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WATER QUALITY OF SEETADWAR LAKE OF SHRAVASTI DISTRICT (U.P.) IN RELATION TO PHYSICOCHEMICAL CHARACTERISTICS OF ZOOPLANKTON

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ABSTRACT

Study on the relationship between Zooplanktons abundance and physico-chemical parameters of Seetadwar lake of Shravasti district (U.P.) India was made. The physico-chemical parameters studied were within the permissible limits. The Zooplanktonic communities were 41 species belonging to 25 genera.

Figure : 01 References : 16 Tables : 03

KEY WORDS : Abundance, Physico-chemical parameters, Zooplankton.

Introduction

Water is the most vital resources for all kinds of life on the earth and essential for the sustainability of the earth's ecosystem. Physico-chemical characteristics directly influence the life. Zooplankton is considered as one of the most important linkage in aquatic food chain and play major role in energy transfer. The physico-chemical factor and nutrient status of water play production of planktonic biomass[13]. But the little information is available on the seasonal variation of Zooplankton and their relationship with the physico-chemical parameters of the water in the Seetadear lake of Shravasti district (U.P.), India.

Some worked on seasonal variation of Zooplankton and their relationship with physico-chemical parameters of Kanal sayer Burdwan West Bengal[2,3]. The aim of the present study was to deal with the impact of various physico-chemical factors on the seasonal abundance of Zooplankton population in Seetadwar lake of Shravasti district (U.P.), India.

Material and Methods

This investigation was conducted in Seetadwar lake of Shravasti district (U.P.) India.

The district Shravasti lies between $27^0.4'$ and $28^0.24'$ north latitude and $82^0.18'$ and $81^0.6'$ east longitude and covers an area of 2380.30 Sq. km. It is the fontier district of eastern uttar pradesh with northern boundaries marching with Nepal for a long distance of the district. The line which runs in south-east direction parallel to the foothills of Nepal forms one of the sides of the very perfect triangle which comprises the district. The western side of the triangle is provided by Kauriala river, the lower part of it's course called the "Ghaghra" at the base of the Gonda district of U.P. Thus, the area is bounded by Nepal in the north, district of Bahraich, Balrampur and Gonda in the west and south east (Figs. 1 - 3).

Sample were collected from the selected areas of the lake using Polythene containers of two littres capacity for a period of one year (January to December - 2015) at monthly intervals. pH and

TABLE - 1 : Seasonal Variation in Physico-Chemical parameters of water of Seetadwar lake of Shravasti district (U.P.), India.

Parameters	Jan.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Temperature	17.5	17.8	20.8	25	25.4	27.5	22	22.6	23	22.5	22	17.7
pH	8.3	7.7	7.5	7.9	7.5	7.6	8.2	7.4	7.2	7.7	7.9	7.8
D.O. (ppm)	19.8	13	10.8	8.4	11	12.5	11.5	13.5	17.5	15.1	11.2	15.8
FCO_2 (ppm)	-	-	-	-	-	5	6	7	6.5	4.5	4.8	-
Carbonate alkalinity (ppm)	78	40	37	58	64	69	57	59	68	60	45	46
Biocarbonate alkalnity (ppm)	96	107	127	147	184	195	198	165	117	137	125	146
Total alkalinity (ppm)	144	142	139	279	219	191	104	95	73	69	87	111
Nitrate (ppm)	0.18	0.2	0.29	0.37	0.35	0.25	0.23	0.18	0.1	0.09	0.11	0.17
Calcium (ppm)	130	92	113	115	167	187	203	162	107	108	119	138
Chloride (ppm)	27.5	9.5	18.5	70	68	70	72	75	16	28	30	20
Phosphate (ppm)	0.03	0.051	0.06	0.065	0.079	0.052	0.042	0.037	0.026	0.032	0.036	0.031
Total Organic Matter (ppm)	3.5	3.6	9.2	10.4	10	11.2	11.4	11.6	6.3	6.5	6.7	3.8
Total Nitrogen	1.47	1.21	1.66	2.65	2	1.72	2.6	2.53	3.02	2.02	1.47	1.55

Fig. 1 : Location of study area in INDIA

temperature were measured by P^H meter and temperature having the accuracy of 0.1^0C and rango 0^0C to 50^0C.

Standard methods[1,16] for Zooplankton counting the Sedgewick rafter (S - R) cell was used which 50mm long and 50mm wides 1mm deep. Number of Zooplankton in the S - R cell was derived from following formula.

TABLE - 2 : Monthly fluctuation in Zooplanktons population (Organism/l) in Seetadwar lake of Shravasti district (U.P.), India.

Zooplanktons	Jan.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Protozoan total specimen	104	99	114	88	69	99	84	91	62	76	92	87
Total genera	4	4	4	4	3	4	4	4	3	4	4	4
Rotifers total specimen	100	101	117	118	120	148	147	148	130	100	109	102
Total genera	3	3	3	3	3	3	3	3	3	3	3	3
Crustacean total specimen	60	58	88	87	82	98	86	89	93	56	48	40
Total genera	2	2	2	2	2	2	2	2	2	2	2	2
Meroplanktonic organisms total specimen	68	62	108	175	190	288	208	248	290	282	100	92
Total genera	3	3	3	3	3	3	3	3	3	3	3	3
Total Zooplankton	332	320	427	468	461	633	525	576	575	514	349	321

$$\text{No. ml}^{-1} = \frac{C \times 1000\text{mm}^3}{L \times D \times W \times S}$$

Where C = Number of organism

L = Length of each strip (S - R Cell length) in mm.

D = Depth of Strip counted.

S = Number of Strip counted.

W = Width of each strip.

Result and Discussion

The physico-chemical properties of fresh water of Seetadwar lake of Shravasti district (U.P.), India have been shown (Table-1).

The pH value varied from 7.2 in the month of September to 8.3 in the month of January 2015 at site. Temperature (^{0}C) of water of Seetadwar lake ranged from 17.5 in the month of January and 27.5 in the month of June - 2015, D.O. (ppm) 8.4 April to 19.8 January 2015, FCO_2 (ppm), 4.5 October to 7.0 August 2015, Carbonate alkalinity 37.0 March to 78.0 January 2015, Biocarbonate alkalinity (ppm) 96.0 January to 198.0 to July 2015, total alkalinity (ppm) 69.0 October to 279.0 April 2015, Nitrate (ppm) 0.09 October to 0.37 April 2015, Calcium (ppm)92.0 February to 203.0 in July 2015, Chloride (ppm) 9.5 February to 75.0 in August 2015, Phosphate (ppm) 0.030 January to 0.079 in May 2015, total organic matter (ppm) 3.5 January to 11.6 in August 2015 and total nitrogen (ppm) 1.21 February to 3.02 in September 2015.

TABLE-3 : Monthwise Number of Zooplanktons

S.No.	Months	Total Zooplanktons
1	January	332
2	February	320
3	March	427
4	April	468
5	May	461
6	June	633
7	July	525
8	August	576
9	September	575
10	October	514
11	November	349
12	December	321

Zooplankton population in Seetadwar lake (Tables- 2 & 3) composed of four major taxa protozoans, rotifers, crustacean and meroplanktonic organisms. The survey carried out 142 genera with five species of Rotifiers and the result is quite clear that *Arcella* sp., *Daphnia* sp. (Cladocera), *Diaptomus* sp., (Cokepoda), *Eristalis* sp. (diptera), *Ptychoptera* sp. (diptera) and *Cordulina* sp. (odonata) were the most dominating Zooplanktons. Similar results were observed earlier[8,10].

During the investigation presence of Zooplankton was maximum in the summer months (May) and the minimum in the spring month (February). This is not in conformity to the earlier findings[4,5] who observed the maximum Zooplankton in April and minimum in September in an American Lake, while some observed maximum in the month of June and minimum in the month of February from a lake of Lucknow (U.P.) and Kohargaddi dam of district Balrampur (U.P.), India[9,11]. Another worker concluded the peak period in the months of January and April[7] but others, found maximum peak during summer months which is quite in conformity to the findings of this investigation[8,10]. The differences in the occurance of peaks in Zooplankton might be due to the different nature of the water bodies, differences in the composition of abiotic factors of water and soil and the variations in the productivity of different water bodies. Some workers correlated bottom community with the fish productivity and accordingly this water body is most suitable for the pisciculture[6,12-15].

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