International Research Journal of Biological Sciences _____ ISSN 2278-3202
Vol. **2(2),** 25-28, February **(2013)** *Int. Res. J. Biological Sci.*

Studies on Occurance, Richness and Composition of Zooplankton in Seena river water at, Mohal, Dist- Solapur, MS, India

Kulkarni D.A.[1] and Surwase S.S.[2]
[1]Department of Zoology, S.M.D.M. Mahavidyalyaya, Kallamb, Dist. Osmanabad, MS, INDIA
[2]Department of Zoology, Rajaram College, Kolhapur, MS, INDIA

Available online at: www.isca.in
Received 8th November 2012, revised 19th December 2012, accepted 28th December 2012

Abstract

This investigation was undertaken to study the physico-chemical characteristics and zooplankton composition of the Seena river water. Physico-chamical parameters of Seena river water were favorable range for growth of Zooplankton. The Zooplankton community was maximum in summer season and minimum in the monsoon due to high temperature and low turbidty in summer season and vice versa. The composition of the zooplankton (rotifera) was dominant (40.82%) followed by Cladocera (25.67%), Copepoda (18.78%) and Ostracoda (14.71%). The Dominant trend of zooplankton in the present investigation Rotifera > Cladocera > Copepoda > Ostracoda during the year 2007-2008 but in the year 2008-2009 The composition of the zooplankton (rotifera) was dominant (34.23%) followed by Cladocera (27.90%), Copepoda (20.09%) and Ostracoda (17.75%). The Dominant trend of zooplankton in the present investigation Rotifera > Cladocera > Copepoda > Ostracoda.

Keywords: Physico-chamical parameters, Zooplankton, Seena river.

Introduction

Fresh water Zooplankton is an important component in aquatic ecosystems, whose main function is to act as primary and secondary links in the food chain. Primarily the physical and chemical environment shapes their community structure. However, these communities are also influenced by biological interactions, predation and their specific competition for food resources[1,2]. The zooplankton community composition and structure is affected by eutrophication, these communities can also be used as the indicator of changing tropic status of an aquatic ecosystem. Zooplanktons have long been used as indictors of the eutrophication[3,4]. Various ecological aspects of zooplankton have been a subject of study by several workers in India during the last fifty years[5-12]. Like other biotic factors, the diversity and population dynamics of zooplankton have been studied by many workers. It was revealed that the temperature, dissolved oxygen and organic matters have influence on zooplankton community structure. So in the present investigation was undertaken with the aim to study the biodiversity and monthly variation in the zooplankton communities of Seena river water near Mohal Dist- Solapur. The study was also aimed at understanding recent hydrobiological changes in the Seena river.

Material and Methods

The monthly water samples were collected from different sampling sites i.e. site- I, site- II and site- III. The qualitative and quantitative evalution of unfiltered, unstrained sample was done by using plankton net made of bolting cloth with 30 meshes /cm. Plankton sample were fixed in 4% formalin and preserved in 100ml polythene bottles. The preserved samples were diluted to 40 ml with distilled water. The zooplankton were identified using methodology by[13] the counting was done by using Sedgwick – Rafter counting cell. 1ml of plankton sample was drawn and transferred to S–R counting cell. The observations were taken under inverted microscope. The procedure was repeated 5 times to get an average. The cell was moved in horizontal direction on the stage of an inverted microscope and zooplankton species encounted in the field was enumerated. Total three replications of sample was enumerated and total population of individual zooplankton and their genera was calculated. The identified species were expressed in number per liter.

The preserved samples were studies for the diversity of zooplankton made the research binocular microscope by using standard keys and literature[14,]

Results and Discussion

In aquatic ecosystem, zooplanktons play critical role not only primary consumers but also they themselves serve as a source of food for higher organisms. Zooplankton provides the main food for fishes and can be used as indicators of the trophic status of a water body.

During the investigation on Seena river 26 species of zooplankton were recorded consisting of 11 species of rotifera, 05 species of caldocera, 06 species of copepoda and 04 species of ostracoda. The monthly variation of zooplankton groups are given in tables 1 and 2.

Table – 1
%composition of Zooplankton species in Seena river water during the year 2007-2008

Zooplankton	Rotifera	Cladocera	Copepoda	Ostracoda	Total
Oc.2007	105	65	52	36	258
Nov.	110	58	56	48	272
Dec.	110	85	53	42	290
Jan-2008	135	7459	59	47	315
Feb.	125	58	40	25	248
Mar.	132	55	40	31	258
April	161	60	35	30	286
May	164	82	50	34	330
June	74	78	56	44	252
July	80	74	59	49	262
Aug.	85	80	68	56	289
Sept.	101	103	68	56	328
Total	1382	869	636	498	3388
Total mean	115.16	72.41	53.00	41.5	282.33
%	40.82	25.67	18.78	14.71	100.00

Table -2
% composition of Zooplankton species in Seena river water during the year 2008-2009

Zooplankton	Rotifera	Cladocera	Copepoda	Ostracoda	Total
Oc.2008	78	62	44	44	228
Nov.	83	64	52	38	237
Dec.	94	69	50	46	259
Jan-2009	92	80	54	46	272
Feb.	100	50	36	34	220
Mar.	118	60	42	35	255
April	107	77	40	36	262
May	107	68	47	40	262
June	58	63	55	54	258
July	62	86	60	54	262
Aug.	59	79	60	56	254
Sept.	81	89	70	56	254
Total	1039	847	610	539	1063
Total mean	86.58	70.58	50.83	44.91	255.25
%	34.23	27.90	20.09	17.75	100.00

Rotifera: Rotifers also called as rotatoria or wheel animalcules are a group of small, usually microscopic, pseudocoelomate animals which have been variously regarded as a separate phylum.In the present investigation Rotifers species varied from 12 to 29 number/ lit at site -I,25 to 48 number/lit at site –II and 16 to 41 number/ lit at site –III during the year of 2007-2008. While in the year of 2008-09 it was ranging form 28 to 60 number/ lit at site –I, 25 to 6 number/ lit at site –II and 2 to 44 number/ lit at site –III. In the present study the rotifera was found 11 species. This observation is in the concurrence with the earlier workers[15]. The species of rotifers found during the period of investigation the minimum number of rotifers was observed in monsoon and maximum in summer season. The following rotifers were identified during the investigation. *Branchinus calcyflorus, Branchinus angularis, Branchius caudatus Kertella tropica, Kertella coculearis, Kertella Spp., Filina Spp., Filina longiseta, Rotaria, Monostyla bulla, Trichocera Spp.*

Cladocera: Cladocerans popularly called as "water flea" prefer to live in deep water and constitute a major item of food for fish. Thus they hold key position in food chain and energy transformation[16.]. In the present study the cladocera species ranging from 14 to 25 number/ lit, 22 to 38 number/ lit and 10 to 30 number/ lit at site –I, II and III respectively in the year 2007-08. While in the year of 2008-09 it was varied from 16 to 40 number/ lit, 16 to 33 number/ lit, and 18 to 40 number/ lit at site I, II and III respectively. The cladocera were minimum in summer season and maximum in monsoon season. The following species of cladocera were identified during the investigation. *Alona rectangula, Chydorus reticulates, Daphina*

carinata, Moina Spp., Bosminopsis deitersi. Population of cladocerans in different water bodies have been reported by[17-20].

Copepoda: Fresh water copepods constitute one of the major zooplankton communities occurring in all types of water bodies and ranging from free living to parasitic forms. They serve as food to several fishes and play a major role in ecological pyramids.

Water temperature and availability of food organisms affect the copepoda population. It is observed that the inverse relationship between high population of rotifera and caldocera. In the present study copepoda species varied from 9 to 20 number / lit, 14 to 24 number / lit and 12 to 28 number / lit at site I, II and III respectively during the year of 2007 – 08.while in the year of 2008-08 it was varied from 10 to 22 number/ lit, 14 to 22 number / lit and 14 to 26 number / lit at site I, II and III respectively. The maximum numbers of copepoda were observed during monsoon season and minimum in summer season. The following species of copepoda were identified during the investigation. *Naupli, Cyclops viridis, Paracyclops Spp., Mesocyclops, Bosmina Spp., Diaptamus Spp.*

Ostracoda: Ostracodes are small crustaceans having the bivalve carapace enclosing the laterally compressed body. The freshwater ostracodes occur in lakes, tanks, swamps, streams, and even polluted waters. The higher population of ostracodes during monsoon may be due to the abundance of fine detritus to which omnivorous organisms switch over during monsoon form their natural benthic habitat and bacteria, mould and algae as food[21]. The decrease in the population of ostracods during winter and summer may be due to the feeding pressure of stocked fishes. Water temperature and the availability of food organisms may affect the ostracoda population. In the present study ostracoda species varied from 8 to 14 number/ lit , 8 to 22 number/ lit 1 and 16 to 24 number/ lit at site I , II and III respectively during the year of 2007-08. while in the year 2008-09 it was raining from 6 to 18 number/ lit, 8 to 20 number/ lit and 10 to 21 number/ lit at site –I, II and III respectively. In the present investigation the maximum numbers of ostracoda were observed during monsoon season and minimum in summer season. The following ostracoda were identified during the investigation. ***Cypris, Meta Cypris, Candocypris, Stenocypris.***

Conclusion

The present investigation the composition of zooplankton species during the year 2007-08 it was Rotifera 34%, Clodocera 28.0%, Copepoda 20% and Ostracoda 18%. Among all these zooplankton species rotifera is dominant followed by Clodocera, Copepoda and Ostracoda species. The trend of zooplankton species with respect to number Rotifera > Clococera > Copepoda > Ostracoda.

During the year of 2008-09 the % composition of zooplankton it was found Rotifera 40.82 %, Clodocera 25.67%, copepoda 18.78% and ostracoda14.71%.

Among all the species of zooplankton rotifera is dominant following by Clodocera, Copepoda and Ostracoda. The % composition of zooplankton with respect to the number of species are as increasing number Rotifera > Cladocera > Copepoda > Ostracoda.

Acknowledgment

The authors are thankful to principal Dr. A.D.Mohekar,, S.M.D.M Mahavidyalaya, Kallamb, Dist- Osmanabad for providing the laboratory facilities during this work.

References

1. Nevas I.F., Rocha O., Roche K.F. and Pinto A.A., Zooplankton community structure of two marginal lakes of the river Cuiba (Mato Grasso, Brazil) with analysis of rotifera and cladocera diversity, *Braz. J. Biol.,* **63(3),** 329-343 **(2003)**

2. Sampio E.V., Rocha O., Matsumura-Tunsisi T. and Tunsisi J.G., Composition and abundance of zooplankton in the limnetic zone of seven reservoirs of the Paranapanema River, Brazil, *Braz. J. Biol*., **62(3),** 525-545 **(2002)**

3. Vandysh O.I., Zooplankton as an indicator of state of lake of ecosystems polluted with mining waste water in the Kolapeninsula, *Russian J. Ecol*., **35(2),** 110-116 **(2004)**

4. Webber Mona, Myers, Elecia Edwards, Cambell C. and Webber D., Phytoplankton and zooplankton as indicator of water quality in Discovery Bay Jamaica, *Hydrobiologia.,* **545,** 177-193 **(2005)**

5. Ansari I.A., Some physico-chemical characteristics of Biahu Tal (A Freshwater Pond) of Tanda, Faizabad U.P. India, *J. Adv. Zool.*, **7(1),** 15-20 **(1986)**

6. Chandrasekhar S.V.A. and Kodarkar M.S. Biodiversity of Zooplankton in Saroornagar lake, Hydrabad, *J. Aqua Biol.,* **10(1),** 44-47 **(1994)**

7. Malathi D., Chandrasekhar S.V.A., Kodarkar M.S., Studies on Branchionus from lake Hussain sagar, Hydrabad, India, *J. Aqua. Biol.,* **13(1),** 7-12 **(1998)**

8. Wagh N.S., Hydrobiological parameters of Harsul dam in relation to pollution, Ph.D. Thesis, Dr. B.A.M. University, Aurangabad **(1998)**

9. Annapurna C. and Chatterjee Tapas, The freshwater *Ostracods* (Crustacea: *Ostracoda*) from Dhanabad, Bihar, *J. Aqua. Biol.*, **14(1&2),** 11-15 **(1999)**

10. Balamurugan S., Gulam M.G., Mohiuddin Subramanian P., Biodiversity of zooplankton in Kavery river stretch Tirucherapplli, Tamialnadu, *J. Aqua. Biol.,* **14(1&2),** 21-25 **(1999)**

11. Hessen D.O., Ellen Van Donk and Ramesh Gulati, seasonal seston stoichimoetry: Effect on Zooplankton in

Cynobacteria dominated lakes, *J. of Plankton Res.,* **27(5),** 449-460 **(2005)**

12. Hujare M.S., Hydrobiological studies on some water reservoir of Hatkanangale Tashil (Maharashtra), P.hD. Theis. Shivaji University, Kolhapur **(2005)**

13. APHA, Standard methods for the examination of water and waste water, 19th edition *American Public Health Association Washington, D.C.* **(1995)**

14. Tonapi G.T., Fresh animals of India (An Ecological Approach) Oxford and IBH Publishing Co., New Delhi, 341 **(1980)**

15. Singh D.N., Seasonal variation of zooplankton in tropical lake, *Geobios,* **27(2-3),** 97-100 **(2000)**

16. Uttangi J.C., Conservation and management strategy for the water fowls of minor irrigation tank habits and their importance as stopover site in Dharwad Dist. In: Hosetti and M. Venkateshwaralu (eds.) Trends in wild life and management, *Daya Publ. House, New Delhi, India,* 179-221 **(2001)**

17. Nayer C.K.G., Cladocera (The biologia classification, Identification and ecology, *Indian association of aquatic Biologists. Publ.5*) **(1971)**

18. Rao M.B. and Muley E.V., Seasonal and species of zooplankton organisms and their succession in two freshwater ponds at Waghuli, Poona, *Proc.Symp. Ecol. Anim. Pool. Zool. Surv., India*, **2,** 63-64 **(1981)**

19. Mathew P.M., Seasonal trends in the fluctuations of plankton and physico-chemical factors in tropical lake (Govindgrah lake M.P.) and their interrelationship, *T. Inland Fish. Soc. India,* **17 (1&2),** 11-24 **(1985)**

20. Kaushik S. and Sharma N., Physico-chemical characteristics and Zooplankton population of a Perinial tank, Matsya Sarower, Gwaliar, *Environment & Ecology,* **12(2),** 429-434 **(1994)**

21. Allen M.B. and Arnon D.I., Studies on Nitrogen Fixing blue green algae II, The sodium requirement of Anabena, Cylindrica, *Physiol Plant*, **8,** 653-660 **(1955)**