



Studies On Fish Biodiversity Of Nawargaon Lake In Maregaon Taluka, District Yavatmal, (M.S.) India

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Abstract

The fishes are one of the most important vertebrate, provided rich protein sources for human and several animals and important elements in the economy of many countries. Fish diversity of Nawargaon Lake essentially represents the fish faunal diversity. Nawargaon Lake conserve a rich variety of fish species which supports the commercial fisheries 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. A good piscine diversity represents the balanced ecosystem. Taking this into consideration the fish diversity of Nawargaon Lake is studied during present investigation. The Nawargaon Lake is huge and spread over area about 2740m and catchment area is 9.663 thousand hectares.

Introduction:

India is one of the mega biodiversity countries in the world and occupies the ninth position in terms of freshwater mega biodiversity (Mittermeier et al., 1997). In India there are 2,500 species of fishes of which 930 live in freshwater and 1,570 are marine (Kar et al., 2003). Day (1994) described 1418 species of fish under 342 genera from British India. Jayaram (1981) listed 742 freshwater species of fishes coming under 233 genera, 64 families and 16 orders from the Indian region. Talwar (1991) estimated 2546 species of fish belonging to 969 genera, 254 families and 40 orders from India. Recently, Jayaram (1999) grouped and estimates 852 species of fishes belonging to 71 families and 16 orders from the Indian region.

The state of Maharashtra is one of the important aquatic biodiversity hotspots of the country, having bestowed with a large number of water bodies both lotic and lentic, the state boasts of a rich fish biodiversity. 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 state were carried out by Hora and Nair (1941). Hora (1949) reported 42 species of fishes in Rihand River of state. Motwani and David (1957) reported 95 species of fishes belonging to 20 families from the 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 Madhya Pradesh and reported the presence of 86 fish species in different River basin of Madhya Pradesh.

Nawargaon Lake is by far the most significant water resources of the state 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 study the fish diversity of this Nawargaon Lake. 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 nearby 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 and 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. The water quality parameters such as air and water temperature, Ph, Secchi Disc transparency, alkalinity (carbonate and bicarbonate) and dissolved oxygen were measured on in the field itself. The air and water temperature was recorded through digital equipment and dissolved oxygen was analyzed used Modified Winkles Method. The methodology adopted for the analysis of physico-chemical

properties was followed from American Public Health Association (APHA, 1998) and Adoni et al., (1985).

2. Collection of Fish: The fishes were collected using monofilamentous gill nets of 10-50mm mesh sizes. We also used cast nets of 10-25mm mesh sizes for collecting fish in shallow areas. Fish specimens were also collected from different fish landing sites. All the specimens were preserved in 4% formaldehyde solution at the field.

3. Laboratory procedure: Fishes brought to laboratory were preserved in 10% formalin solution in separate specimens jar according to the size of specimen. The fishes were identified using standard keys of Jayaram(1981), Qureshi & Qureshi(1983), Jhingran(1991), Day Francis(1994, and Shrivastava(1983). Fish Base website was also referred for various aspects of fish fauna (www.fishbase.org).

Results and Discussion:

At the period of this study, the two seasons 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 species of fishes belonging to 5 orders and 12 families were identified (Table No.1). The order Cypriniformes was found to be dominant among fishes. Total 9 species of fishes were observed belonging to order Cypriniformes and family Cyprinidae. The members of 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 is presence of one or two pairs of barbules. The four species belonging to order Perciformes, two species belonging to Ophiocephaliformes and one species belonging to Osteoglossiformes were also observed from the Nawargaon Lake. The economically important species of fishes like *Labeo rohita*, *Catla catla*, *Channa striatus*, *Channa marulius*, and *Tilapia mossambica* were found numerically more in Nawargaon Lake during the study period. This was due to the release of seedlings and fingerlings of these economically important fishes in Lake for commercial fishery practices.

During present study period the globally threatened species of fishes like *Tor khudree* and near threatened species like *Ompok bimaculatus* were observed (IUCN,2011). The diversity and abundance in fishes of Nawargaon Lake is attributed to the availability of plenty of food material and healthy ecosystem developed over a long period of time. It is also may be the result of controlled fishing practices at Nawargaon Lake. The fishes prefer the optimum ecological factors for their existence and proliferation.

Sakhare (2001) reported the occurrence of 23 species of fishes belonging to 7 orders at Jawalgaon reservoir, Dist. Solapur(M.S.). The order Cypriniformes was reported to be the dominant in terms of number of species.

Sarwade and Khillare (2010) reported the 60 species of fishes belonging to 15 families and 36 genera during their study on Ujani wetland (M.S.). Kamble and Reddi (2012) reported the occurrence of 10 species of fishes belonging to 5 orders and 6 families. Kharat et al., (2012) had recorded 51 species of fishes belonging to the 14 families and 35 genera during their study on Krishna River at Wai (M.S.). Jayabhaye and Lahane (2013) observed the 21 species of fishes belonging to 6 families and 13 genera during their study period on Pimpakdari tank, Dist. Hingoli(M.S.). Our findings are corroborating with observations of Sakhare (2001), and Sarwade and Khillare (2010), Kharat et al., (2012) and Jayabhaye and Lahane (2013).

Table 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	Ophiocephaliforme	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) <i>Ompok pabda</i> (Hamilton, 1822) <i>Ompok bimaculatus</i> (Jayaram, 1977) <i>Wallago attu</i> (Day, 1878)
		Siluridae	<i>Bagarius bagarius</i> (Hamilton, 1822)

Conclusion:

The Nawargaon Lake exhibit a good ichthyofaunal diversity represented by 23 species of fishes belonging to 21 genera, 12 families and 5 orders. The diversity and abundance of fishes in Nawargaon Lake represents the suitability of water of Nawargaon Lake for aquaculture practices. To maintain the richness of aquatic ecosystem continuous monitoring of lake is needed.

The present study that the Nawargaon Lake hosts a number of freshwater fish species. But the fish fauna of this lake are being threatened due to several anthropogenic activities including introduction of exotic fish species, habitat degradation, pollution, irrational fishing. Due to different anthropogenic activities the fish diversity of this water body is in declining mode. To conserve this inherent treasure of Nawargaon Lake, the wetland of International importance, a long term management plan should be adopted. Effective implementation on the regulation on mesh size and fishing gear is much needed to prevent over exploitation. Strict management measures with large public awareness would be essential to save the fish germplasm and its time to make proper policies and take necessary actions to improve conservation measures so that the future generations get the fish live on the earth rather than the photographs in the literature. This study would serve as a frame of reference for future initiatives in studying fish biodiversity and conservation management.

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References:

- Hora, S. L. & Nair, K. K. (1941): Fishes of Satpura Range, Hoshangabad District, Central Province, Rec. Indian Mus. 43.361-373.
- 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.
- 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, Calcutta. 647-665pp.
- 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.
- Qureshi, T. A., Qureshi, N. A. (1983): Indian fishes, Publisher: Brij Brothers, Sultania Road, Bhopal. (M. P.) 5-209.
- 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.
- Talwar, P. K. and A. Jhingaran (1991): "Inland Fishes of India and Adjacent Countries." Oxford and IBH Publishing Co. New Delhi.
- Day Francis (1994): The Fishes of India, Jagmander Book Agency, New Delhi.
- Mitte-meier, 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.
- APHA (1998): Standard methods for the examination of water and wastewater, American Public Health Association, Washington, D C.
- Sakhare, V. B. (2001): Ichthyofauna of Jawalgaon Reservoir, Maharashtra. Fishing chimes 19(8): 45-47.

- 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.
- Sarwade, J. P. and Y. K. Khillare(2010): Fish Diversity of Ujani Wetland, Maharashtra, India. Bioscan Spl. Issue 1:173-179.
- Kamble, A. B. and K. R. Reddi (2012): Biodiversity of fishfauna at Mangi reservoir, Dist. Solapur with respect to physico-chemical parameters. Life science Bulletin, 9(1):55-58.
- 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.
- 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.
- 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.
- 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.
- Fish diversity of Chargaon Reservoir, Distict. Chandrapur (M. S.), India. Kamdi R. R., Sawane, A. P. and Kale, M. C. India Stream Research Journal ISSN 2230-7850, 2013.
- Ichthyofaunal diversity of Wardha River in the vicinity of Warora, Dist.-Chandrapur (M. S.), India. (2016): I. J. R. B. A. T. Special issue 2016: 136-139, Khekare, S. S. and Sawane, A. P.