

RESEARCH ARTICLE

Biodiversity of Zooplankton in Pillowa Reservoir District Morena Madhya Pradesh, India

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Manuscript details:

Received: 18 June, 2014
 Revised : 08 August, 2014
 Revised received: 11 September, 2014
 Accepted: 16 September, 2014
 Published: 30 September, 2014.

Editor: Dr. Arvind Chavhan

Citation this article as:

Kadam CP, Dandolia HS, Kausik S, Saksena DN and Shrotriya VP (2014) Biodiversity of Zooplankton in Pillowa Reservoir District Morena Madhya Pradesh, India, *Int. J. of Life Sciences*, 2(3): 263-267.

Acknowledgement:

Authors are thankful to Head school of studies in zoology Jiwaji University Gwalior for providing all laboratory facilities for this research work and boatman of Pillowa reservoir, who help in collection the samples from various station of reservoir.

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ABSTRACT

Zooplanktons play a vital role in the food web of aquatic ecosystems. They are good indicator of water quality. Present paper deal the qualitative and quantities estimation of zooplankton. The present study was done from June 2008 to May 2010 In all 27 species of zooplankton were identified. Among them 4 species belong to Protozoa, 10 species belong to Rotifera, 6 species belong to Cladocera, 5 species belong to Copepoda and 2 species belong to Ostracoda. The zooplanktonic forms were exhibited as Protozoans were 9.50%, Rotifers with 54.84%, Cladocerans with 14.43%, Copepods with 15.70% and Ostracoda with 5.54%. The abundance of zooplankton in Pillowa reservoir followed a sequence as Rotifera > Copepoda > Cladocera > Protozoa > Ostracoda.

Keywords: Zooplanktons, seasonal abundance, qualitative and quantitative estimation, Pillowa Reservoir.

INTRODUCTION

Zooplanktons are microscopic and free-floating animals, which play a vital role in the food web of aquatic ecosystems. They play a major role to study of faunal diversity and in energy transfer to the next higher trophic levels and are also good indicator of water quality. They feed on phytoplankton and facilitate the conversion of plant material into animal tissue they constitute the basic food for higher invertebrates like fishes, particularly their larvae.

MATERIAL AND METHOD :

Pillowa Dam is situated on River sank in district Morena of Madhya Pradesh. It is constructed during the period 1906-1914 by the Princely state of Gwalior. Pillowa reservoir is 25 km away from Morena city. The Catchments area is 544.30 Sq.km. It has gross storage capacity of 23.186 m³ with a maximum height of 10.42.M Pillowa reservoir established with Latitude 26^o-28' N and Longitude 78^o-12'E. (Fig.-1).

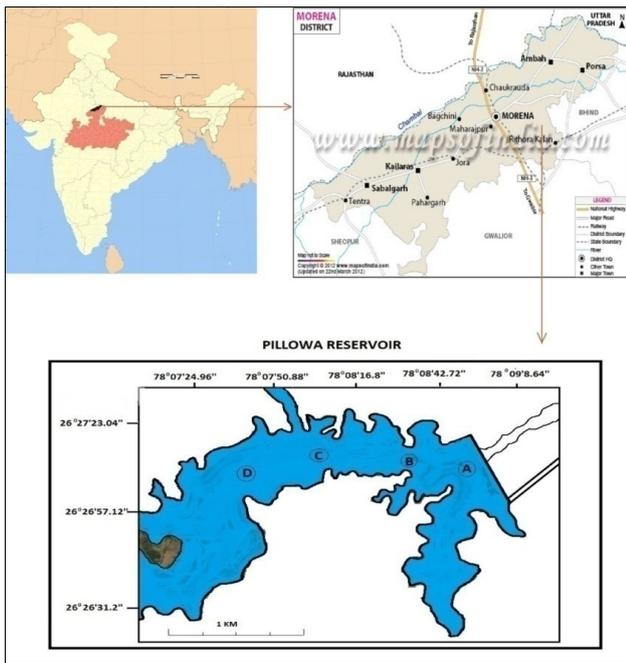


Fig. 1: Showing the location of sampling station at Pillowa Reservoir.

For qualitative and quantitative study of zooplanktonic four sampling stations were established namely station-A which was established near the sluice its

local name is Rajhansh baba ghat. Station-B was established near narrow area of Pillow reservoir and Muhana of Nakati Nala. Station-C was established near Narsinghpur ghat and station-D located near Muhana of Kotwal pillow link canal and local name is Lathaghat. The monthly samples of sub-surface water were collected from all sampling stations in the iodine treated double stoppers polyethylene bottles in the first week of each month in the early hours of the day i.e., between 7 a.m. to 9 a.m. care was taken to avoid spilling of water and air bubbling during the time of sample collection.

Samples were preserved by adding 4% formalin solution for further analysis. Organisms were counted and identified to genus and species level using keys provided by Ward and Whipple (1959), Tonapi (1980), Adoni et al. (1985), Kurian and Sebastian (1982), monographs and research papers.

RESULTS AND DISCUSSION

In all 27 species of zooplankton were identified from Pillowa reservoir during the course of study.

Table 1: systematic list of zooplanktonic organisms identified has been given as under in Pillowa reservoir

Phylum	Class	Order	Family	genus	Species	
Protozoa	Lobosa	Testacealobosa	Arcellidae	<i>Arcella</i> (Ehrenberg)	1. <i>A. discoides</i> (Ehrenberg)	
			Diffugiada	<i>Diffugia</i> (Leclerc)	2. <i>D. lebes</i> (Penard)	
			Centropyxidae	<i>Centropyxis</i> (Strein)	3. <i>C. aculeate</i> (Ehrenberg)	
		Testacealobosa		<i>Wailesella</i> (Diflundre)	4. <i>W. eboracensis</i> (Wailes)	
Rotifera	Monogononta	Ploima	Brachionidae	<i>Anuraeopsis</i> (Lauterborn)	5. <i>B. angularis</i> (Goose)	
				<i>Brachionus</i> (Pallas)	6. <i>B. forficula</i> (Wierzejski)	
					7. <i>B. falcatus</i> (Zacharias)	
					8. <i>B. quadridentatus</i> (Hermann)	
				<i>Keratella</i> (Boryde St. Vincent)	9. <i>K. valga</i> (Ehrenberg)	
					10. <i>K. cochlearis</i> (Goose)	
			Lecanidae	<i>Lecane</i> (Nitzch)	11. <i>L. unguitata</i> (Fadееv)	
					12. <i>L. bulla</i> (Gosse)	
	Filinidae	<i>Filinia</i> (Bonyde St. Vincent)	13. <i>F. opoliensis</i> (Zacharias)			
	Gastropodidae	<i>Ascomorpha</i> (Perty)	14. <i>A. ovalis</i> (Berge)			
Arthropoda	Crustacea	Cladocera	Daphnidae	<i>Scapholeberis</i> (Schodler)	15. <i>S. kingi</i> (Sars)	
					<i>Ceriodephnia</i> (Dana)	16. <i>C. cornuta</i> (Sars)
			Bosminidae	<i>Bosmina</i> (Sars)	17. <i>B. longirostris</i> (Muller)	
			Chydoridae	<i>Chydorus</i> (Lach)	18. <i>C. sphaericus</i> (Muller)	
				<i>Indialona</i> (Patkovski)	19. <i>I. ganapati</i> (Patkovski)	
			Sididae	<i>Diaphanosoma</i> (Fischer)	20. <i>D. excisum</i> (sars)	
		Cyclopidae	Cyclopoida	<i>Mesocyclops</i> (Sars)	21. <i>M. hyalinus</i> (Rehberg)	
					<i>Thermocyclops</i> (Lindberg)	22. <i>Thermocyclops</i> sp.
					23. <i>T. crassus</i> (Fischer)	
			Calanoida	Dipotamidae	<i>Heliodiaptomus</i> (Kiefer)	24. <i>H. viduus</i> (Gurney)
					<i>Phyllodiaptomus</i> (Kiefer)	25. <i>P. blanci</i> (Guerne and Richard)
			Podocopa	Cypridacea	<i>Cypris</i> (Muller)	26. <i>Cypris</i> sp
						<i>Cyprinotus</i> (Brady)

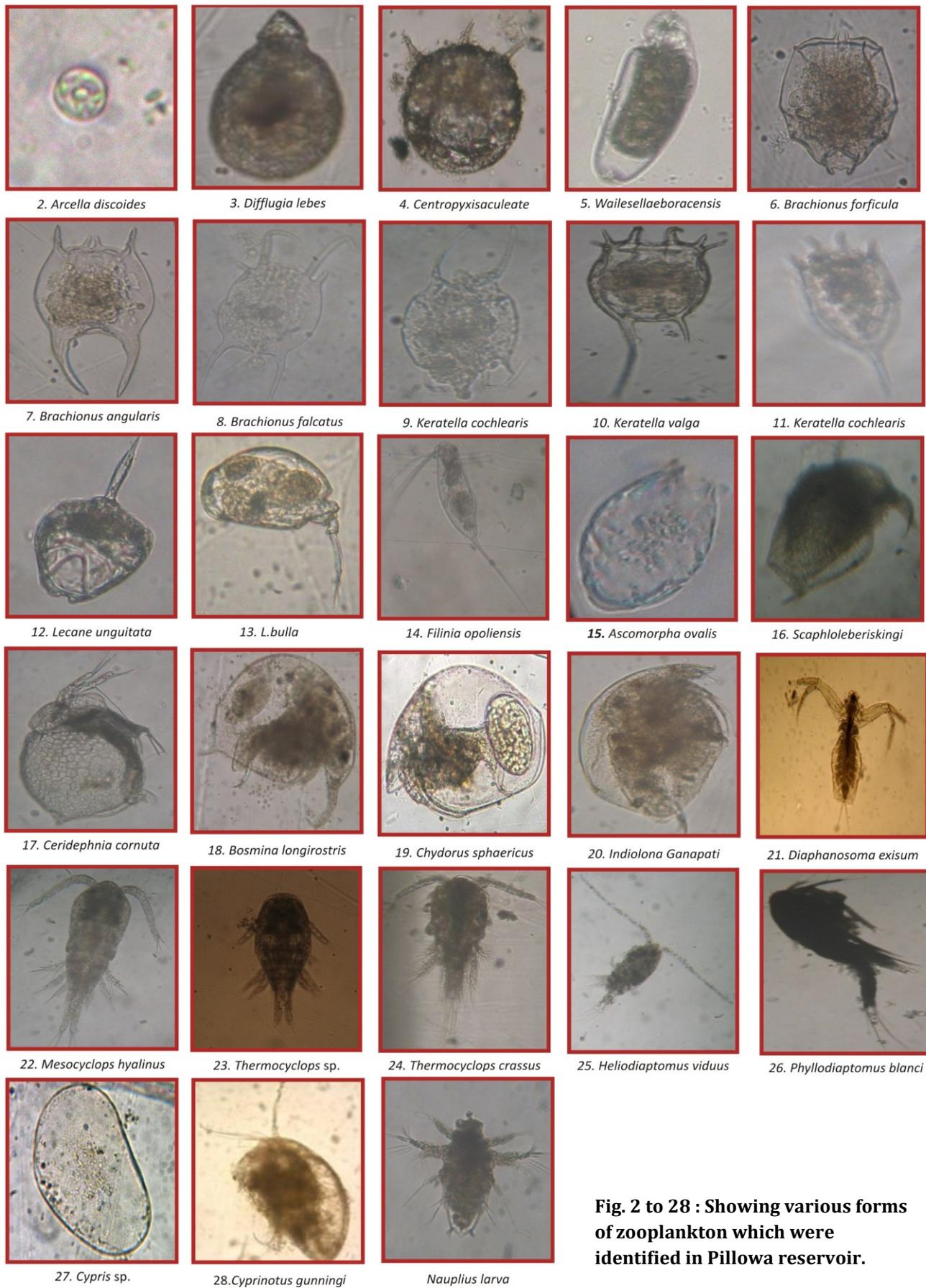


Fig. 2 to 28 : Showing various forms of zooplankton which were identified in Pillowa reservoir.

Table: 2-Showing distribution of Zooplanktonic organism at various stations in Pillowa Reservoir.

S. N.	Species	2008-2010			
		A	B	C	D
1.	<i>Arcella discoides</i>	+	+	+	-
2.	<i>Diffugia lebes</i>	+	+	+	+
3.	<i>Centropyxis aculeate</i>	+	+	+	+
4.	<i>Waiellesella eboracensis</i>	+	+	+	+
5.	<i>Brachionus angularis</i>	+	+	+	+
6.	<i>B. forficula</i>	-	+	+	+
7.	<i>B. falcatus</i>	+	+	+	+
8.	<i>B. quadridentatus</i>	+	-	+	+
9.	<i>K. valga</i>	+	+	+	+
10.	<i>K. cochlearis</i>	+	+	-	+
11.	<i>L. unguitata</i>	+	+	+	+
12.	<i>L. bulla</i>	-	+	+	-
13.	<i>Filinia opoliensis</i>	+	+	+	+
14.	<i>Ascomorphaovalis</i>	+	+	+	+
15.	<i>Scapholeberis kingi</i>	+	+	+	+
16.	<i>Ceriodaphnia cornuta</i>	+	+	+	+
17.	<i>Bosmina longirostris</i>	-	+	+	-
18.	<i>Chydorus sphaericus</i>	+	+	+	+
19.	<i>Indialona ganapati</i>	+	+	-	+
20.	<i>Diaphanosoma exisum</i>	+	+	+	-
21.	<i>Mesocyclop hyalinus</i>	+	+	-	+
22.	<i>Thermocyclops sp.</i>	+	-	+	-
23.	<i>T. crassus</i>	+	+	+	+
24.	<i>Heliodiaptomus viduus</i>	-	+	+	+
25.	<i>Phyllodiaptomus blanci</i>	+	+	-	+
26.	<i>Cypris sp.</i>	-	+	+	+
27.	<i>Cyprinotus gunningi</i>	+	-	-	-
	Nauplius larva	+	+	+	+

Table 3: Number of zooplankton in pillowa reservoir during 2008-10.

Sr. No.	Group	Average Number (org L ⁻¹⁰⁰)	%
1	Protozoa	57.7	9.50
2	Rotifera	333.8	54.84
3	Cladocera	87.8	14.43
4	Copepoda	95.5	15.70
5	Ostracoda	33.7	5.54

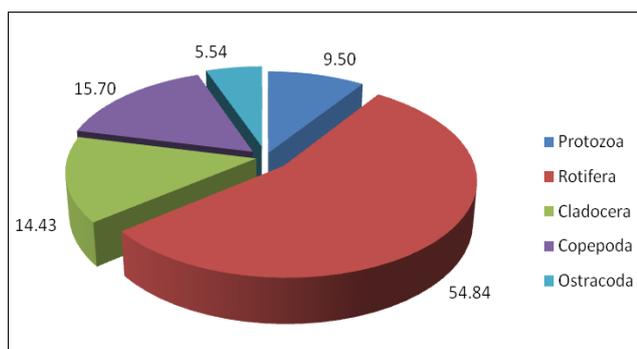


Fig. 29: Showing average number of zooplankton

Among 27 species 4 species were represented by Protozoa viz., *Arcella discoides*, *Diffugia lebes*, *Centropyxis aculeate*, and *Waiellesella eboracensis* 10 species of Rotifera, viz., *Brachionus angularis*, *B. forficula*, *B. falcatus*, *B. quadridentatus*, *Keratella valga*, *K. cochlearis*, *L. unguitata*, *L. bulla*, *Filinia opoliensis*, and *Ascomorpha ovalis*. In Cladocera, 6 species were identified viz., *Scapholeberis kingi*, *Ceriodaphnia cornuta*, *Bosmina longirostris*, *Chydorus sphaericus*, *Indialona ganapati*, *Diaphanosoma exisum*, of 5 species Copepoda were identified viz., *Mesocyclops hyalinus*, *Thermocyclops sp.*, *Thermocyclops crassus*, *Heliodiaptomus viduus*, *Phyllodiaptomus blanci*, and Ostracoda viz., with 2 species only. *Cypris sp.*, *Cyprinotus gunningi* were also identified. Nauplei and eggs have been found in plenty.

The zooplankton play an important role in the study of faunal diversity of aquatic ecosystems. In North India, Twenty eight species of zooplankton were identified in Naukuchiyatal lake in Uttaranchal (Gupta and Bagat, 2004). In South India, Rajashekhar et al. (2010) have recorded 24 species; of which 10 species belong to Rotifera, 6 to Cladocera, 5 to Copepoda and 3 to Ostracoda. The most diversified genus has been *Brachionus*, which was represented by its five species viz., *B. angularis*, *B. bidentata*, *B. falcatus*, *B. forficula* and *B. quadridentatus*.

In Central India, Dagaonkar and Saksena (1992) reported twenty six species of zooplankton with two species belonging to Protozoa, nineteen species to Rotifera, three species to Cladocera, and two species to Copepoda from Kailasagar tank at Gwalior. Similar results were observed in Pillowa reservoir in Shivbari temple tank of Bikaner Twenty eight species of zooplankton with six species of Cladocera, fourteen species of Rotifera, five species of Copepoda and three species of Ostracoda were reported in Sirur dam, Nanded (Pawar et al., 2003). Patil et al. (2008) have identified 70 species of zooplankton in Rishi lake among them were 34 species of rotifers, 10 species of Protozoa, 10 species of Copepoda, 9 species of Cladocera and 7 species of Ostracoda in this lake. In holy lake of Pushkar of Ajmer, sixteen species of zooplankton were identified. Out of which two species of Protozoa, five species of Rotifera, five species of Cladocera and four species of Copepoda were identified (Khanna and Yadav, 2009). In Harsi reservoir, a total of 67 species of zooplankton has been identified (Shrotriy, 2010). In Lony dam in Rewa, a moderate biodiversity of zooplankton with 29 species

belonging to 6 of Protozoa, 11 of Rotifera, 8 of Cladocera and 4 of Copepoda has been reported (Sharma and Tiwari, 2011). Foregoing account indicates very clearly that the zooplankton community is quite different even in water bodies of the same region. This may be due to input of nutrients, pollutants, infestation of weeds in the water bodies and climatic conditions of the area. In the present study on Pillowa reservoir In all 27 species of zooplankton were identified during study period. They are represented by 4 species of Protozoa, 10 species of Rotifera, 6 species of Cladocera, 5 species of Copepoda and 2 species of Ostracoda. Which confirm the results of above workers

In Naukuchiyatal, Rotifera were found 57% population followed by Copepoda (39%) and Cladocera (4%) (Gupta and Bhagat, 2004). The rotifers were found to be dominant group with 28.94% population density followed by the copepods (25.42%), cladocerans (18.52%), ostracods (16.84%) and protozoan (10.26%) respectively in two diverse pond of North Bihar (Manzer *et al.*, 2005). The percentage composition of the species was Ostracoda 3%, Protozoa 6%, Cladocera 10%, Copepoda 13%, and Rotifera 68% in Gohad reservoir (Mishra, 2008). In a fish culture pond at Gwalior, the percentage composition of various group was Rotifera (62%), Copepoda (13%), Cladocera (13%), Protozoa (8%) and Ostracoda (4%) (Saxena and Saksena, 2009). In Harsi reservoir, Shrotriya (2010) has found that rotifers were highest in percentage (31%), followed by the copepods (30%), Cladocerans (27%), Protozoa (10%) and Ostracoda (2%) among zooplanktonic. In the present study on Pillowa reservoir, Rotifera were maximum in number with 54.84%, Copepoda with 15.70%, Cladocera with 14.43%, Protozoa with 9.50% and Ostracoda with 5.54% in a descending order. Similar results were observed in Present study where rotifers as dominant group followed by Copepod, Cladocera, Protozoa and Ostracoda.

CONCLUSION

In all 27 species of zooplankton were identified from Pillowa reservoir during the course of study of two years. 4 species were represented by Protozoa, 10 species of Rotifera, 6 species of Cladocera, 5 species of Copepoda, and 2 species of Ostracoda, Nauplei and eggs have also been found in good number. group wise composition of zooplanktonic forms during two years of

study exhibited Protozoans with a population 9.50%, Rotifers with a population 54.84%, Cladocerans with a population 14.43%, Copepods with a population 15.70% and Ostracoda with a population 5.54% only. In conclusion we can say that The abundance of zooplankton from this Pillowa reservoir followed a sequence as under: Rotifera >Copepoda >Cladocera >Protozoa >Ostracoda.

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