International Research Journal of Biological Sciences _____ ISSN 2278-3202
Vol. **4(8),** 10-13, August **(2015)** *Int. Res. J. Biological Sci.*

Seasonal Variations of Zooplanktons from River Vena, Distt. Nagpur, Maharashtra, India

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Available online at: www.isca.in, www.isca.me
Received 29th June 2015, revised 21st July 2015, accepted 5th August 2015

Abstract

Zooplankton is free swimming microscopic animal. They play an important role as a food for aquatic fauna. We may even consider them as the most numerous animals on earth. They forms a remarkable bioindicator for water pollution. In the present piece of work an attempt has been made to investigate the distribution of Zooplankton in Vena river district Nagpur. Study of Zooplanktons in various seasons has been carried out at a 4 sites of Vena river. Samples were collected in all the month during year 2013. The Zooplankton population is represented by four different groups in winter season viz. Protozoa, Copepoda, Cladocera and Rotifera. In the present investigation during winter season maximum density of Zooplankton is in the month of January. However Zooplanktons minimum density was recorded in the month of October due to the domestic sewage, industrial sewage, concentration of water and rise in temperature.

Keywords: Seasonal distribution, Zooplankton, Vena river.

Introduction

Water is precious commodity for Survival. Hydrobiology is the study of fresh water Term, "Plankton" was referred to living organisms and non living particulate matter in the aquatic bodies Cole[1,2].

Zooplankton showed abundance in all types of aquatic bodies with their vital role in the energy transfer at different trophic level[3]. Zooplankton plays an important role in the early detection and monitoring the pollution densities of water or presence or absence of certain species of fishes. They play an important role of converting phytoplankton into food, which is suitable for fish and aquatic animals.

The zooplankton communities composed of both primary and secondary consumers. They are the direct link between primary producers and higher trophic level. Nearly all fishes depend on zooplanktons entire life. Madin, Horgan, steinberg[4]. Zooplankton play an integral role and serve as indicators and it is well suited tool understanding water pollution status.

Material and Methods

The Zooplankton samples were collected from the site A, Site B, Site C and Site D of Vena river at every month of 2013. Samples were collected using plankton net made up of silk bolting cloth No. (mush size 25 µm) by sieving a 50 liter volume of water sample for Zooplankton investigation during 7 am to 9 am. The concentration of sample of plankton was preserved in 5% formaline.

The quantitive analysis of Zooplankton was carried out with the help of S.R. Cell. Zooplankton were observed and identified under research Binocular microscope by using standard key and literature of Kodarkar[5] and calculated by using formula,

$$n = \frac{a \times c}{l}$$

Where, n= No. of Zooplankton / liter of water, a= No. of Zooplankton in 1 ml. c= ml. of plankton concentrate, l= Vol. of original water sample taken

Results and Discussion

According to the findings and results the present study reports the Zooplankton community in winter season Vena River of Nagpur region have resulted total 18 species of which 3 species of Copepoda, 1 Specie of Protozoa, 7 species of Caldocera and 7 species of Rotifers.

Numerical and seasonal variations in Zooplankton abundance is shown table-1, 2, 3, 4 and 5. The quantitative and qualitative analysis of Zooplankton was studied, they were belonging of four groups, i.e. Protozoa, Copepoda, Cladocera and Rotifers.

Protozoa is a heterogeneous group embracing a large number of animals with a cellular body. Their cellular bodies carried out all the life activities. Free living protozoa are common in fresh as well as in marine water.

Protozoans constitute important links in the food webs, are employed in biological and medical research act as an indicators of pollution and petroleum deposits and also acts as the natural

enemies of harmful bacteria, thus aiding in soil fertility. Protozoa were the first animal to evolve and thus have a special place in the evolutionary history of animals. Protozoa research essential for understanding the dynamics of the aquatic ecosystem. The present investigation of winter season, protozoa was recorded maximum in October at site A.

Copepods: When the pollution level increased the Copepods they gate dissapeared in stable environmental conditions. Several workers had studied the seasonal variations of copepods in Indian water bodies. They form primary food source of planktonivorous fishes and hence constitute an essential link with food chain. The present investigation of winter season, copepods were recorded maximum in the month October at site-D

Cladocerans: Major roll played by Cladocerans in limnotic and benthic food chain. Daphnia species indicates the clear reservoir water and absence of organic pollution. Most of the cladoceran species are primary consumers food an microscopic algae and fine particulate matter in the detritus. The present investigation of winter season, cladocerans were recorded maximum in the month of January at Site D.

Rotifers: he prominent group among the Zooplankton of a water body irrespective of its trophic status is Rotifers. This is because of the less specialized food, high fecundity and Parthenogenetic reproduction. Rotifers use as a change in water quality and respond more quickly to the environmental changes amongst the Zooplanktons. Most of the rotifers are primay consumers feeding on phytoplankton and forms important links in food chain. The present investigation of winter season, rotifers were recorded maximum in the month of October at Site and C.

Conclusion

The Zooplankton analysis shows that, the plankton density was maximum in January month in winter season, due to temperature is favorable for phytoplanktonic growth as an abundance of food. However the minimum density of Zooplankton was recorded in the month of October due to the domestic sewage, industrial sewage, concentration of water and rise in temperature.

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Figure-1
Vorticella

Figure -2
Diaptomus

Figure-3
Nauplius

Figure-4
Cyclops

Figure-5
Diaphanosoma

Figure-6
Daphnia

Figure-7
Monia

Figure-8
Filinia

Figure-9
Keratella

Figure–10
Asplanchna

Figure-11
Brachionus

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Table–1
Numerical abundance of Zooplankton (ORG/L) at different station in winter season of Vena river During 2013 (Month - October)

Sample No	Location	Zooplankton no./m³	Protozoa	Copepoda	Cladocera	Rotifera	SWI
1	Site – A	2,250	33 %	67 %	00	00	0.915
2	Site – B	3,000	00	50 %	00	50 %	1.00
3	Site – C	3,000	00	25 %	00	75 %	0.811
4	Site – D	750	00	100 %	00	00	00

Table–2
Numerical abundance of Zooplankton (ORG/L) at different station in winter season of Vena river During 2013 (Month- November)

Sample No	Location	Zooplankton no./m³	Copepoda	Cladocera	Rotifera	SWI
1	Site – A	4,800	56 %	00	40 %	0.989
2	Site – B	2,400	38 %	00	63 %	0.950
3	Site – C	9,600	53 %	00	47 %	0.998
4	Site – D	16,200	57 %	6 %	37 %	1.22

Table–3
Numerical abundance of Zooplankton (ORG/L) at different station in winter season of Vena river During 2013 (Month- December)

Sample No	Location	Zooplankton no./m³	Copepoda	Cladocera	Rotifera	SWI
1	Site – A	5,400	56 %	00	44 %	0.988
2	Site – B	3,300	45 %	00	55 %	0.747
3	Site – C	9,000	80 %	6 %	13 %	0.934
4	Site – D	1,11,000	88 %	4 %	8 %	0.629

Table–4
Numerical abundance of Zooplankton (ORG/L) at different station in winter season of Vena river During 2013 (Month- January)

Sample No	Location	Zooplankton no./m³	Copepoda	Cladocera	Rotifera	SWI
1	Site – A	39,000	43 %	34 %	23 %	1.539
2	Site – B	17,400	57 %	3 %	40 %	1.159
3	Site – C	21,900	59 %	23 %	18 %	1.382
4	Site – D	38,400	47 %	53 %	00	0.998

Table–5
Average result of Quantitative Analysis of Zooplankton

Sample No	Location	Zooplankton no./m³	Protozoa	Copepoda	Cladocera	Rotifera	SWI
1	Site – A	4087.5	33 %	56 %	34 %	37 %	1.1077
2	Site – B	6525	00	48 %	3 %	52 %	0.964
3	Site – C	10825	00	54 %	15 %	38 %	1.0312
4	Site – D	41587	00	73 %	21 %	23 %	0.949

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