



Study on zooplankton diversity of Yaldali Dam, Parbhani (M.S.), India.

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ABSTRACT

The distribution and diversity of zooplankton in aquatic ecosystem depends mainly on the physico-chemical properties of water. Zooplankton have been considered as ecological importance organisms. The zooplankton community in Yeldari Dam is comprised of rotifer, Cladocera, Copepoda and Ostracoda. Total 34 species and 29 genera of zooplankton obtained in this study, out of that number of species rotifer are 18, Cladocera 8, Copepods 5 and 3 Otracodes are found during study period. A percentage comparison among the various zooplankton species reveals that the rotifers were the dominant group forming 52.94% of the zooplankton followed by cladocerans are 23.52% , copepods representing 14.7% each. This was followed by Ostracoda representing 8.82% of the total zooplankton. Thus, each group of zooplankters preferred to reach their peak in different months of the year.

Keyword: Zooplankton, yaldari, Diversity.

INTRODUCTION

Zooplankton play important role in freshwater ecosystem as they indirectly convert the food energy due to their role as prey of economically important fishes. They usually act as primary consumers in the freshwater aquatic ecosystem. In absence of these primary consumers, herbivores and other food chains would collapse. Their qualitative and quantitative estimate gives us an idea of water quality Changes in water quality are well indicated by zooplankton because it is affected by environmental conditions and responds quickly to changes in environmental quality. They play important role in indicating the presence or absence of certain fishes and they also provide the basic information of entire ecology and the current condition of the water body. Zooplankton communities in water depends on few complex factors like variation of climatic factors, physical and chemical parameters and vegetation. The density and diversity of zooplankton in freshwater ecosystem is controlled by several factors.

Temperature, dissolved oxygen, and organic matter are significant factors which control the growth of zooplanktons. They feed on phytoplankton and facilitate the conversion of plant material into animal tissue and in turn form the basic food for higher animals including fishes. Zooplankton are one of the most important biotic components influencing all the functional aspects and play a vital role in nutrient recycling and energy flow in the aquatic ecosystem. The zooplanktons serve as an important link in the aquatic food chain. Zooplankton constituents important and item of many omnivorous and carnivorous fish. Light and predation are the important ecological factors regulating zooplankton abundance and distribution. Phytoplankton presence in the water body reflects the average ecological conditions and therefore, they may be used as indicator of water quality. Zooplankton provides the necessary amount of protein required for rapid growth and development of different organs of fishes. Zooplankton communities respond to different disturbances like nutrient loading, fish presence or absence acidification and contaminants and sediment input. The zooplanktons are resident fauna of aquatic ecosystems which respond to a wide range of water quality changes and monitoring have a very feeble locomotive power Groups of zooplankton. planktonic nutrient regeneration is a fundamental process that maintains most of the primary productivity in freshwater environments, and the phosphorus supply for lake plankton comes primarily from within the plankton community, rather than from external loading or from larger organisms such as fish.

MATERIAL AND METHODS

The Yeldari dam which is located 15 km distances away from Jintur city in the Yeldari village (rural area) at the GPS latitude N 190 43' 12.4" Latitude N 190 43' 12.4" Longitude E 760 43' 55". Yeldari dam is fresh water body built on Purna River which is sub Basin of Godavari River. This dam has spread on large agricultural area there are so many villages were came under the this dam during construction i.e. Kinhi, Kawatha, Amberwadi, Bamni, Wazar and Sawangi, Sonsawangi and Belkhi The present study has been undertaken 1st time on Yeldari dam to know the climatic changes as per the sites and species richness. Limnological survey of Yeldari dam: proposed research is undertaken to study the limnology yeldari

dam, to fulfill the objectives of proposed research work, plankton samples will be collected from four different sampling sites.

Sampling site: 1 located on east direction of dam.

Sampling site: 2 located on west direction of dam.

Sampling site: 3 located on north direction of dam.

Sampling site: 4 located in south direction of dam.

Plankton sample will be collected from four different sampling sites, collected plankton sample analyzed in to the laboratory of P. G. and Research Department of Zoology R. A. College Washim. All collected sample will be analyzed by following the methods suggested in APHA (1998) and Dhanpathi (2000).

RESULTS

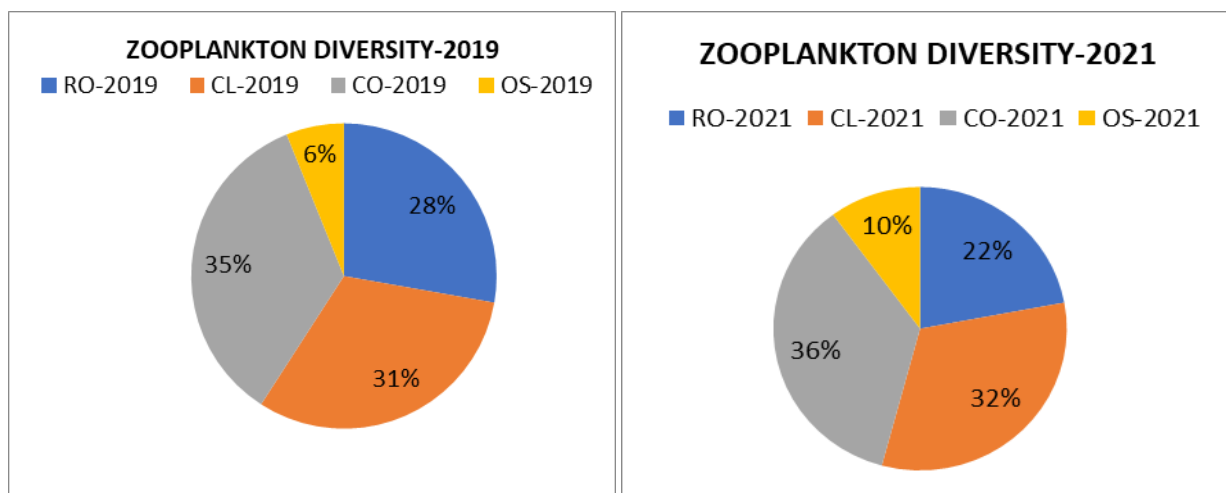
The zooplankton community in Yeldari Dam is comprised of rotifer, Cladocera, Copepoda and Ostracoda. Total 34 species and 29 genera of zooplankton obtained in this study, out of that number of species rotifer are 18, Cladocera 8, Copepods 5 and 3 Otracodes are found during study period.

1: Rotifer

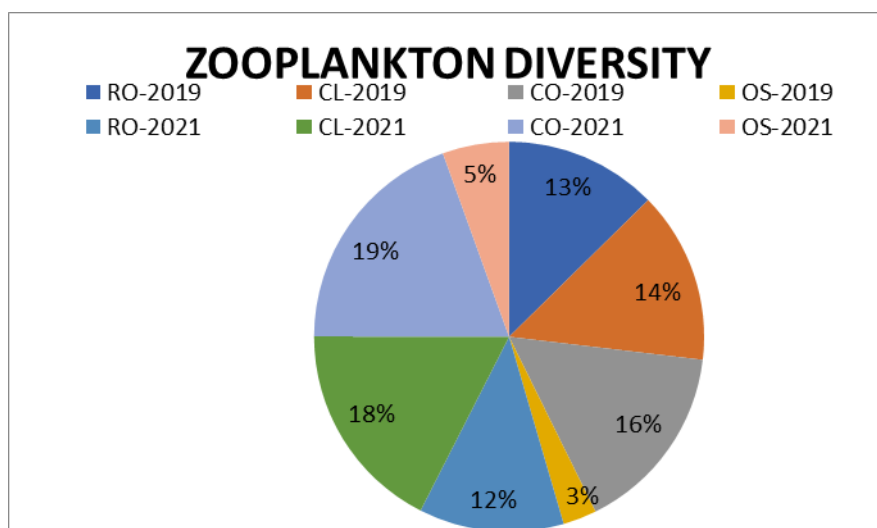
During study periods the mean Rotifer diversity ranges from 0.75 ± 0.5 to 10.25 ± 1.2583 in 2019 and in 2021 it was 0.75 ± 0.9574 to 10.00 ± 2.1602 . Comparative study of all sampling sites in both years calculated by 't' value ranges 0 to 2.828. In rotifer total 6 genera are recorded including 18 species. Rotifera species were recorded more in winter season than monsoon and summer. Maximum number of rotifer found in the month of January in both the years and minimum in May. Calculated 'f' value was 0.967386 throughout study period. Rotifers are chiefly fresh water forms and presence of rotifer in abundance is indicate suitable condition for their survival. Dhanapati (2000) In rotifera species *Keratella sp.* and *Brachionus sp.* were abundant reported by Kedar *et al.*, (2008) in abundance in Rishi Lake, Karnja in various water bodies of Central India Kaushik and Sexena (1995) have also reported genus *Brachionus* in abundance. Occurance of genus *keratela* with *Brachionus* indicate nutrient rich status of water body. According to Goel and Charan (1991) *K. tropica* and *Brachionus Calyciflorus* are the pollution tolerant species and indicate accumulation of organic matter and theses species reported dominant in polluted fresh water lake of Kolhapur.

Table no.1: Taxonomic description in systematic form of Zooplankton species.

TAXANOMIC DESCRIPTION
PHYLUM ROTIFERA
ORDER : PLOIMIDA
FAMILY I :BRACHIONIDAE
1. <i>Brachionus caudatus</i> (Barrios and Daday, 1894)
2. <i>Brachionus diversicornis</i> (Daday,1883)
3. <i>Brachionus durgea</i> (Dhanpathi, 1974)
5. <i>Brachionus falcatus</i> (Zacharias, 1998)
6. <i>Brachionus plicatilis</i> (Muller,1786)
7. <i>Brachionus calyciflorus</i> (pallas 1776)
8. <i>Brachionus calyciflorus f.amphiceros</i> (Ehrenberg 1838)
9. <i>Brachionus calyciflorus var hymani</i> (Dhanpathi, 1974)
10. <i>Brachionus calyciflorus f.borgerti</i> (Apstein 1907)
11. <i>Brachionus foricula f. typicus-urawensis</i> (Sudzuki,1955)
12. <i>Keratella tropica</i> (Apstein,1907 ; Berzing,1955)
FAMILY II : ASPLANCHNIDAE
13.. <i>Asplanchna sp.</i>
14. <i>Asplanchna sieboldi</i>
15. <i>Asplanchna brightwelli</i>
FAMILY III : FILINIDAE
16. <i>Filinia opoliensis,contracted</i>
17. <i>Filinia longiseta,contracted.</i>
FAMILY IV : LECANNIDAE
18. <i>Lecane (M) cornuta</i>
PHYLUM CLADOCERA
FAMILY I: CHYDORIDAE,
1. <i>Dunhevedia crassa</i>
2. <i>Chydorus ovalis.</i>
3. <i>Chydrous cf.hermani.</i>
FAMILY II:Aloniae
4. <i>Alona affinis</i>
5. <i>Allonella sp ,</i>
FAMILY III:DAPHNIIDAE
6. <i>Daphnia schodleri.</i>
FAMILY IV: MOINIDEA
7. <i>Moina sp.(macrothris goeldil</i>
8. <i>Moina micrura</i>
PHYLUM COPEPODA
Copepods : Cyclopoid:
1. <i>Cyclopes agilis</i>
2. <i>Cyclopes scutifer</i>
3. <i>Eucyclopes prionophorus</i>
Copepode: Calanoids
4. <i>Diaptomus minutus</i>
5. <i>Diaptomus nauplius stage</i>
Copepode : Herpacticoid
6. <i>Bryocamptus sp.</i>
7. <i>Egrasilous chautauquaensis</i>
PHYLUM OSTRACODA
1. <i>Paracondona euplectella.(dorsal) .</i>
2. <i>Chlamydotheca speciosa speciosa</i>
3. <i>Cyclocypris forbesi</i> (Sharp 1897)



Graph plate No. I: Zooplankton Diversity during study periods



Graph plate No. II: Zooplankton Diversity during study periods

Where; RO-Rotifer, CL-Cladocera,CO-Copepoda, OS-Ostracoda, SD-Standard deviation

2: Cladocera

Quantitative analysis of Cladocera during the 2019 it was 3.25 ± 0.5 to 6.25 ± 1.2583 and in 2021 it was 4.75 ± 1.893 to 8.75 ± 2.9861 . Cladocera were found more in summer than monsoon and winter. Calculating 't' value ranges from zero to 2.81. Total 8 species of cladocera was found in 5 genera. Comparison by calculating 'f' value is 0.692667. Number of cladocera was more in January, minimum in the month of September in 2019 and 2021 highest was observed in August and lowest in May. Gadekar *et al.*, (2014) also found that Cladocera were minimum in Monsoon but they recorded that maximum cladocera found in winter. In present study due to favorable temperature and availability of food like suspended detritus, bacteria and nanoplakton the abundance of Cladocera increases. Similar result recorded by Raut *et al.*,

(2012) they found Cladocera dominated in summer season over other zooplankton. In monsoon season the physico-chemical factor like dissolved oxygen, temperature, turbidity, transparency also play an important role to controlling the density and diversity of Cladocera. (Edmonson,1965; Baker 1979). Among cladocera *Alona sp.* and *Moina* were most abundant.

3: Copepods

During the first year the mean Copepods ranges from 3.5 ± 0.5774 to 10 ± 3.6515 in 2019 and 2021 it was 2.75 ± 0.9574 to 12.5 ± 7.3258 . calculating 't' values ranges from 0.243 to 4.583. It shows the fluctuation all over the year but maximum number of copepods was found in November in both years and less number found in January in 2019 and March in 2021. Comparison of Copepods throughout the study periods

by calculating 'f' value was 0.589296. Number of Copepods recorded 5 species in 6 genera. Contraversial result obtained by Pradhan (2014) that they found dominancy of Copepods in summer month during study period. *Calanoid (diaptomus sp.)*, *Eucyclopes sp.*, *microcyclopes sp.* and Presence of Diatomus and cyclopes also observed by Pawar and Pulle (2005) in Pethwadaj dam Nanded. The Cladoceran are primary consumers which feed on algae and fine particulates thus it influence the energy of food chain and cycling matter in the detritus. Sitare, (2013).

4: Ostracodes

Ostracodes during the 2019 it was ranges from 0.5 ± 0.57735 to 1.75 ± 0.9574 and in 2021 it was 0.5 ± 1 to 6.00 ± 1.4142 . The value of 't' was ranges from 0 to 4.977 throughout study periods in both years. The highest ostracodes were observed during the month of April that is summer season while the lowest was observed in winter season that is month of November in both years. By Compared the ostracodes diversity throughout study periods calculated 'f' values was 0.002521. In ostracodes *Paracondona euplectella* and *Cyclocypris sp.* were abundant. The highest density of ostracoda found in summer by Sontakke and Mokashe (2014) in Kagzipura Lake. Water level decreases in summer and metabolic activities of biotic component increases. This result found by them and Jayebhaye (2010) worked on river kayadhu, near Hingoli city, Hingoli district, Maharashtra and study on perennial tank in Warangal district, A.P. As compared to other zooplankton population Ostracoda shows minimum population, similar observation are got by Lahane and Jaybhaye (2013) according to them Ostracoda population are less due to the feeding pressure of fishes and Ostracoda are small Crustaceans having bivalve carapace enclosing the laterally compressed body.

CONCLUSION

The present investigation on the zooplankton composition, seasonal variation in the diversity and distribution of zooplankton in Yaldari dam Parbhani District (M.S.), India is helpful to investigate the status of this Dam. In all 34 species of zooplankton were identified from Yaldari dam during the course of study of two years. All four groups of zooplankton were recorded throughout the study period. The number was highest during winter and lowest during summer

except ostracoda. Ostracoda is maximum in summer to the study area. The study indicates that temperature plays an important role in the distribution of zooplankton in a fresh water habitat. The abundance of zooplankton from this Yaldari Dam followed a sequence as under: Rotifera > Cladocera > Copepoda > Ostracoda.

Conflict of Interest:

None of the authors have any conflicts of interest to disclose. All the authors approved the final version of the manuscript.

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