

Seasonal abundance of Zooplanktons in Pakhal Lake, Khanapur Mandal, Warangal Dist (T.S) India

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ABSTRACT

Zooplanktons are the smallest, acellular or metazoans in water bodies, ranging in size from about 0.05 to 10 mm. Rotifers, Cladocera, Copepodes and Ostrocoada and small insects constitutes most Zooplankton communities. They provide food for many species of fish and are therefore, vital in the food web of ponds. They are also used as an index of productivity, eutrophication and pollution of the water bodies. Seasonal variation in the number of Zooplankton with the communities occupying higher tropic levels were recorded in Pakhal Lake, Khanapur Mandal, Dist. Warangal. The Zooplankton population of Pakhal Lake was studied for a period of 24 months from October 2011 to September 2013. A total of 25 Zooplankton taxa were observed and found dissimilar in the three seasons. In summer Rotifers, Cladocera during monsoon, and Copepoda in winter are dominant taxa.

Key words : Zooplanktons, Abundance, seasonal, Pakhal lake, water quality.

INTRODUCTION

Zooplanktons are microscopic free swimming minute floating animals found in aquatic system. They are represented by wide array of taxonomic groups namely Protozoa, Rotifera, Cladocera, Crustacea, and Copepoda. Zooplankton communities are highly sensitive to environmental variation. Zooplankton plays major role in the food web of an aquatic ecosystem and forms an intermediate link between primary and tertiary production. Studies of Zooplankton communities in fresh water environments may be instrumental in the prediction of long term changes in the lake ecosystem²¹. Zooplankton diversity and

abundance refers to variety within the community. They provide food for fish in freshwater lakes and play a major role in fish production¹⁰. According to Rajagopal *et al*¹⁵, Zooplanktons plays an integral role and serves as bioindicator and it is a well-suited tool for understanding water pollution status. Study of plankton diversity and their ecology greatly contribute to an understanding of the basic nature and general economy of an aquatic habitat. Zooplanktons are representing the microscopic communities at secondary level. They react quickly to limnological change of aquatic environment. They can be used as pollution indicators²⁰.

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The present investigation has been undertaken to assess the seasonal variations in the occurrence of Zooplanktons of Pakhal Lake.

MATERIALS AND METHODS

The Pakhal lake is surrounded by hilly terrain and a dense forest and is spread over an area of around 30 sq km. and located in Pakhal Wild life Sanctuary in Warangal district with 17° 15'32" N, 80° 0'57" E. Zooplankton samples were collected from 5 selected stations in Pakhal lake during October 2011 to September 2013. The samples were collected monthly wise on early morning hours in between 7 am to 10 am. The Zooplankton sample will be collected by filtering 50 liters water through standard plankton net of bolting silk No. 25 (Battish, 1992). The collected plankton samples were fixed and preserved in 4% formalin.

Biological analysis:

The supernant plankton's free water was removed and the settled Zooplanktons were enumerated by "Sedgwick-Rafter Cell" method. Identification of Zooplankton species was performed under microscope by using keys and monographs of standard references^{1,14}.

OBSERVATION AND DISCUSSION

The results of the analysis of Zooplanktons variables are given in the table 1, 2 and fig: 1. the abundance and distribution of Zooplankton is guided by a variety of ecological factors. The physico-chemical parameters such as temperature, light, p^H, 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 Zooplankton in an environmental unit. The

importance of these factors has been given by several workers- namely Arora², John *et al*⁹, Rajendra¹⁶, Kumar and Dutta¹², Kodarkar¹¹ and Desilva⁷. But these parameters are extremely variable from place to place and from time to time. In general the fluctuating pattern of physico-chemical conditions of water affects the distribution of Zooplanktons. Related to the zooplankton diversity, 4 groups with 21 genera was observed namely, Rotifera (8 genera), Cladocera(5 genera), Copepoda (5 genera) and Ostrocod(3 genera).

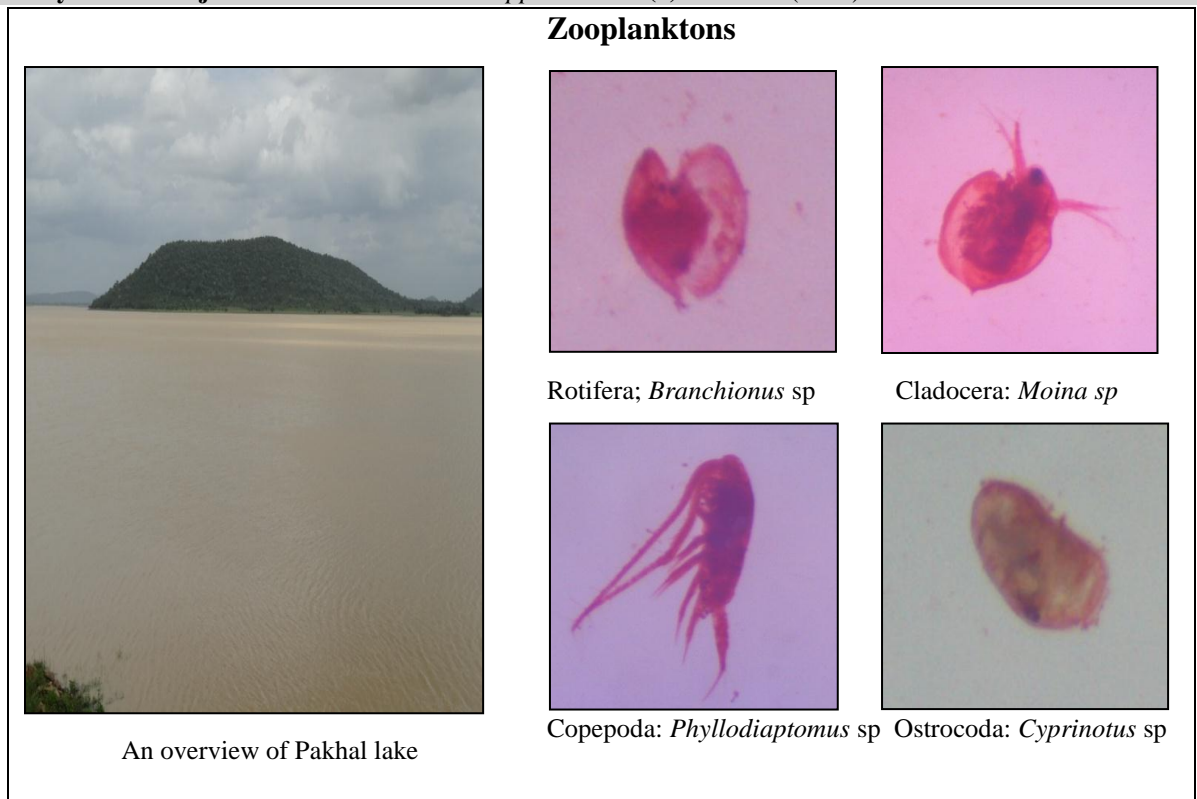
Four groups of Zooplanktons show the following alternations in their sequence with change in season.

Summer : Rotifera > Copepoda > Cladocera > Ostrocod.

Monsoon : Cladocera > Copepoda > Rotifera > Ostrocod.

Winter : Copepoda > Cladocera > Rotifera > Ostrocod.

All major groups of Zooplanktons were observed in the summer season. The summer population maxima of Zooplankton is due to high temperature, lower transparency and a high standing crop of primary producers leading to greater availability of food^{18,19}. According to Bais and Agarwal⁴, a progressive increase in the alkalinity of water also increased the Zooplanktons population. Presence of dissolved oxygen and hard water favour the production of Zooplanktons during the summer^{6,12,17}. During Monsoon, lower Zooplankton densities are recorded due to its dilution effect and decreased photosynthetic activity by primary producers³. The population rises again higher level in the winter due to favourable environmental conditions, including temperature, dissolved oxygen and the availability of abundant food^{5,8,13}.



Diversity of Zooplankton taxa recorded in Pakhal lake during 2011-2013.

Groups	Family	Species	
ROTIFERA	Brachionidae	<i>Brachionus angularis</i> (Gosse, 1851)	
		<i>Brachionus calyciflorus</i> (Pallas, 1766)	
		<i>Brachionus diersicornis</i> (Daday, 1883)	
		<i>Brachionus caudatus</i> (Haner, 1937)	
		<i>Keratella tropica</i> (Apstein, 1907)	
		<i>Keratella cochlearis</i> (Gosse, 1851)	
	Lecanidae	<i>Lecane monostyla</i> (Daday, 1897)	
		<i>Lecane lunaris</i> (Ehrenberg, 1982)	
		Philodinidae	<i>Filinia longiseta</i> (Ehrenberg)
		Asplanchnidae	<i>Asplanchna</i> sp
CLADOCERA	Daphnidae	<i>Moina brachiata</i>	
		<i>Daphania pulex</i>	
		<i>Daphania carinata</i>	
	Bosminidae	<i>Bosmina longirostris</i>	
		<i>Moinadaphnia macleayli</i>	
	Chydoridae	<i>Alonella</i> . Sp	
COPEPODA	Cyclopidae	<i>Mesocyclops hyalinus</i>	
		<i>Mescyclops leuckarti</i>	
		<i>Nauplius larva</i>	
	Diaptomidae	<i>Cyclopoid copepodite</i>	
		<i>Paracyclops fimbriatus</i>	
		<i>Phyllodiaptomus</i> sp	
OSTROCODA	Cyprididae	Cyprididae sp	
		<i>Stenocypris</i> sp	
		<i>Cyprinotus</i> sp	

Seasonal distribution of Zooplankton groups in Pakhal Lake

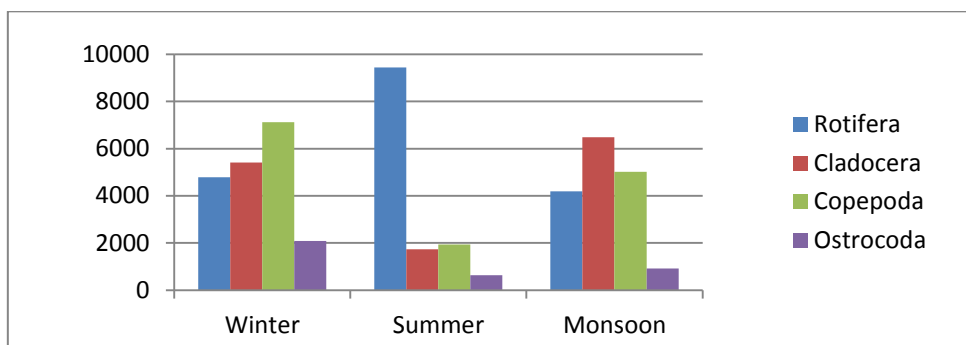
(Table :1)

Season	Group	Station 1	Station 2	Station 3	Station 4	Station 5
Winter	Rotifera	1089	856	903	1002	930
	Cladocera	1149	948	870	1020	1419
	Copepoda	1417	1690	1473	1337	1205
	Ostrocooda	477	416	407	424	361
Summer	Rotifera	2364	1665	1447	1855	2105
	Cladocera	487	426	287	282	246
	Copepoda	558	292	339	383	364
	Ostrocooda	102	143	108	111	174
Monsoon	Rotifera	896	895	849	710	845
	Cladocera	1731	1085	1400	1095	1167
	Copepoda	1106	1155	1076	920	758
	Ostrocooda	201	165	198	192	161

(Table: 2)

S.No	Group	Winter	Summer	Monsoon
01	Rotifera	4780	9436	4195
02	Cladocera	5406	1728	6478
03	Copepoda	7122	1936	5015
04	Ostrocooda	2085	638	917

Fig. 1:

**CONCLUSION**

The diversity and density of Zooplankton from Pakhal lake of Warangal District exhibited by four major groups namely - Rotifera, Cladocera, Copepoda and Ostrocooda with 25 genera showed seasonal variability in density due to seasonal alternation in different physico-chemical parameters. Zooplankton density was least in the monsoon seasons, due to dilution effect, high turbidity and less photosynthetic activity by primary producers. Maximum population of Rotifera observed in summer season. During winter season Copepods population maximum in number, but Cladocera population maximum during the

monsoon season. This study determined that abundance of Zooplankton has been estimated by the cumulative effect of physico-chemical and biological parameters. Therefore, it is suggested that the immediate measures are necessary to be initiated to avoid further contamination of lake due to anthropological activities. At present the lake water is suitable for fishing culturing and irrigation purpose.

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