A CHECKLIST OF FRESHWATER ICHTHYOFUANA OF NAKANA LAKE, DISTRICT- DHULE (M.S.) INDIA.

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ABSTRACT

Fishes are aquatic creatures, perfectly adopted for aquatic life. Freshwater bodies comprise variety of fishes and maintain the balanced ecosystem. Present study reveals total 20 species belonging to 5 orders, 12 families and 18 genera. The family Cyprinidae was found to be dominant form major bulk (30%). Followed by Siluridae, Bagridae and Ambassidae each with (10%). Whereas family Clupiidae, Mastacembalidae, Channidae, Cyprinidae, Gobiidae, Claridae, Heteropneustidae and Cobitidae including single species of each contribute (5%). Authors documented the record of fish diversity by calculating the various diversity indices such as Shannon-Wiener diversity index (H), Simpson’s Dominance index (D), Simpson’s index of diversity (I-D), Simpson’s Reciprocal index (1/D), Margalef’s Richness index (MD) and Pielou’s Evenness index (J).

Results and Discussion

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

Data analysis

1. Shannon – Weiner Index, (1963): (H) = −ΣPi(ln Pi),
2. Simpson’s Dominance Index, (1949): (D) = 1/2 n(n−1)/N(N−1),
3. Simpson’s Index of Diversity = 1−D,  
4. Simpson’s reciprocal index = 1/D,  
5. Margalef’s Index, (1958): (MD) = R=s−1/Ln(n),  
6. Pielou’s evenness Index, (1966): (J) = H/lns

KEY WORDS: Cyprinidae, Conservation, Aquaculture, Shannon-wiener Diversity Index.

Introduction

Water is life, it is utmost important for survival. The freshwater bodies i.e. lakes, ponds and reservoirs etc. are vital resources for developing countries, although the amount of water in them constitutes only a minute fraction i.e. less than 1% of the total freshwater resources on the earth. In India these are mostly manmade, having great economic importance. Indian history is full of events prompting construction of water bodies for power generation, irrigation, drinking and flood control etc. but now a day these are also utilized for fisheries. These are important from socio-economic point of view, as it has potential of providing employment (Khan et al., 1991).

Fish species plays a major role in the trophic structure of aquatic ecosystems, as they are considered as keystone species. Therefore, the knowledge of the freshwater fish community in any water body is of great importance for the conservation and management of aquatic ecosystems and the biodiversity (Khan et al., 1991).

The present study was conducted at Nakana Lake. It was built over the Pimpaldari River, near Morane Village, Tah. and Dist. - Dhule (MS) India. The geographical location of the lake has (20° 52' 56.27” N and 74° 43.31 82.” E). This is earthen lake having catchment area is of 945 m^2, maximum height is 18.41 m. Main purpose behind construction of the lake is for drinking water supply, irrigation and aquaculture.

Material and Methods

Study area

The present study was conducted at Nakana Lake. It was built over the Pimpaldari River, near Morane Village, Tah. and Dist. - Dhule (MS) India. The geographical location of the lake has (20° 52’ 56.27” N and 74° 43.31 82.” E). This is earthen lake having catchment area of 945 m^2, maximum height is 18.41 m. Main purpose behind construction of the lake is for drinking water supply, irrigation and aquaculture.

Collection, identification and preservation of fish

To study the ichthyofaunal diversity, relative species and abundance of Nakana Lake was selected as a case study. The fresh fish specimens were purchased from fisherman at the sight of abundance of Nakana Lake was selected as a case study. The fresh fish specimens were purchased from fisherman at the site of abundance of Nakana Lake at Nakane, Sulwade and Sonawane and Patole (2017) reported 20 fish species belonging to order Cypriniformes, those were also reported by other authors from different freshwater reservoirs. Sakhre and Joshi (2002) reported the ichthyofauna of Palas-Nilegaon reservoir in Osmanabad District, Maharashtra. They revealed 21 species of fishes belonging to 14 families and 36 genera during their study on Krishna River at Wai (M.S.). Jayabhaye and Lahane (2013) were observed 21 species of fishes belonging to 6 families and 13 genera during their study period on Pimpaldari tank, Dist. Hingoli (M.S.). Recently Sharma et al (2017) recorded 143 fish species including 4 orders, 22 families and 45 genera from River Yamuna.

For due to the abundance of major carp; density of Cypriniformes was evident in the Lake and suitable environmental condition relatively higher population. Dominance of fish species belonging to order Cypriniformes, those were also reported by other authors from different freshwater reservoirs. Sakhre and Joshi (2002) reported the ichthyofauna of Palas-Nilegaon reservoir in Osmanabad District, Maharashtra. They revealed 21 species of fishes belonging to 14 genera falling under 4 Orders (Cypriniformes, Perciformes, Siluriformes and Ossteglossiformes). Patole and Patil (2009) recorded 22 fish species from Panzara River, Tahsil Sakri, Dist. - Dhule. These belong to 5 orders, 12 families and 22 genera. The number of order Cypriniformes were dominated from major bulk (60%) Patole (2014) again recorded 32 fish species from Tapi River with 6 stations through Dhule and Nandurbar district in Maharashtra. These belong to 6 orders, 12 families and 23 genera. Recently, Dwivedi et al (2017) revealed that 58 fish species belonging to 5 orders, 18 families and 43 genera from the Pansuni River. Cypriniformes order was shared 27 species (46.55%). Sonawane and Patole (2017) reported 20 fish species belonging to 16 genera, 11 families and 6 orders from Nakane, Sulwade and
In present investigation family wise percentage of fishes is shown in fig.-2, in which Family Cyprinidae is dominant with 6 species (30%) over all the reported families. Ambassidae, Bagridae and Siluridae were having 2 species (10%). Family Clupiidae, Mastacembalidae, Channidae, Cichlidae, Gobidae, Claridae, Heteropneustidae and Cobitidae including single species of each contribute (5%).

Every natural ecosystem doesn’t have equal abundance, it shows variety of species which differ in their relative abundance and richness. During tenure of this research work total 252 catches of 20 fish species represented by 12 families.

- Family Cyprinidae found to be dominant group with 6 species in the assemblage composition in which Cirrhinus reba was less abundant, Puntius sophore, Rasbora doniconius and Labeo boggut were found to be abundant as well as Cyprinus carpio and Labeo rohita were moderately abundant.
- Family Siluridae shown 2 species Ompok bimaculatus was found to be less abundant and Wallago attu was rare.
- Family Bagridae represents 2 species Mystus bleekeri and Mystus vittatus were less abundant and moderately abundant respectively.
- Family Ambassidae shown 2 species Chanda nama and Parambassis ranga was abundant and less abundant respectively.
- Family Heteropneustidae had shown Heteropneustes fossils species was rare.
- Claridae family includes Clarius batrachus was moderately abundant.
- Cichlidae Family represents exotic species Oreochromis mossambicus was found to be abundant.
- Family Gobidae includes Glossogobius guiris was rare.
- Channidae Family conveys Channa punctata was less abundant.
- Family Mastacembalidae includes Mastacembelus armatus was found to be rare
- Family Clupeidae represents species Telenusa ilisha was abundant.

Rao, et al (2013) recorded 63 fish species from river Champavathi (Vizianagaram, A.P., India). They showed 13 species were abundant, 15 moderate, 23 species common and 12 were rare.

Biological Indices
Biological diversity can be measured by many different ways i.e. Richness and Evenness. Different kinds of organisms are present in a particular area is called richness while evenness compares the similarity of population of each species. Diversity depends on those, both things are increases, diversity automatically increases. Shannon and Wiener index is also an important tool for quantifying diversity of particular habitat. By using different formulas we calculated values of same indices given in table - 2.

Table-2, Fish species richness, abundance, dominance and diversity indices of Nakana Lake, Dhule.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Index</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Species Richness ($)</td>
<td>263</td>
</tr>
<tr>
<td>2</td>
<td>Species abundance (N)</td>
<td>252</td>
</tr>
<tr>
<td>3</td>
<td>Shannon-Weiner Index (H) (Shannon and Wiener, 1963)</td>
<td>1.7550</td>
</tr>
</tbody>
</table>

The present investigation focused richness, abundance and different diversity indices of freshwater body Nakana Lake. The lake represents richer value about fish species i.e. 20 and abundance is 252. The value of the Shannon-Weiner index was (1.7550) shows greater diversity. The index of dominance is useful for determining particular fish species dominating by that habitat. In Simpson’s Dominance Index quantify the probability that two individuals randomly selected from a sample will belongs to the same species. The value of this index was (0.0713), which ranges between 0 and 1. If a value of this index is 0 stands for infinite diversity and 1 indicates no diversity. When value of lake is low, the implication is “Dominance is shared by all the species of that community” Cummins (2002). To get over this problem ‘D’ is subtracted from 1 to give the Simpson’s index of diversity (1-D) which was (0.9291) and Simpson’s reciprocal index (1/D) was (14.0469).

Conclusion
Freshwater resources are nothing but the life supporting system. If they exploited economic purpose there are not beneficial for human society. Aquatic environment and its biota necessary to save and kept the ecosystem undisturbed. Nakana Lake is manmade water reservoir, it is away from dumping of industrial effluents, and drainage of city and garbage. It is dynamic wetland ecosystem but the ichthyofauna of this lake being disturbed due to some anthropogenic activities including over fishing with fingerlings and juveniles. At the time of religious festivals huge idols of Lord Ganesha and Durga were disposed into the lake. Every year this type of situation reduced the capacity of water body. On the other hand presence of exotic fish species in the reservoir directly affects on commercially important major carps. The diversity of fish fauna of Nakana Lake is higher hence there is urgent need to create awareness among fishermen and local peoples about the importance of lake. Government fishery department and NGO’s has to take lead and conserve them for future generation.

Acknowledgement
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Table-1, ichthyofaunal diversity of Nakana Lake during June, 2013 to May, 2014.

<table>
<thead>
<tr>
<th>Order</th>
<th>Family</th>
<th>Scientific Name</th>
<th>Local Name</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>CYPRINIFOR MES</td>
<td>Cyprinidae</td>
<td>Cirrhinus reba (Hamilton)</td>
<td>Reba</td>
<td>R</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cyprinus carpio (Linnaeus)</td>
<td>Komba</td>
<td>MA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Puntius sophore (Hamilton)</td>
<td>Dhebri</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Rasbora doniconius (Hamilton)</td>
<td>Zora</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Labeo rohita (Hamilton)</td>
<td>Rav</td>
<td>MA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Labeo boggut (Sykes)</td>
<td>Ger</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lepidocephalichthys thermalis (Val)</td>
<td>Zirmuti</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lepidocephalichthys thermalis (Val)</td>
<td>Zirmuti</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>SILURIFORMES</td>
<td>Siluridae</td>
<td>Ompok bimaculatus (Bloch)</td>
<td>Raigdi</td>
<td>LA</td>
</tr>
</tbody>
</table>
References


