIAL & METHODS:

Sampling and Analysis: -

1. Physico-chemical Analysis: During the study, water samples were collected at seasonal interval during Feb.2016 to March 2017, using clean 1L-polyethylene bottle for analysis of water variables in the laboratory from pre-selected spots of the Nawargaon Lake.

2. Collection of Fishes: The fishes are observed for one year, fishes were collected by using various

nets (Gill net, Hand net, Drag net etc.) with the help of local fisherman. Sometime fish samples purchased from fisherman on local landing centers, from four water bodies. Fishes were brought to the laboratory and preserved in 10% formalin solution in separate specimen jar according to size of the specimen. Fishes were identified by using standard keys and books (Day, 1967; Jhingran, 1991; Misra, 2004; Gupta and Gupta, 2006). Sometime fish base website also referred for identification of fishes and to find out various aspects of fish fauna (www.fishbase.org).

Threat status of each fish species was made according to the report of (Lakra et al., NBGFR, 2010) threatened freshwater fishes of India and 'Red List' of threatened species by (IUCN). The relative abundance of the fish was classified into three categories: Abundant (+++) constitutes 71-100 % of total catch, Moderate (++) constitute 36-70 % of the total catch and Rare (+) constitute 1-35 % of total catch, assuming the fishing efforts constant for each catch (Wani and Gupta, 2015).

RESULTS AND DISCUSSIONS:

At the period of this study, the two season were: dry(October-June) and wet (July-September) pH (7.0-8.9),air temperature (19.41°C), water temperature (20°C-33°C), transparency (08-144cm), conductivity (210µ/cm-670µ/cm), freeCO₂ (04mg/l-62mg/l), total alkalinity (128mg/l-252mg/l), Dissolved Oxygen (6.8mg/l-13.6mg/l), Chloride (6.99mg/l-420.57mg/l), total hardness (26mg/l-318mg/l), Calcium hardness (21mg/l-144.9mg/l) and turbidity (4.8NTU-10.3NTU). The Nawargaon Lake serves as a source of water for irrigation.

During present investigation 23 fish variety have been related to 5 order and 12 family were identified given in the **(Table No.1)**. In the order Cypriniformes maximum number of fishes were

found during the study of one-year research work. Totally 9 fish variety was found to be observed related to the order Cypriniformes and family Cyprinidae is concerned. The fishes related to this family are distributed in freshwater habitat all over the world. Freshwater carps are included in this order. The second largest order observed at Nawargaon lake was Siluriformes. Generally, cat fishes are included in this order of fishes. The common identification marks of these fishes are presence of one or two pairs of barbels.

The four species belonging to order Perciformes, two fish variety were related found to order Ophiocephaliformes and one fish variety were found to be order Osteoglossiformes also observe during the course of research work from the Nawargaon Lake. The marketable demand of these fishes is very high like native and exotic variety of fishes such as *Labeo rohita*, *Catla catla*, *Channa striatus*, *Channa marulius*, and *Tilapia mossambica* were found to be in large number of Nawargaon lake during the study period as well as socio-economic conditions of the poor fisherman is also well developed due to because of the addition of the fish seed and small fishes during monsoon breeding season for marketable values fish culture programmed as well-being continue throughout the year.

During present study of research work the world famous critically available fish variety is found in the lake in a very less number such as *Tor khudree* and *Ompok bimaculatus* were observed, according to (IUCN, 2011). The variety amongst the fishes are found in a large number because of due to easily available food materials in the Nawargaon lake which provide a good atmosphere for the betterment of equilibrium and control over fresh water ecological parameters during seasonal variation and various physical, chemical and biological factors.

Then fishes were identified up to the species level with the help of books and standard keys (Day,

1967; Jhingran, 1988; Misra, 2004; Gupta and Gupta, 2006). The fresh fishes collected for the analysis. Fish collection was done during the period from Feb. 2016 to March 2017 once in every month. Local fish market was visited frequently and information about fishes was collected from local fisherman.

Random samples from a mixture of fishes, 2-8 similar sized fish were taken for the analysis. They were kept in cold ice box and transported to the laboratory. Fishes were brought to laboratory immediately washed with fresh, clean water for the removal of algal biomass, mud and other waste material and dried by using blotting paper. Our findings are corroborating with observations of Sakhare (2001), and Sarwade and Khillare (2010), Kharat *et al.*, (2012) and Jayabhaye and Lahane (2013).

CONCLUSION:

In the Nawargaon lake found a large number of fish varieties which is a very good sign of various fish fauna such as related with 23 fish variety with 21 genus, 12 family and 5 orders respectively during the study of research work in one-year duration Feb.2016-March-2017.

The large number of variety of fishes were found in Nawargaon lake represents the suitability of water for aquaculture practices. To continue the species of aquatic ecosystem daily observations of water body is necessary. The present study shows that the Nawargaon lake hosts a large number of freshwater fish variety among the species.

However, the fish fauna of Nawargaon is being free from pollution, any illegal activities, deterioration of water, and addition of other fish variety which is harmful for native available fishes respectively.

This lake is not much polluted due to involvement of people because it provides functional yield of fresh water fishes easily available for a common people to get nourishment and food in an affordable rate in the weekly market, as well as good quality water for drinking and irrigation of

water for domestic animals and agriculture purposes.

RECOMMENDATIONS:

To prevent the loss of naturally available water body we have to take efforts from deterioration of lakes aesthetic and beautiful values of lake.

In the Nawargaon lake, the fresh water lake is of great national importance, a long duration life span of flora and fauna for irrigation management plan should be adopted.

Effective implementation and proper planning on the regulation on various crafts, boats, advance instruments and fishing gear is much needed to prevent over exploitation of natural water bodies.

SUGGESTIONS:

Strict management measures with large public awareness would be essential to save the fish germplasm and it's time to make proper policies and take necessary actions to improve conservation measures.

This study would serve as a frame of reference for future initiatives in studying fish biodiversity and conservation management.

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REFERANCE :

- Adoni, A. D., Joshi G., Ghosh K., Chourasia S. K., Vaishya A. K., Yadav M., Verma H. G. (1985): Workbook on Limnology, Pratibha Publishers, Sagar India, pp1-127.
- APHA (1998): Standard methods for the examination of water and waste water, *American Public Health Association*, Washington, DC.
- Day Francis (1994): The Fishes of India, Jagmander Book Agency, New Delhi.

- Dubey, G. P. and Mehra, R. K. (1962): Fish and Fisheries of Chambal River Proceedings of the first all-Indians Congress of Zoology, Part-2, Scientific Papers, The Zoological Society of India, Culcutta.647-665pp.
- Ehrlich, P. R. and Wilson O. W., (1991), *Biodiversity Studies: Science and Policy Science* Vol. 253 (5021), pp. 758-762.
- Fish diversity of Chargaon Reservoir, District. Chandrapur (M. S.), India. Kamdi R. R., Sawane, A. P. and Kale, M. C. *India Stream Research Journal* ISSN 2230-7850, 2013.
- Gupta, S.K. and Gupta, P.C., (2006), *General and applied Ichthyology (fish and fisheries): S. Chand and Company Ltd. Ramnagar, New Delhi, India.* pp. 10-15.
- Hora, S. L. & Nair, K. K. (1941): Fishes of Satpura Range, Hoshangabad District, Central Province, Rec. Indian Mus. 43.361-373.
- Ichthyofaunal diversity of Wardha River and Nirguda River in selected stretch of Wani, Dist. Yeotmal (M. S.), India. Khamankar D. B., Kamdi R. R. & Sawane, A. P. *Environment Conservation Journal* (ISSN 0972-3099) Vol. 13 (1&2) (125-128),2012.
- IUCN Red list, (2018), International Union for Conservation of Nature: Retrieved on February 15, 2018 from <http://www.iucnredlist.org>.
- Jayabhaye, U. M. and L. D. Lahane (2013): Studies on Ichthyofaunal Diversity of Pimpaldari Tank, Hingoli, Maharashtra, India. *S. S. M. R. A. E., Jaipur* 4(43-44). 54-55.
- Jayaram, K. C. (1981): "The Fresh Water Fishes of India, Pakistan, Bangladesh, Burma and Sri Lanka". A Handbook Zool. Survey India, Calcutta i-xxii:1-475.
- Jhingran, V. G., (1991), Fish and Fisheries of India, Hindustan Publishing Corporation (India), Delhi.

- Kamble, A. B. and K. R. Reddi (2012): Biodiversity of fish fauna at Mangi reservoir, Dist. Solapur with respect to physico-chemical parameters. *Life science Bulletin*, 9(1):55-58.
- Kar, D. A., C. Kumar, Bohra and L. K. Sigh, (Eds) (2003): Fishes of Barak drainage, Mizoram and Tripura; In: Environment, pollution and management, APH publishing corporation, New Delhi, pp:604:203-211.
- Kharat, S. S., M. Paingankar and N. Dahanukar (2012): Freshwater Fish Fauna of Krishna River at Wani, Northern Western Ghats, India. *J. Threatened Taxa* 4(6): 2644-2652.
- Lakra, W. S., Sarkar, U. K., Gopalkrishnan, A. and Kathivelpandian, A., (2010), Threatened Freshwater Fishes of India: NBFGR Publication, Lakhnow, ICAR, ISBN: 978-81-905540-5-3.
- Misra, K. S., (2003), An Aid to the Identification of The Common Commercial Fishes of India and Pakistan: Narendra Publishing House, Delhi - 110006 (India).
- Mittermeier, R. A. and C. G. Mitemeier (1997): Megadiversity Earth's Biological Wealthiest Nation. In Mc Allister, D. E., A. Lttamition and B. Harvey (Eds). *Global Fresh Water Biodiversity Sea Wind Cemex, Mexico City*. Pp1-140.
- Motwani, M. P. and David, A. (1957): Fishes of the river Sone with observations on the Zoogeographical Significance. *J. Zool. Soc. India*. 9(1):9-15.
- Qureshi, T. A., Qureshi, N. A. (1983): Indian fishes, Publisher: Brij Brothers, Sultania Road, Bhopal. (M. P.) 5-209.
- Sakhare, V. B. (2001): Ichthyofauna of Jalgaon Reservoir, Maharashtra. *Fishing chimes* 19(8): 45-47.
- Sarwade, J. P. and Y. K. Khillare (2010): Fish Diversity of Ujani Wetland, Maharashtra, India. *Bioscan Spl. Issue* 1:173-179.
- Shivashankar, P. and Venkataramana, G. V., (2012), Ichthyodiversity Status With Relation to Water Quality of Bhadra River, Western Ghats, Shimoga District, Karnataka: *Annals of Biological Research*, 3(10), ISSN 0976-1233, pp. 4893-4903.
- Talwar, P. K. and A. Jhingran (1991): "Inland Fishes of India and Adjacent Countries." Oxford and IBH Publishing Co. New Delhi.
- Tiple, A. D., Waykar, V. D. and Khurad, A. M., (2012), Nectar Plant Resource Visits by Butterflies on a Futala Farm, Nagpur City (Central India): *J. of Sci. Inf.* (3), ISSN: 2229-5836. pp 136-143.
- Vyas, V., Parashar, V. and Damde, D. (2012): Fish Biodiversity of Betwa River in Madhya Pradesh, India with Special reference to Sacred Ghat. *Int. J. Biodiv. Con. Vol.* 4(2) p. 71-77.
- Wani, O. A. and Gupta, U. S. (2015), A Study on Ichthyofaunal Diversity of Sagar Lake, Madhya Pradesh, India: *Academic J., I. J. of Biodiversity and Conservation*, Vol. 7(3), ISSN 2141-243X, pp.126-129.

Table No.1 Fishes Observed at Nawargaon Lake from Feb.-2016 to March-2017:

Sr. No.	Order	Family	Scientific name of fish
1	Cypriniformes	Cyprinidae	<i>Catla catla</i> (Hamilton, 1822) <i>Cirrhina mrigala</i> (Hamilton, 1822) <i>Ctenopharyngo idella</i> (Howes, 1981) <i>Cprinus carpio</i> (Linnaeus, 1758) <i>Labeo rohita</i> (Hamilton, 1822) <i>Puntius sarana</i> (Hamilton, 1822) <i>Puntius ticto</i> (Menon, 1974) <i>Rasbora daniconius</i> (Hamilton, 1822) <i>Tor khudree</i> (Hamilton, 1822)
2	Ophiocephaliformes	Channidae	<i>Channa marulius</i> (Hamilton, 1822) <i>Channa striatus</i> (Bloch, 1794)
3	Osteoglossiformes	Notopteridae	<i>Notopterus notopterus</i> (Pallas, 1769)
4	Perciformes	Centropomidae	<i>Ambassis ranga</i> (Day, 1878)
		Gobiidae	<i>Glossogobius giuris</i> (Koumans, 1953)
		Mastacembelidae	<i>Mastacembelus armatus</i> (Day, 1878)
		Cichlidae	<i>Tilapia mossambica</i> (Jones and Sarojini, 1953)
5	Siluriformes	Bagridae	<i>Mystus seenghala</i> (Sykes, 1839)
		Clariidae	<i>Clarias batrachus</i> (Linnaeus, 1758)
		Heteropneustidae	<i>Heteropneustes fossilis</i> (Bloch, 1794)
		Siluridae	<i>Ompok pabda</i> (Hamilton, 1822) <i>Ompok bimaculatus</i> (Jayaram, 1977) <i>Wallago attu</i> (Day, 1878) <i>Bagarius bagarius</i> (Hamilton, 1822)