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Studies on monthly population of total rotifer zooplanktons and their correlation coefficient with physicochemical factors of lony dam Theonthar, Rewa (M.P.)

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Abstract

The lony dam is mainly rain fed. The present investigation was made from March 2005 to Feb. 2006. The rotifer zooplankton Community in surface water of lony dam is comprised of *Brachionus angularias Brachionus falcatus, Brachionus caudatus, Brachionus diversicornis, Brachionus forficula,Keratella tropica, Keratella procurva, Trichotria, Macrocoides chlaena, Polyertha indica and Asplanchnaperiodonta*. The pH range of water of this dam showm -ve correlation with transparency.

Key-Words: Lentic water, Rotifer density, Correlation coefficient and Littoral Zone.

Introduction

Rotifers are the most important soft bodies metazoan among the plankton. Their name comes from the apparently rotating wheel of cilia known as corona used for locomotion and sweeping food particles toward the mouth planktonic rotifer have a very short life cycle under favorable conditions of temperature, food and photo period since the rotifer have short reproductive stage they increase in abundance rapidly under favorable environmental conditions Dhanapathi (2000). The survival and reproductive rate of rotifer are related strongly to the quality and abundance of food as well as temperature. These functions have major importance determining seasonal fluctuation in the population resulting from changes in the balance between increases by reproduction and decline from mortality.

Material and Methods

The three sampling sites A, B and E, were taken from littoral zone and two sampling sites C and D were taken from limnetic zone. The water samples were collected from lony dam Theonthar,Rewa M.P. during first week of every month between 8:00 am to 12:00 noon from March 2005 to February 2006.

In order to estimate the quantitative values of physicochemical parameters the water sample were taken to laboratory and were analysed by applying the standard method. APHA (1975). The quantitative estimation of dissolved O_2 , Free CO_2 , Calcium hardness and Magnesium hardness, Nitrate and alkalinity were done in laboratory by using standard method as suggested by APHA (1985), Trivedi and Goel(1986-87).

Rotifer zooplankton collected from surface with minimum disturbance and filtered in a number 25 bolting silk cloth net. The final volume of filtered sample was 125 ml which was transferred to an other 125ml plastics bottle were preserved by adding 2ml of 4% formalin preserved the samples. The quantitative analysis of zooplankton was done by using sedgwick rafter cell and by lackeys drop method.

Correlation coefficient were calculated for all the characters combination at genotypic. Phenotypic and environmental level by the formula given by miller et al (1958,1986).

$$r\, x_i\, x_j = \frac{\text{cov}\, x_i\, x_j}{\sqrt{(\text{var}\, x_i)\,(\text{var}\, x_j)}}$$

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where:
r xi, xj = coefficient of correlation between xi and xj traits, cov xi xj = covariance between xi and xj traits, var xi = variance of xi traits, var xj = variance of xj traits

Results and Conclusion

The pattern of total rotifer zooplankton analysis and monthly variation at different experimental sites of lony dam are given in table No 1.correlation among physico chemical factor and rotifer are given in table No 2. The maximum density of rotifer zooplankton were noticed in month of june and minimum density was Nov and Jan. Maximum potential of rotifer zooplankton were appeared in summer moderate in rainy and minimum in winter. Thus the rotifer zooplankton analysis for lony tank suggest that the health of community is less disturbed and tank in general less polluted. The rotifer population in the dam moderate in number. This may be due to the moderate in flow of nutrients in to the dam leading to moderate primary production which has resulted in the moderate food for zooplankton consumption hence the tank is in meso trophic condition. The PH range of water of this tank shown -ve correlation with transparency. Gupta and Mehrotra (1986) recorded -ve correlation of PH with dissolved O2. The rotifer spicies namely *Brachionus angularias, Brachionus falcatus, Brachionus caudatus, Brachionus diversicornis, Brachionus forficula, Keratella tropica, Keratella procurva, Asplanchnaperiodonta* were noted to be most dominating and common species in present water body Chaursia and Adoni (1985) noted that two or three constituent species of rotifer usually dominance over other species that contribute the main bulk of rotifer zooplankton population. In present water the species of *Brachionus angularias, Brachionus falcatus Keratella tropica* have contributed the major rotifer population. Nayak 1981 reported *Brachionus, Keratella* to be most dominating rotifer genra. Datta etal (1987) Documented *Brachionus angularias* are the most dominating species of Calcutta .The present has revealed that rotifer an densities depends on the quantitative changes of organic decaying materials and temperature the same view was given by michael(1969). They also found high quantity of rotifera in summer and low in winter. According Chaurasia(1985) the rotifera was noted to be main and first dominating group to total zooplankton around the year. The present data of rotiferan species coincide with the finding of blum(1956). Lakshmi Narayan (1965) as they also noted a peak of rotiferan at high PH and temperature. In present investigation the quantitative increase in terms of rotiferan abundance were also noted with an increase PH and temperature in present water body. There fore these might be the significant parameters that have effected the rotiferan growth and their seasonal appearance and disappearance up to marked extent along with other physicochemical and biological circumstances.

Table 1: Monthly data of total Rotifer zooplankton (Units/L.) of lony dam (2005-2006)

Month	Littoral sites			Limnetic sites		Mean value
	A	B	E	C	D	
Mar	55	50	60	45	40	50
Apr	45	35	50	30	28	37.6
May	70	72	75	60	55	66.4
Jun	120	122	130	100	95	115.6
July	118	120	130	112	94	114.8
Aug	45	35	40	30	28	35.6
Sep	30	24	32	30	24	28
Oct	27	28	30	20	18	24.6
Nov.	20	21	24	17	15	19.4
Dec.	50	45	55	47	40	47.4
Jan.	20	20	21	19	17	19.4
Feb.	25	20	22	18	16	20.2
Seasonal Variations						
Summer	72.5	69.7	78.7	58.7	54.5	66.8
Rainy	55	51.7	58	48	41	50.7
Winter	28.7	26.5	30.5	25.5	22	26.5

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Table 2: Matrix showing the values of correlation coefficients data of physico-chemical factors and rotiferan zooplanktons of Lony dam 2005-06

Parameter	pH	Water temperature	Water transparency	Total hardness	Protozoans
pH	1				
Water temperature	0.541479	1			
Water transparency	-0.578583*	0.174943	1		
Total hardness	0.103077	-0.49643	-0.41763	1	
Rotiferan	0.257986	0.523217	-0.1268	-0.19352	1

df = 10

* Significant at 5% level, ** Significant at 1% level

Table value of r (correlation coefficient) at 5% = 0.564

Table value of r (correlation coefficient) at 1% = 0.764

Ns insignificant