



Zooplankton Diversity and Their Seasonal Variation in Nav-Talav, Amgaon, Gondia District

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Abstract

The plankton constitutes the basic food sources of any aquatic ecosystem, which supports fish and other aquatic animals. Zooplankton is the characteristics of water quality, they form an important link in the food chain of a fresh water ecosystem. Knowledge about zooplankton is linked with the life of inhabitants. Hence qualitative and quantitative studies of zooplankton are of great importance. In the present study qualitative and quantitative studies of zooplanktons in Nav-Talav, Amgaon of Gondia district were carried out during February 2016 to January 2017. Using microscopic taxonomical studies of zooplankton, this investigation revealed that 23 genera belonging to five major groups i.e. Rotifera (Eight genera), Cladocera (six genera), Copepoda (Five genera), Ostracoda (Two genera) and Protozoa (Two genera) were present.

Key words: Zooplanktons, seasonal variation, Nav-Talav, Amgaon

INTRODUCTION

Zooplanktons are the most fascinating group of microorganism found in aquatic ecosystem. They have been as an indicator for monitoring the water quality, trophic status and pollution level. Plankton is part of aquatic life, which is composed of tiny organisms living and drifting in the direction of water current. It acts as the main source of food for most fauna, both in lotic and lentic water ecosystems. Zooplankton is the intermediate link between phytoplankton and fish. Hence qualitative and quantitative studies of zooplankton are of great importance in Reservoir water body.

Zooplanktons are microscopic animals that act as primary and secondary links in the food webs of all aquatic ecosystems. They feed on phytoplankton which directly provide food source for larval vertebrates and invertebrates as well as related to the growth of juvenile and larger fish. They are also important component in the transfer of energy from primary producers of phytoplankton to higher trophic levels such as fish [R.S. Stemberger, 1990]. Zooplankton has been extensively studied in India and several workers worked on this aspect. Dhanapati (2000), Jaya *et al.* (1994), Kodarkar (1994), Pradhan *et al.* (2006), Dahegaonkar (2008), Hedge and Bharati (1984), Jindal and vasisht (1985), Gupta and Sudan (1985), Malathi *et al.* (1998), Bais and Agarwal (1995), The present study has been undertaken to determine the zooplankton diversity and abundance in relation to physical parameters in the study sites with aim of contributing to the knowledge of zooplankton diversity in nav talav, Amgaon.

Description of Site

Nav-Talav, Amgaon. Many lake in this tahesil but very large diversity of aquatic animal & plants in this lake. So, I have been select as area of study for Zooplankton. Amgaon is a city in Gondia District of Maharashtra State, falling under Vidarbha region. It is located 24 km towards the east from District headquarters Gondia. Amgaon is located near Madhya Pradesh and Chhattisgarh states borders and this makes it an interesting place to visit as it is melange of various cultures. Although people of different ethnicity live here, but no riots are noticed till date.

Time zone: - IST (UTC+5:30)

Elevation/Altitude: - 317 meters. Above Sea level

Geography: - It is located at 20°39'0"N 79°57'0"E at an elevation of 211 m from MSL

Collection Of Sample

Water samples were collected randomly in different three selected site of the reservoir on monthly basis for a period of one year from February 2016 to January 2017. Collection of Zooplankton was carried out by using plankton net. Sampling was made between 8.00 am to 10.00 am. By Plankton net (mesh size 25 mm) was swept through surface water. 100 lit of surface water were sieved through the plankton net and filtered sample were transferred to plastic containers and 4% formalin was added for sample preservation. These samples were then brought to laboratory for further studies.

The systematic identification of plankton was made by using standard keys of Dhanapathi (2000), Michael and Sharma (1988),

Krishnaswamy (1973), Edmondson (1959), Pennak (1968), Altaff (2004).

RESULTS AND DISCUSSION

A total 23 species of zooplankton were recorded from Nav Talav. Among 23 species, Rotifera was dominant with 08 species followed by 6 species of Cladocera, 05 species of Copepoda and 02 species of Ostracoda and Protozoa.

The abundance and distribution of zooplankton is guided by a variety of ecological factors. The physiochemical parameters such as temperature, light, pH, organic and inorganic constituents and the interrelationship with their organisms play an important role in determining the nature and pattern of fluctuation of population densities of zooplanktons in an environmental unit.

The rotifers are being considered as the most important zooplanktons (Hutchinson, 1967). Most of the rotifers are primary consumers feeding on phytoplankton and forms important link in food chain. In the present investigation maximum density of rotifers was recorded during winter season. Sawane et al (2006) reported maximum number of rotifers in winter from river Irai, Chandrapur. Dahegaonkar (2008) recorded maximum density of rotifers in winter season in Wardha river near Ballarshah (M.S.). Edmonson (1965) observed high rotifer population in winter tributary with favourable temperature and availability of abundant food in the form of bacteria and suspended detritus. Dhanpathi (1997) had suggested temperature plays a conspicuous role in the form of occurrence of variation in tropical region. Telkhade et al (2008) recorded maximum population of cladocera during the winter season and minimum during monsoon season.

All these results indicate that changes of conditions affecting faunistic composition of the zooplankton occurred in the three lakes this is mainly due to eutrophication. The increase in the anthropogenic activities and urbanized catchment area and agricultural runoff are major cause for eutrophication in these lakes. So there is urgency to take conservation steps for preventing further eutrophication. We strongly recommend to the concerned authorities of the city corporation to take restoration programs and minimize the anthropogenic activities in and around the lakes.

These groups with their respective genera composition are,

<p>Rotifera (8 genera) 1. <i>Filinia terminalis</i> 2. <i>Polyarthra major</i> 3. <i>Trichocerca</i> spp. 4. <i>Brachionus</i> spp. 5. <i>Brachionus forficule</i> 6. <i>Cephalodella</i> spp. 7. <i>Brachionus caudatus</i> 8. <i>Brachionus calyciflorus</i></p>	<p>Cladocera (6 genera) 1. <i>Chydorous</i> spp 2. <i>Alona</i> spp. 3. <i>Diaphanosoma excisum</i> 4. <i>Daphnia longirimis</i> 5. <i>Moina macrocopa</i> 6. <i>Moina micrura</i></p>
<p>Copepoda (5 genera) 1. <i>Mesocyclop leucarti</i> 2. <i>Mesocyclops hyalinus</i> 3. <i>Paracyclops fermbrialis</i> 4. <i>Diaptomous</i> spp. 5. <i>Eucyclops</i> spp.</p>	<p>Ostracoda (2 genera) 1. <i>Cypris</i> spp. 2. <i>Hemicypris</i> spp.</p> <p>Protozoa (2 genera) 1. <i>Paramecium</i> spp. 2. <i>Vorticella companula</i></p>

Table : Zooplankton variation of Nav-Talav, Amgaon, during Feb. 2016 to Jan. 2017

Sr. No.	Group	Percentage
1.	Rotifera	26.61%
2.	Cladocera	19.20%
3.	Copepoda	21.30%
4.	Ostracoda	20.25%
5.	Protozoa	13.12%

The present study the occurrence of season wise zooplankton groups was dominant in the following increasing order.

Winter : Rotifera > Ostracoda > Copepoda > Cladocera > Protozoa
 Summer : Rotifera > Copepoda > Cladocera > Ostracoda > Protozoa
 Monsoon : Rotifera > Copepoda > Cladocera > Ostracoda > Protozoa

Zooplanktons of all major groups were observed in the summer season. The summer population maximum of zooplankton were correlated with higher temperatures, lower transparency, and a high standing crop of primary producers leading to greater availability of food. These same findings were expressed by Salve and Hiware (2010) who studied the zooplankton diversity of wan reservoir, Nagpur (MS.), India. According to Bais and Agrawal (1995), a progressive increase in the alkalinity of water also increased the zooplankton population. The simultaneous presence of dissolved oxygen and hard water also favored the production of zooplanktons during the summer in both lakes. Similar results have also been suggested by a number of workers (Ramakrishnan and Sarkar 1982; Bhati and Rana 1987 and Kumar and Datta 1994). Normally the monsoon is associated with lower population densities due to its dilution

effect and decreased photosynthetic activity by primary producers. Similar results have been shown by Bais and Agrawal (1993). The summer population of total zooplankton falls during the monsoon due to a dilution effect. The population rises to a higher level in the winter as a result of favorable environmental conditions, including temperature, dissolved oxygen and the availability of abundant food in the form of bacteria, nanoplankton and suspended detritus. Edmondson (1965) and Baker (1979) have also confirmed these findings.

Rotifers increased in summer which may be due to the higher population of bacteria and organic matter of dead and decaying vegetation (Majagi and Vijaykumar, 2009). Segers (2003) highlighted the dominance of rotifer population which was due to its preference for warm waters. The rotifers have short reproductive stages they increase in abundance rapidly under favorable environmental conditions (Dhanapathi, 2000). According to observation the Brachionus species are very common in temperate and tropical waters (Hutchinson, G. E. 1967) indicates alkaline nature of water. Excess growth of rotifers in lakes and reservoirs indicates due to the eutrophic conditions.

Cladocerans are the most useful and nutritive group of crustaceans for higher members of fishes in the food chain. In the present study, a total of 6 species were recorded. The population densities of cladocera were higher in summer season and lower in winter. It was higher during summer followed by monsoon and lowest during winter. Abundance has also been earlier reported in summer season and lower in winter by Dushyantkumar Sharma (2012) in Thigra Reservoir Gwalior (M.P.).

Copepods showed higher population density in summer season and lower in winter. This pattern of seasonal fluctuation of copepods has also been observed by Mahor (2011) in Trigha reservoir of Gwalior. Abundance of copepods in summer and monsoon is due to the lake which is rich in organic matter supporting higher number of Cyclopoids, thus suggesting their preponderance in higher trophic state of water. Similar observations are made by Somani and Pejavar (2004) in Masunda Lake.

Ostracod density was higher in summer season and less in Monsoon. This result has also been observed by Sukand and Patil (2004) in Fort Lake of Belgaum and Kedar *et al.* (2008) in Rishi freshwater lake of Washim district. Occurrence of

of some species of ostracods in Dharwad district has been reported (Patil C.S.etal1989).

Protozoans are consumers of bacteria-plankton and organic matter. In the present study, 2 species of protozoa were recorded. The population density was higher in summer season and less in Monsoon. similar observation were made by Shivashankar P. et al (2013) at Bhadra Reservoir, Karnatka & Solanki (2006).

CONCLUSION

The present study reveals seasonal variation in the diversity and distribution of zooplanktons in Nav-Talav, Amgaon, Dist. Gondia. All Five groups of zooplanktons were recorded throughout the study period. The number was highest during summer and lowest during winter. Zooplankton density was least in the monsoon seasons. This was due to dilution effect, high turbidity and less photosynthetic activity by the primary producers. Maximum population of Rotifera observed in winter season and Ostracoda did not show any seasonal remarkable fluctuations. Thus study has determined that abundance of zooplankton has been governed by the cumulative effect of physico-chemical and biological parameters.

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