



Diversity of Zooplankton in Barwani Tank of West Nimar, MP, India

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Abstract

Biodiversity is the shortened form of two word's "biological" and "diversity". It refers to all the variety of life that can be found on earth (plants, animals, fungi and Micro –organism) as well as to the communities that they form habitats in which they live. Biodiversity is not only the sum of all ecosystem, species and genetic material. Rather, it represents the variability within and among them. Zooplankton constitutes a vital link in the food chain of an ecosystem and fish yield is to a great extent depending on their abundance. The abundance of Zooplankton is more of less governed by the interaction of number of Physical, Chemical and biological processes. The present investigation was undertaken to study the biodiversity of Zooplankton in "Barwani tank" of West Nimar, M.P. A total 23 species belonging to four groups have been identified. Protozoa 8 species, Rotifers 6 species, copepods 5 species and cladocers 4 species contributed to Zooplankton in the Barwani tank. Zooplankton diversity of this tank is higher in comparison to running water body link river Narmada. Where only 21 genera of Zooplankton occur.

Keywords: Zooplankton, diversity, Barwani tank.

Introduction

The proposed study area i.e. Barwani tank, of District Barwani, is situated in the South-Western part of the state of M.P., It lies between the parallels of 21^o44'-22^o04'N- latitude and 74^o27'-75^o07'-E- longitude. It covers an area of 835.74 sq. km.,Vindhyanchal in north and Maikal rang in east. Physiographical area is hilly with plains; the general topographic elevation is 177-200 m. from mean Sea-level. Average annual rainfall is around 400-500 mm (i.e. 20-25 inch) contributed by south-west monsoon.

Plankton is weakly swimming but most drifting small organism that inhabit called the water column of ocean, and bodies of fresh water. The name comes from the Greek term, plankton-meaning "Wanderer" and "drifter". Plankton is composed of tiny plant called phytoplankton and animal called zooplankton, as well as organism that are not easily classified into those two groups (such as Protozoa's and bacteria). Planktonic organisms are suspended in water and are so small that even slight current move them about. Fish eat zooplankton, phytoplankton and tiny plants and animals attached to objects on the pond bottom. They are also being used as bioindicators of water quality¹. Many studies on zooplankton and water quality of fresh water have been conducted from all over India².

Material and Methods

The plankton samples were collected following Welch³ and Lind⁴ by filtering 40 liters of water through small plankton net made up of bolting silk no. 25 (64 u mesh size). The concentrate was preserved in 5% formalin solution for zooplankton study respectively.

The systematic identification of plankton was made by standard Keys of Adoni A.D⁵., Apha Awwa⁶ and WPCF, Needhan and Needhan⁷, Edmondson W.T⁸., Battish, S.K⁹., Biswas S. P¹⁰., Patil ,H.S¹¹., Sunkad, B.N¹²., Gaikawad S.R¹³., Sutrakar R.C¹⁴., Okogwu I.O¹⁵., Kadam, S.S¹⁶., Somani Vaishali¹⁷, Goswami, A.P¹⁸., Studied zooplankton of Fresh water Reservoir Nyari-II Rajkot District, Gujarat, India.

Results and Discussion

A Total of 23 species belonging to four groups have been identified. Protozoa 8 species, Rotifers 6 species, Copepods 5 species and Cladocers 4 species contributed to zooplankton into Barwani tank. Some species of Protozoan are *Arcella* sp., *Actinophrys* sp., *Euglepha* sp., *Epistylis* sp., *Lacrmaria* sp., *Opercularia* sp., *Prorodon* sp., *Vorticella* species. Rotifers exhibit high turnover rates in nature. Chourasia¹⁹ reported that the diversity of rotifers and their species diversity are higher in eutrophic condition. Rotifers are *Branchionus caudatus*, *Branchionus falcatus*, *Horaella* sp., *Keratella tropica*, *Monostyla* sp., *pseudodiaptomus* sp., *Nauplii* species and Cladocer *Bosmina* sp. *Daphnia* sp., *Moina* sp., *Leydigia* species. Protozoa maximum recorded in summer month. Similar observation made by Mahar R.K²⁰.

We were recorded Protozoan (33.82%), Rotifers (35.56%), Cepepoda (14.76%) and Cladocera (15.88%). A number of Protozoan in higher than Rotifers. We were found Protozoan and Rotifers similar and Copepod and Cladocera are similar in the tank.

Table-1
Monthly variation in Zooplankton Density in Barwani Tank (No. /lit.) 2011-2012

	Name of Group & Genera	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Annual Total
Protozoa	<i>Arcella</i> sp.	0	0	0	6	12	4	35	6	0	0	0	0	63
	<i>Actinophyxis</i> sp.	0	19	18	7	31	91	33	7	0	0	0	0	206
	<i>Euglepha</i> sp.	0	10	0	0	9	13	10	9	6	0	0	0	57
	<i>Epistylis</i> sp.	0	20	20	4	26	40	29	20	0	0	0	0	159
	<i>Lacrymaria</i> sp.	30	4	4	4	6	2	5	0	17	27	20	5	124
	<i>Opercularia</i> sp.	14	2	4	0	0	0	12	41	74	30	12	3	192
	<i>Prorodon</i> sp.	24	7	10	5	0	0	5	11	16	24	22	73	197
	<i>Vorticella</i> sp.	0	18	22	15	5	0	0	0	0	0	0	0	60
	Total sp.	68	80	78	41	89	150	129	94	113	81	54	81	1058
Rotifera	<i>Branchionus caudatus</i>	25	20	18	18	71	96	75	75	39	29	36	29	531
	<i>Branchionus calyciflorus</i>	0	0	5	8	8	12	20	34	6	0	0	0	93
	<i>Haxarthra</i> sp.	15	10	10	0	0	0	0	0	25	70	25	10	165
	<i>Keratella</i> sp.	30	0	11	13	12	0	0	0	0	10	3	25	104
	<i>Monostyla</i> sp.	15	10	10	10	0	0	0	0	33	29	25	16	148
	<i>Notholca</i> sp.	0	0	0	0	9	36	8	17	0	0	0	0	70
	Total sp.	85	40	54	49	100	144	103	126	103	138	89	80	1111
Copepoda	<i>Cyclops</i> sp.	10	0	7	8	10	6	9	0	0	10	0	0	60
	<i>Mesocyclops</i> sp.	0	10	0	4	3	0	0	0	5	0	13	18	53
	<i>Macrocyclops</i> sp.	0	0	6	16	28	15	0	0	0	6	0	0	87
	<i>Pseudodiaptomus</i> sp.	60	6	20	12	0	0	0	0	6	10	26	31	171
	<i>Nauplii</i> sp.	0	13	0	0	5	12	4	30	28	0	0	0	91
Total sp.	70	29	33	40	46	33	13	30	39	26	39	49	462	
Cladocera	<i>Bomina</i> sp.	18	10	21	15	6	0	0	0	28	12	8	12	130
	<i>Daphnia</i> sp.	0	0	0	0	0	30	18	30	30	15	30	20	173
	<i>Monia</i> sp.	10	10	8	12	41	0	2	10	0	0	10	20	123
	<i>Leydigia</i> sp.	11	5	8	0	0	0	10	16	0	0	15	6	71
Total sp.	39	25	37	27	47	30	30	56	58	27	63	58	497	

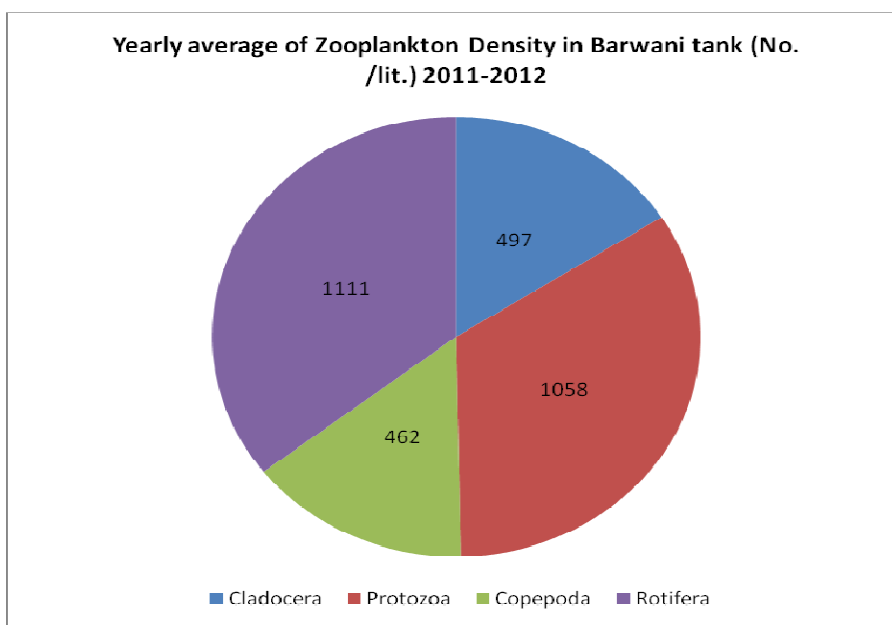


Figure-1
Species composition of Zooplankton and relative percentage of each group



Figure-2
Arcella sp.



Figure-5
Epistylis sp.



Figure-3
Actinophyxis sp.

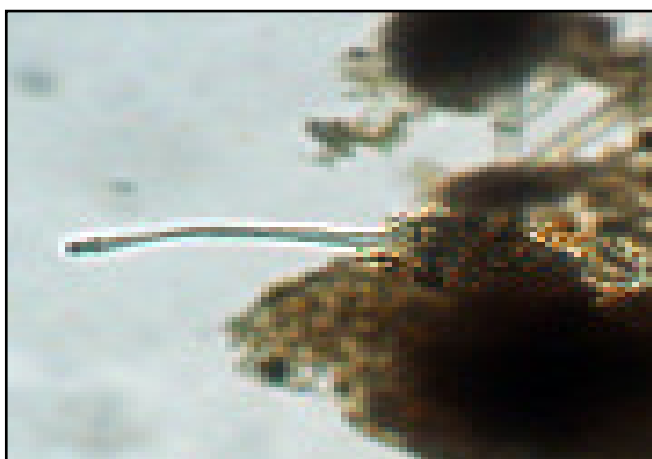


Figure-6
Lacrymaria sp.

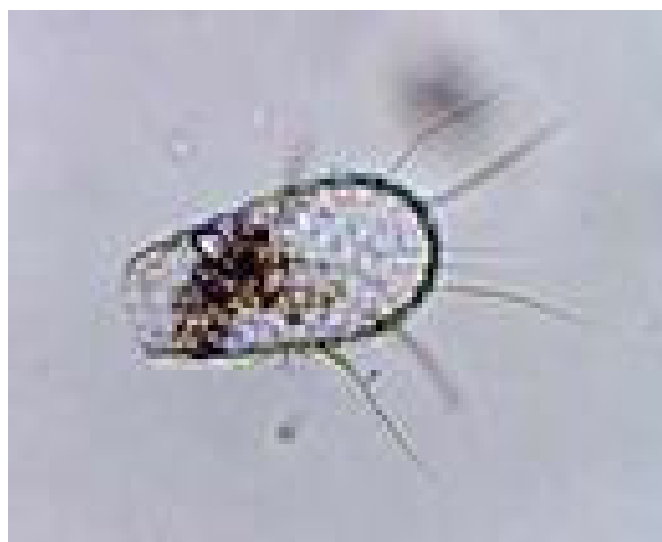


Figure-4
Euglepha sp.

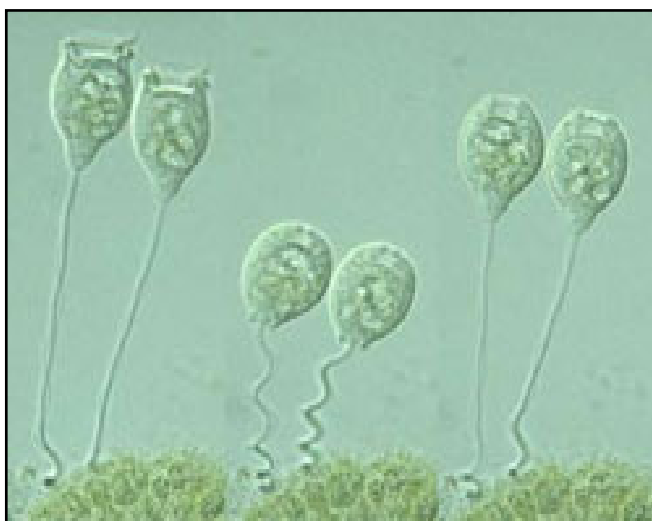


Figure-7
Opercularia sp.



Figure-8
Prorodon sp



Figure-11
Branchionus calyciflorus



Figure-9
Vorticella sp.



Figure-12
Haxarthra sp.

ROTIFERA



Figure-10
Branchionus caudatus



Figure-13
Keratella sp.



Figure-14
Monostyla sp.



Figure-17
Mesocyclops sp.

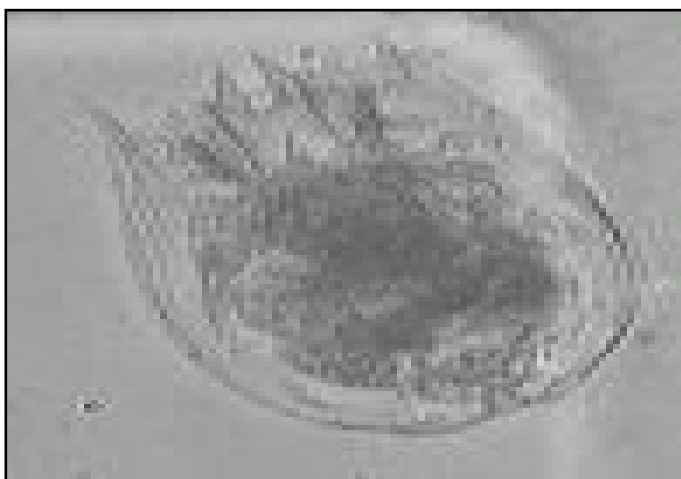


Figure-15
Notholca sp.



Figure-18
Macrocyclus sp.

COPEPODA



Figure-16
Cyclops sp.



Figure-19
Pseudodiaptomus sp.



Figure-20
Nauplii sp.



Figure-23
Monia sp

CLADOCERA

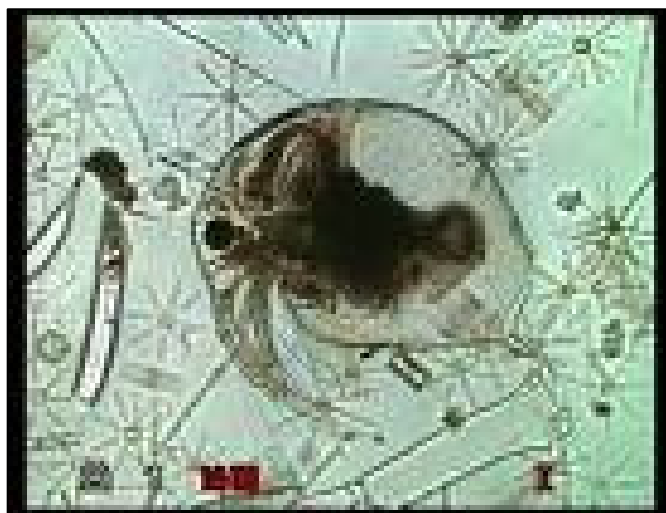


Figure-21
Bomina sp

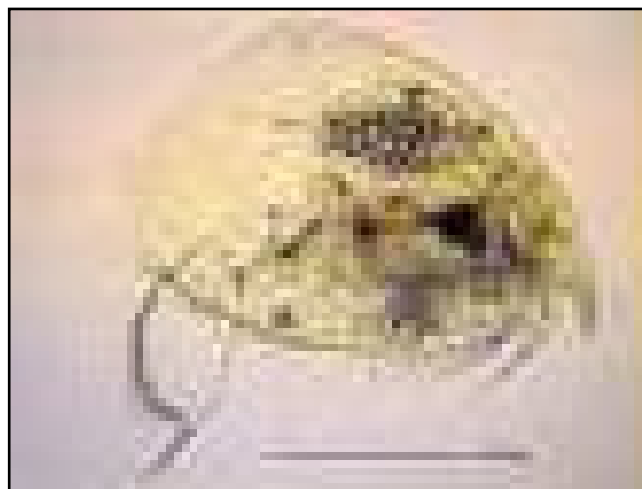


Figure-24
Leydigia sp.

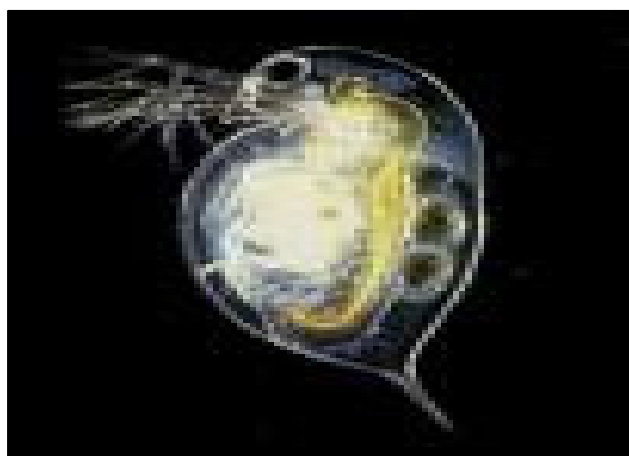


Figure-22
Daphnia sp

Conclusion

Zooplankton diversity of Barwani tank is higher in comparison to running water body link river Narmada. Where only 21 genera of Zooplankton occur. Zooplanktons are economically important large group of tiny animal. The role of planktonic organism in aquatic environment is an essential link in food chain.

References

1. Goswami S.C., Zooplankton: Food for fishes, In know our shores: Goa, (Ed: A. G. UNTawale) Publ.WWF, India, 75-82 (2004)
2. Thirupathaiah M., Sravanthy Ch and Sammaiah C., Diversity of Zooplankton in Lower Karimnagar AP, India, *International research Journal of Biological Sciences*, 1(7), 27-32 (2012)

3. Welch, Limnological methods: McGraw Hill Book Co. New York, 199 (1953)
4. Lind O.T., Handbook of common methods in limnology, The C.V. Mosby Co. 2nd Ed. St. Louis, Missouri (1979)
5. Adoni A.D., Work book on limnology. Pratibha Publishers C-10 Gour Nagar, Sagar-470003, 191-195 (1985)
6. Apha, Awwa and WPCF, Standard methods for examination of water and waste water, 16th Ed., American Public Health Assoc. Washington, D.C. (1985)
7. Needham M. and Needham R., A guide to study of fresh water biology Holden day, San Francisco, 180 (1962)
8. Edmondson W.T., Population dynamics and secondary production, *Ergeb. Limnol.*, **8**, 56-64 (1971)
9. Battish S.K., Fresh water zooplankton of India. Oxford and IBH publishing Co. Pvt.Ltd, Calcutta, 61-66 (1992)
10. Biswas S.P. and Boruah S., Fisheries ecology of the northeastern Himalayas with special reference to the Brahmaputra river, *Ecol. Eng.*, **16(1)**, 39-50 (2000)
11. Patil H.S. and Karikal S.M., Zooplankton diversity of Bhutnal reservoir at Bijapur- Karnataka state, In water quality Assessment, Biomonitoring and zooplankton diversity, (Ed.) B.K. Sharma, 236-249 (2001)
12. Sunkad B.N., Diversity of zooplankton in Rakasokappa reservoir of Belgium, North Karnataka, *Ecology of plankton*, 147-152 (2004)
13. Gaikwad S.R. and Thorat S.R. and Chavan T.P., Diversity of phytoplankton and zooplankton with respect to pollution status of river Tapti north Maharashtra region, *Ecology of plankton*, 61-66 (2004)
14. Sutrakar R.C. and Singh B.S., Physico-chemical study of river at Amarkantak with Reference to Zooplankton as bio-indicator. Thesis Pandit Shambhunath Shukla Govt. P.G. College Shadol (M.P.) India, 1-193 (2007)
15. Okogwu I.O., Seasonal variation of species composition and abundance of zooplankton in Eboma Lake, Floodplain Lake in Nigeria, *Rev. Biol. Trop.*, **58(1)**, 171-182 (2010)
16. Kadam S.S. and Tiwari L.R., Zooplankton composition in Dahanu Creek-West Coast of India, *Research Journal of Recent sciences*, **1(5)**, 62-65 (2012)
17. Somani Vaishali, Quadros Goldin and Pejaver Madhuri. K., occurrence of Rotifers and its Relation to the water Quality during the Bioremediation process in Lake Kacharali, Thane, MS, India, *ISCA Journal of Biology Science*, **1(3)**, 54-58 (2012)
18. Goswami A.P. and Mankodi P.C., Study on Zooplankton of Fresh water Reservoir Nyari- II Rajkot District, Gujarat, India, *ISCA J. Biological Sciences*, **1(1)**, 30-34 (2012)
19. Chaurasia, S., Seasonal fluctuation of zooplankton in Burha tank water, Raipur, *Int.J. Envnt. and Prot.* **16(2)**, 140-142 (1996)
20. Mahor R.K., Diversity and seasonal fluctuation of zooplankton in fresh water reservoir Tighra Gwalior (M.P.), *International Research Journal*, **2(19)**, 24-25 (2011)