MICROFAUNAL DIVERSITY IN TWO AQUATIC HABITATS OF WASHIM DISTRICT

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Abstract

A microscopic community of aquatic animals is known as zooplankton which found usually free floating, swimming with little or no resistance to water currents, suspended in water, non motile or insufficiently motile to overcome transport by currents. Zooplankton principally comprise of Protozoa, Rotifera, Ostracoda, Copepoda and Cladocera. Mostly they are heterotrophic in nature and are the favourite food of many aquatic animals. Zooplankton plays important role in food web by limiting the primary producers and organisms of higher trophic levels. In the present research work two freshwater aquatic habitats viz., Sarsi-Both and Sawargaon [Kanhoba] lake were selected two assess microfaunal diversity. During the present investigation month-wise quali-quantitative enumeration of microfauna of the selected aquatic habitats was done for a period of one year i.e. from February 2010 to January 2011. In the present studies Sawargaon [Kanhoba] lake was found as dominant in quali-quantitative aspects of microfauna over Sarsi-Both lake. In both the aquatic habitats rotifera was recorded as dominating group of zooplankton community over the others.

Key words: *Sarsi-Both lake, Sawargaon [Kanhoba] lake, Microfaunal diversity.*

Introduction

Zooplankton are minute aquatic animals that are non motile or are very weak swimmers and they drift in water column of ocean, seas or freshwater bodies to move any great distance. Zooplankton constitute important food item of many omnivorous and carnivorous fishes because they provide the necessary amount of protein for the rapid growth and specially that of the gonad (Dewan et. al., 1977). Microfauna plays a key role in freshwater lentic ecosystems, due to its pivotal position in bottom-up and top-down feed back mechanisms. Ultimately, zooplankton can function as an indicator of ecosystem health (Pereira et. al., 2002). Both the qualitative and quantitative abundance of zooplankton in a aquatic habitat are of great importance in managing the successful aquaculture operations, as they vary from location to location and pond to pond within the similar ecological conditions (Boyd, 1982).

Materials and Methods

Two aquatic habitats of Washim District i.e. Sarsi – Both lake and Sawargaon [Kanhoba] lake were selected to assess microfaunal diversity. Sarsi-Both lake is near about 17 kms away and is on South-West side of Mangrulpir town. The lake is about 1324 ft. above MSL and located at $77^0$19’ E longitude and $20^0$15’ N latitude. The lake is built in 1986 to raise the ground water level in the nearby area and also to provide the water for irrigation and drinking purpose for the people of nearby villages. The water of the lake is filtered and then supplied for drinking purpose. It supplies drinking water to ten villages of its vicinity.

Sawargaon [Kanhoba], the other experimental water body is near about same distance away but on South side of Mangrulpir town. This aquatic habitat is about 1328 ft. above MSL and located at $77^0$23' E longitude and $20^0$13' N latitude. The lake is built in 1979 to raise the ground water level in the nearby areas and also to provide the water for irrigation and drinking purpose of people of nearby villages. These both the lakes come under the jurisdiction of Minor Irrigation Department of Mangrulpir Tahasil, District Washim, Maharashtra.

Water samples from the selected experimental water bodies were collected monthly for a period of 12 months from February 2010 to January 2011. Five sampling spots were selected at each waterbody to represent the respective lake. Quali-quantitative estimation of microfauna of both the aquatic habitats was made by using methods given by APHA (1989) where as identification of zooplankton was done by using keys and monographs given by Edmondson (1959).

Result and Discussion

In the present investigation, quail-quantitative enumeration of zooplankton of the two selected water bodies i.e. Sarsi-Both lake and Sawargaon [Kanhoba] lake was done during February 2010 to January 2011 and results obtained are shown in tables 1 to 4. During the present study all the common groups of zooplankton i.e. protozoa, rotifera, ostracoda, copepoda and cladocera were found at all the selected experimental lakes (Table 1 & 2).

In the present work Sarsi-Both lake was recorded as least diversified with existence of 32 zooplankton species. In this aquatic system rotifera occupied first position with 11 species whereas least position was taken up by protozoa with 03 species. However cladocera achieved second position by reporting 07 species of the group followed by copepoda and ostracoda with 06 and 05 species respectively (Table 1).

High zooplankton biodiversity was enumerated at Sawargaon [Kanhoba] lake with occurrence of 40 species. Here also rotifera stood first with 14 species followed by cladocera (with 09 species), copepoda (with 07 species), ostracoda (with 06 species) and protozoa stood at base line with 04 species only (Table 2).

During quantitative studies, least zooplankton were estimated at Sarsi-Both lake as 778.56 Ind/L. Higher share was made by rotifera with 632.15 Ind/L (81.19 %) followed by cladocera 82.15 Ind/L (10.55 %), copepoda 34.84 Ind/L (4.47 %), ostracoda 23.37 Ind/L (3.01%) and protozoa 6.05 Ind/L (0.78 %) (Table 3).

High zooplankton quantity was observed at Sawargaon [Kanhoba] lake as 844.14 Ind/L. Maximum contribution was made by rotifera as 604.18 Ind/L (71.57 %) followed by cladocera with 113.84 Ind/L (13.48 %), copepoda with 66.72 Ind/L(7.91 %), ostracoda 49.27 Ind/L (5.83%) and minimum contribution was by protozoa as 10.13 Ind/L (1.21%) (Table 3).

In the present investigation net zooplankton count was recorded as maximum in summer season while minimum in monsoon, in the selected experimental lakes (Table 4). Increase in the zooplankton abundance during summer probably correspond to the water quality, decaying vegetation, increased levels of organic matter in the sediment and higher abundance of bacteria in the lake during

this time (Srivastava *et.al.*, 1990 and Coman *et.al.*, 2003).

During the present investigation protozoa population stood least in quali-quantitative respect in the experimental lakes. Protozoa of Sarsi-Both & Sawargaon [Kanhoba] lake composed of 03 species each. Less contribution of protozoa compared to rest of the groups of zooplankton probably because of their low ability to withstand and survive in varying limnological conditions prevailing at different seasons Chattopadhyay & Barik (2009). Our findings are well in agreement with the above authors.

The rotifera, also called rotatoria or wheel animalcales, are a group of small, usually microscopic, pseudocoelomate animals. The rotifers have attracted much attention from microscopists because of their wide-spread distribution in waters of all kinds, the great abundance in which they frequently occur and striking beauty of some of the species (Edmondson, 1959).

During the present investigation rotifera dominated the lakes in both the respects i.e. diversity & density. Rotifera of Sarsi-Both lake estimated 632.15 Ind/L (81.19 %) and Sawargaon [Kanhoba] 604.18 Ind/L (71.57 %). (Table 3). In the selected freshwater habitats rotifera was enumerated as higher in summer and lower in monsoon. Similar seasonal trend was also reported by Singh (2000) during his work.

Low density of rotifera in monsoon might be due to huge rainwater in the lakes. Similar observation was also made by Saboor & Altaf (1995). Whereas high rotifers in summer indicates the influence of temperature and showing direct relationship between temperature and rotifer population (Rajashekhar *et.al.*, 2010).

Table 1:- Zooplankton Diversity of Sarsi – Both lake during Feb. 2010 to Jan. 2011.

Sr. No.	Name of Group and Species
A.	**Protozoa**
1.	*Centropyxis sp*
2.	*Paramecium sp*
3.	*Vorticella sp.*
B	**Rotifera**
1.	*Brachionus angularis*
2.	*B. calyciflorus*
3.	*B. forficula*
4.	*Cephalodella adriatica*
5.	*Colurella adriatica*
6.	*Filinia longiseta*
7.	*Keratella cochlearis*
8.	*K. valga*
9.	*Lecane monostyla*
10.	*Trichocerca cylindrica*
11.	*T. porcellus*
C	**Ostracoda**
1.	*Candocypria sp.*
2.	*Candona sp.*
3.	*Cyclocypris sp.*
4.	*Eucypris sp.*
5.	*Stenocypris sp.*
D	**Copepoda**
1.	*Cyclops sp.*
2.	*Diaptomus sp.*
3.	*Eucyclops sp.*
4.	*Mesocyclops leuckartii*
5.	*Microcyclops sp.*
6.	*Nauplius*
E	**Cladocera**
1.	*Alona monocantha*
2.	*Camptocercus oklahomensis*
3.	*Chydorus sphaericus*
4.	*Dadaya macrops*
5.	*Daphnia similis*
6.	*Leydigia acanthocercoides*
7.	*Macrothrix sp.*

Table 2:- Zooplankton Diversity of Sawargaon [Kanhoba] lake during Feb. 2010 to Jan. 2011.

Sr. No.	Name of Group and Species
A.	**Protozoa**
1.	*Centropyxis aculeate*
2.	*Euglena sp.*
3.	*Glaucoma sp.*
4.	*Paramecium sp*
B	**Rotifera**
1.	*Brachionus angularis*
2.	*B. bidentata*
3.	*B. forficula*
4.	*Cephalodella exigna*
5.	*Colurella adriatica*
6.	*Filinia longiseta*
7.	*Horaella brahmi*
8.	*Keratella tropica*
9.	*K. valga*
10.	*Lecane (M) bulla*
11.	*Lecane depressa*
12.	*Lepadella ovalis*
13.	*Testudinella patina*
14.	*Trichorus porcellus*
C.	**Ostracoda**
1.	*Candocypria sp.*
2.	*Candona sp.*
3.	*Cyclocypris sp.*
4.	*Cypria sp.*
5.	*Cyprinotus sp.*
6.	*Stenocypris sp.*
D.	**Copepoda**
1.	*Cyclops sp.*
2.	*Diaptomus sp.*
3.	*Eucyclops sp.*
4.	*Heliodiaptomus sp.*
4.	*Mesocyclops leuckartii*
5.	*Microcyclops sp.*
6.	*Nauplius*
E	**Cladocera**
1.	*Alona sp.*
2.	*Bosmina longirostris*
3.	*Camptocercus oklahomensis*
4.	*Ceriodaphnia sp.*
5.	*Chydorus gibba*
6.	*C. sphaericus*
7.	*Dadaya macrops*
8.	*Leydigia acanthocercoides*
9.	*Macrothrix sp.*

Table 3:- Population Density And Percentage Contribution Of Different Groups Of Zooplankton In The Two Experimental Lakes During February 2010 to January 2011

Sr. No.	Name of the Group	Sarsi-Both		Sawargaon [Kanhoba]	
		Population Density (Ind/L)	Percentage Contribution (%)	Population Density (Ind/L)	Percentage Contribution (%)
1.	Protozoa	6.05	0.78	10.13	1.21
2.	Rotifera	632.15	81.19	604.18	71.57
3.	Ostracoda	23.37	3.01	49.27	5.83
4.	Copepoda	34.84	4.47	66.72	7.91
5.	Cladocera	82.15	10.55	113.84	13.48
	Total	**778.56**	**100.00**	**844.14**	**100.00**

Table 4:- Seasonal Variations in Various Groups of Zooplankton (Ind/L) of The Two Experimental Lakes During February 2010 to January 2011

Sr.No.	Group	Summer		Monsoon		Winter	
		Sarsi-Both	Sawargaon [Kanhoba]	Sarsi-Both	Sawargaon [Kanhoba]	Sarsi-Both	Sawargaon [Kanhoba]
1.	**Protozoa**	2.86	5.03	1.08	1.46	2.11	3.64
2.	**Rotifera**	278.43	291.87	161.15	137.52	192.57	174.79
3.	**Ostracoda**	10.87	23.72	5.36	10.67	7.14	15.53
4.	**Copepoda**	16.29	34.08	6.93	13.92	11.62	18.72
5.	**Cladocera**	37.97	52.89	17.84	23.17	26.34	37.78

Conclusion

Zooplankton composition of all the selected lakes was estimated. Total zooplankton count of Sarsi-Both lake was estimated as 778.56 Ind/L and Sawargaon [Kanhoba] lake as 844.14 Ind/L. Regarding the percentage contribution in quqli-quantitative respect, all lakes followed similar trend as Rotifera > Cladocera > Copepoda > Ostracoda > Protozoa. Quali-quantitative status of both the lakes suggests that the selected water bodies are nutrient rich and suitable for pisciculture practices.

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