



## STUDY ON SEASONAL FLUCTUATIONS IN ZOOPLANKTON DIVERSITY AT KATPHAL LAKE, TAL- SANGOLA, DIST- SOLAPUR (M.S.) INDIA.

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### ABSTRACT

*Zooplankton acquire central place in food chain which are found in various strata of trophic level including herbivores and carnivores. Studies on zooplankton of Katphal Lake were undertaken for one complete year from January 2014 to December 2014. Out of the total 20 species recorded during the study, 10 belonged to Rotifera, 5 to Copepoda, 4 to Cladocera and 1 to Ostracoda. Rotifera was the most dominant group throughout the study period. Seasonal variations were observed in the distribution of zooplankton. Seasonally, the number was highest during summer, followed by winter and lowest during monsoon.*

**KEYWORDS :** Seasonal fluctuations, Katphal Lake, Zooplankton, Sangola.

### INTRODUCTION

Zooplanktons are microscopic floating animal components of an aquatic ecosystem. They play important role in fresh water 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. 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 present condition of the pond. Among all the freshwater aquatic biota, zooplankton population is able to reflect the nature and potential of any aquatic systems (Kumar *et al.* 2010). As a group, they have worldwide distribution, species composition and community structure which are sensitive to changes in environmental conditions, nutrient enrichment and different levels of pollution (Jha and Barat, 2003).

In India considerable investigation have been made by the various authors and researchers like Sukand and Patil (2004), Sreelatha and Rajalakshmi (2008), Kotadiya and Solanki(2013), Kotadiya (2013) and Shaikh *et al.*(2014). But there is no available record on biological characteristic of the Katphal Lake. The study on zooplankton diversity will provide the basic information of entire ecology and the present condition of pond.

### Materials & methods:

The zooplankton samples were collected from Katphal lake monthly during January 2014 to December 2014. The Katphal lake is located near Katphal village, Tal – Sangola, Dist – Solapur (M.S.) along the side major district road, Karad - Pandharpur State highway number 76. This lake is situated at 17°33'88" N latitude and 74°59'41.04" E longitude. The lake has an earthen dam. This is 1300 meter long. This lake is perennial. The gross capacity of lake is 36.04 meter mcf. The live storage of lake is 36.04 mcf. The average rain fall is 533.40 mm. The zooplanktons were collected by using zooplankton net (made of bolting silk of mesh size 20  $\mu$ ). The samples were fixed in 4 percent formalin. The zooplanktons were identified with standard keys. Identification of Rotifera was done according to key of Dhanapathi (2000), Tonapi (1980). Identification of Copepod was done with keys of Battish (1992). Identification of Cladocera was done with the help of keys of Murugan *et al.* (1998). Identification of Ostracoda was done according to keys of Edmondson (1959).

### RESULTS AND DISCUSSION:

During present investigation total 20 species of Zooplankton were observed. Out of which 10 were belonging to Rotifera, 04 were belonging to Cladocera, 5 were belonging to Copepoda and 1 was belonging to Ostracoda.

#### Rotifera

During present study rotifers belonging to 3 genera and 2 families were observed (Table No.1). Rotifers represented 40.65 % of all zooplankton recorded from the Katphal lake (Fig.1). The maximum number of rotifers (690 individuals/lit.) at site 2 during May 2014 and the number was minimum (150 individuals/lit) at site 3 in July 2014 (Table No. 2). Throughout the study period the rotifer was found to be a dominant group. Rotifers had shown seasonal fluctuation. They were highest during summer, followed by winter and lowest during monsoon. The similar results were also obtained by Sharma and Diwan (1993), Deshmukh (2001), Singh *et al.*(2002).

#### Cladocera

In our studies cladocera was represented by 4 species (Table.No.1). Cladocerans represented by 19.74% of all zooplanktons recorded in this study (Fig.1.). The maximum density of Cladocera was in month December 2014 (280 individuals/lit) at site 2 and the minimum density recorded in month July 2014 (100 individuals/lit) at site 3 (Table no. 2). Maximum population of Cladocera in winter attributed to favorable temperature and availability of food. The similar observations are made by Edmondson (1965), Jayabhaye, (2010), Puille and Khan (2003).

#### Copepoda

In the present study Copepods were second largest group of zooplankton representing 25.57% of all zooplanktons (Fig. 1). The recorded copepods belonged to 5 genera and 2 families (Table No.1). The highest density of copepods was during May 2014 (420 individuals/lit) at site 2 and their number was least (130 individuals/lit) in July 2014 at site 3 (Table. No.2). Copepoda during the study period was mainly represented by Cyclops species and nauplii larvae. Similar findings were also reported by Verma *et al.* (1984), Ahmad *et al.* (2011), Syuhei,(1994), Padmavati and Goswami (1996). The occurrence of nauplii throughout the study period in the present lake indicated extended reproductive phase of the cyclopoid, which is in

agreement with the reports Sharma and Sharma (2011).

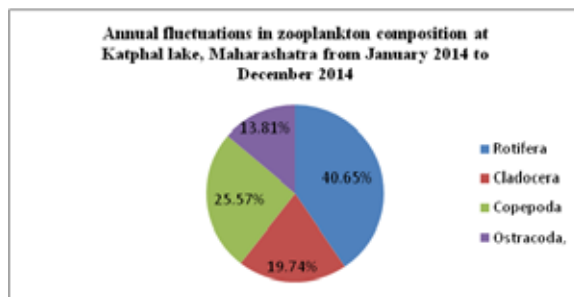
**Ostracoda**

In the present study only 1 species of Ostracod was found. (Table No.1). Ostracoda represented 13.81% of the total population of zooplankton recorded in the Katphal Lake (Fig.1). The highest density of ostracod was recorded during May 2014 (200 individuals/lit) at site 2 and minimum density was recorded in July 2014 (90 individuals/lit) at site 3 (Table No.2). Similar observations are made by Padbhanabha and Belagali (2008) reported that highest abundance of ostracods during summer months.

**Table No. 1: Zooplankton diversity in Katphal Lake, Maharashtra**

Sr.no.	Group	Family	Scientific name
1	Rotifera	Brachionidae	Brachionus bidentata
			Brachionus calcyflorus
			Brachionus caudatus
			Brachionus falcatus
			Brachionus forticula
			Brachionus rubens
			Keratella tecta
			Keratella testudo
		Keratella vulga	
		Testudinellidae	Filinia longisetata
2	Cladocera	Bosminidae	Bosmina longirostris
		Daphniidae	Daphnia parvula
		Sididae	Diaphanosoma species
		Moinidae	Moina species
3	Copepoda	Cyclopidae	Cyclops scutifer
			Mesocyclops haylinus
			Nauplius larvae
		Diaptomidae	Leptodiaptomus species
			Skistodiaptomus species
4	Ostracoda	Cypridinidae	Cypris species

**FIGURE 1.**



**CONCLUSION**

Total 10 species of zooplankton belonging to 4 groups viz Rotifera, Cladocera, Copepoda and Ostracoda were recorded. During present study it has been found that the Katphal lake shows seasonal fluctuations in zooplankton diversity and distribution. The less number and diversity in rainy season is due to dilution of water and this lead to minimum photosynthetic activity by primary producers. The moderate number and diversity in winter season is due to favorable conditions and increasing food availability. But in summer the number and diversity is maximum due to less inflow of water, stability of water and decomposition of organic matter increases food availability and predators are also less.

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**Table No. 2: Monthly fluctuations in zooplankton (no./lit) of water at three sites of Katphal lake , Maharashtra for January 2014 to December 2014**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Rotifera Site 1	390	400	425	430	500	220	200	250	300	320	350	380	4165
Site 2	490	550	580	600	690	340	300	375	390	410	440	460	5625
Site 3	370	375	390	390	420	190	150	210	280	290	320	360	3745
Mean	417	442	465	473	537	250	216	278	323	340	370	400	4512
Cladocera Site1	220	190	210	200	195	130	120	140	160	180	200	200	2145
Site 2	260	230	212	205	200	160	140	180	200	220	250	280	2537
Site 3	200	180	190	175	180	110	100	125	130	150	170	180	1890
Mean	227	200	204	193	192	133	120	148	163	183	207	220	2191
Copepoda Site 1	290	300	320	350	400	160	150	180	200	240	280	300	3170
Site 2	340	350	370	390	420	200	180	250	280	285	300	320	3685
Site 3	280	280	310	325	340	140	130	170	190	280	260	270	1730
Mean	303	310	333	355	387	167	153	200	223	252	280	297	2862
Ostracoda Site 1	130	125	130	125	160	100	100	105	110	120	125	135	1465
Site 2	155	160	160	170	200	110	120	110	120	140	150	150	1745
Site 3	120	110	125	135	160	90	90	100	105	110	120	125	1390
Mean	135	128	138	143	173	100	103	105	111	123	132	137	1533

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