

FAUNAL DIVERSITY OF FISH SPECIES FROM NAKANA LAKE, DISTRICT-DHULE (MS) INDIA

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ABSTRACT

The aim of this study was to reveal the faunastic diversity of fish species from Nakana lake, during May, 2015 to Apr., 2016. Total 15 species were recorded. These belonged to 4 order, 6 families and 14 genera. The order Cypriniformes was found to be dominated by 8 species including *Amblypharingodon mola*, *Catla catla*, *Cyrrhinus mrigala*, *Garra mullya*, *Labeo calbasu*, *Labeo bata*, *Pethiya ticto* and *Puntius sarana*. The results of present study clearly showed that the Ichthyofauna of the Nakana lake is highly diverse. The proper utilization of this water resource is discussed for fisheries, proper management and its conservation.

KEYWORDS: Ichthyofauna (Fish diversity), Nakana lake, conservation.

INTRODUCTION

Fishes are the versatile animals in the world. It gives immense pleasure to the man and lively hood to the human being. From ancient time it is an important part and parcel of the human lives. Fishes constitutes half of the total number of vertebrates in the world and lives in all types of aquatic habitats. Around the world approximately 22,000 fish species have been recorded out of which 2500(11%) are found in India, Nagma and Khan, (2013); Kar (2003). From those 930 are live in freshwater and 1,570 are marine, Sing *et al.*, (2013).

Fish is valuable source of protein, in addition to being an important palatable food item, for human consumption. They are part of aquatic food chain, nutrient cycling and ecosystem services. Fish also used as a genetic library for possible future use in medicine and aquaculture, stimulate human interest in nature, Chandrashekhar *et al.*, (2013).

The country is endowed with vast and varied water resources and rich biodiversity. Freshwater ecosystems are comparatively vast on the mother earth. It is 45,000 km of rivers, 126334 km of canals, ponds and tanks 2.36 million hectores. Fishes are divided into main two classes, viz., Chondrichthyes and Osteichthyes. There are about 450 families of freshwater fishes globally, out of which about 40 are reported in India, And 25 of these families contain commercially important species. Fresh water Fishes are poorly studied group since information regarding distribution, population dynamics and threats are incomplete, and most of the information is available from a few well-studied locations only. Biodiversity is essential for the stabilization of ecosystem, protection of environmental quality, for understanding ecological niche. In India, there are 2500 species of freshwater fishes that have been recognized in the Indian subcontinent, of which 930 are categorized as freshwater species by Day, (1878); Jayaram, (1981); Talwar and Jhingran, (1991); Rao *et al.*, (1999); Sakhare and Joshi, (2002); Dutta *et al.*, (2003); Sakhare and Joshi, (2004); Yadav, (2005); Battul *et al.*,(2007) and Ashashree *et al.*,(2008). The present study will be useful to examine factors influencing the structure and interaction of whole ecosystem specially in relation with fish diversity, distribution and endemic species composition of freshwater fishes, as it is closely depends on the different factors such as the availability of food, breeding sites, water current, depth, topography and physic-chemical properties of water, Harris, (1995). Thus an attempt has been made to highlight the fish diversity of Nakana lake, near Dhule city.

MATERIAL AND METHODS

Study area

Nakana Lake was constructed on the Panzara River, near Morane village, tahsil-Dhule, district-Dhule (MS) India. The geographical location of the lake having Longitudes: 74.7417477 and the Latitudes: 20.9095349. It is having catchment area is of 945 m, maximum height of lake is 18.41 m. This lake also receives water from Haranmall lake. The water of the lake is used for the purpose of drinking water supply to Dhule city, irrigation to nearby fields and for fisheries. Well developed forest is present at the opposite side of the Nakana lake.

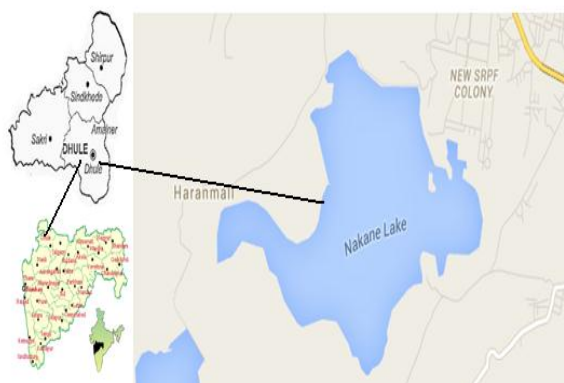


Fig 1: Map Showing Study area, Nakana Lake.



Fig 2: Photograph of Collection site Dhule (MS) India.

To record the Ichthyofaunal diversity of Nakana lake was selected in the region of Dhule district (Ms) India, during May, 2015 to April, 2016. The specimens were purchased from the local fisherman. For taxonomic study, identification and confirmation and photographs were snapped. Morphological characters were noted and specimens were preserved in 10% formalin. The specimens were identified to specific level by using taxonomic keys and different literature Day (1889); Talwar and Jhingran (1991) and Jayaram (1981). Those which are not identified, are sent to the ZSI (Zoological survey of India), Pune, for correct identification.

For quantitative way of water assessment, species diversity indices of diverse water bodies were computed in recent years, Kawade and Pandharkar, (2016). With help of following equations we determine the four diversity indices to assess how divers the lake about fish species.

Data analysis

1. Shannon – Weiner Index, (1963): (H): $H = -\sum P_i (\ln P_i)$,
 $P_i = A/T$ where A is number of each species in the sample,
2. Simpson's Dominance Index,(1949) :(D): $D = \sum n(n-1)/N(N-1)$,
 N = Total number of individual of all species.
 n = Total number of individuals of particular species.
3. Simpson's Index of Diversity = 1-D,
4. Simpson's reciprocal Index = 1/D,

RESULTS AND DISCUSSION

During the entire study total 15 species were collected from Nakana lake in between May, 2015 to April, 2016. The scientific name, local name of the species along with order and family were illustrated in Table:-1.

Table 1: Fishes observed at Nakana lake during May, 2015 to April, 2016.

Order	Family	Species	Common name
Channiformes	Channidae	1. <i>Channa striatus</i> (Bloch,1795)	Dokh
Cypriniformes	Balitoridae	2. <i>Oreonectes evizardi</i> (Day,1873)	Muri-1
		3. <i>Shcistura denisoni</i> (Day,1873)	Muri-2
	Cyprinidae	4. <i>Amblypharingodon mola</i> (Ham, 1822)	Moyda
		5. <i>Catla catla</i> (Ham,1822)	Catla
		6. <i>Cyrrhinus mrigala</i> (Ham,1822)	Padin
		7. <i>Garra mullya</i> (Sykes,1839)	Mahya
		8. <i>Labeo calbasu</i> (Ham,1822)	Rav
		9. <i>Labeo bata</i> (Ham, 1822)	Lal rahu
		10. <i>Pethiya ticto</i> (Ham, 1822)	Chota doted
		11. <i>Puntius sarana</i> (Ham, 1822)	--
	Bagridae	12. <i>Mystus cavasius</i> (Ham,1822)	Kirkatta
Siluriformes	Siluridae	13. <i>Sperata aor</i> (Ham,1822)	Ekakati
		14. <i>Osteobrama vigorsii</i> (Sykes,1839)	Gulbi
Synbranchiformes	Mastacembelidae	15. <i>Macragnathus punctalus</i> (Ham,1822)	Vam

Total 15 species belongs to 4 Orders, 6 Families and 14 Genera. Order Cypriniformes including 3 families, viz., Channiformes, Siluriformes and Synbranchiformes are with single family. Family Cyprinidae is dominant with 8 species (53.33%) from over all the reported families. Due to more fecundity of major carp density of Cyprinidae was evident in the lake and suitable environmental condition relatively higher population. Author's previous study is correlated with this study, Patole and Patil, (2009); Patole, (2015). Balitoridae and Suluridae have 2 species (13.33%). Bagridae, Channidae and Mastacembalidae including single species of each (6.66%) shown in fig.:-3. *Shcistura denisoni* found to be abundant and *Macragnathus punctalus* was least, shown in fig. :- 4 & 5.

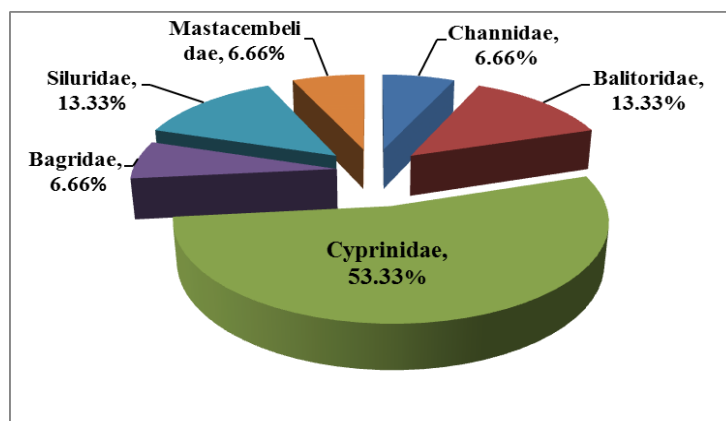


Fig. 3: Percentage occurrence of fish families of Nakana Lake, Dhule (MS), India.

Many researchers are agree with this finding, Ahirrao,(2014) reported an account of fish resources of 39 fish species belonging to 24 genera and 12 families from Bori dam at Tamaswadi, Parola, district Jalgaon. Jaiswal and Ahirrao, (2012) observed, 28 fish species in Rangavali dam (Navapur), belong to 25 genera and 12 families. Uchchariya, (2012) had reported the fish fauna in Tighra reservoir in Gwalior in Madhya Pradesh with 40 fish species.



Fig. 4: *Shcistura denisoni*.



Fig. 5: *Macrornathus puncalus*.

Biological Indices

The present investigation showed richness, abundance and different diversity indices from Nakana lake. Shown in Table:-2.

Table 2: Fish diversity indices of Nakana lake.

Sr. No.	Index	Values
1	Species Richness (S)	15
2	Species abundance (N)	188
3	Shannon-Weiner Index (H)	4.5353
4	Simpson's Dominance Index (D)	0.0766
5	Simpson's Index of Diversity (1-D)	0.9234
6	Simpson's reciprocal Index (1/D)	13.0548

Richness of the lake about fish species (S) was 15 and abundance of total species (N) was 188. The value of Shannon-Weiner Index (H) was 4.5353; the Simpson's index of dominance (D) was 0.0766. The Simpson's index of diversity (1-D) was 0.9234 and Simpson's reciprocal index (1/D) was 13.0548. The results are in favor of Khodake *et al.*,(2014).

Conservation

This is the natural site where river originates within the nearby hills. Hence the lake is always away from drainage of city and industrial effluents. The water of present lake is useful for water supply for drinking purpose to the Dhule city, irrigation for nearby farms and for fish farming.



Fig. 6 and 7: Immersion of idol of Lord “Ganesh” and “Durga in the Nakana Lake, Dhule.



Fig. 8 and 9: Nakana lake, Water Pollution Increase at the time of festivals.

Lake shows rich diversity, but some activities and rituals of Indian traditional festivals are the causes decrease the productivity of lake, not only as fishery point of view but as water storage of lake also. Immersion of idols during religious celebrations has led to entry of toxic paints and undesirable material in the lake (plaster of paris), shown in fig. no. 6 & 7. These poisonous chemicals have a far-reaching and long term impact on the aquatic biota and structure of the lake. Further silt gets washed into the lake and it reduced the storage capacity of the lake every year. Reduction in the capacity of the lake to store the rain water means less water for drinking, irrigation and fishery. In these occasion “Nirmalya, Gulal, polythene and other waste things” are also thrown in to the lake, shown in fig. no. 8 & 9, of which some are non biodegradable, hence dead storage level proves harmful to ecosystem level.

The present investigation provides further strategies for fish conservation and also focused on conservation status of lake, Lakra *et al.*, (2006) develop various research tools to generate information, relevant to conservation strategies of prioritized and endangered fish species. The model proposed by Mace and Lande, (1991) are more exact and less subjective than that of IUCN, ASFB, AFS. But such quantitative data is not available at present. It is suggested that to conduct periodical studies for enlisting of the species to species specific conservation plan for saving invaluable freshwater fish resources of the country.

CONCLUSION

Water of lake is polluted at the time of “Ganesh Festival, Durga Festival and “Dassera”. The immersions of idols of the Lord Ganesha, Durga and “Nirmalya” in to the lake. Plaster of Paris, polythene and colors of idols are non-biodegradable, affects several days up to years. It specifically affects the aquatic biota. To save ecological situation of Nakana lake from future deterioration, there is an urgent need to create scientific awareness and holistic approach towards sustainable management among local peoples on the importance of the reservoir habitat and its fish fauna. As it is the basic need to conserve them for future generations.

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