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Study of Selected Water Quality Parameters And Plankton Diversity In Saroda Reservior of Kabirdham District, Chhatisgarh

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Abstract

A study was carried out to determine variation in physico-chemical parameters of water and plankton diversity in Saroda Reservoir, Kabirdham District, Chhattisgarh. The study was conducted from August to November, 2018. The selected physico-chemical parameters are analyzed such as Temperature, pH, Electrical conductivity, Dissolved oxygen and Hardness and results should that the parameters were in acceptable range for reservoir fisheries. Average temperature of the reservoirs is 28.57 ˚C. Plankton forms integral components of freshwater environment and contributes significantly to biological productivity of the ecosystem. Various phytoplankton and zooplankton were identified in Saroda Reservoir, Chlorophyceae were higher in numbers compared to other phytoplankton and Cladocerans were dominant zooplankton. The result of present study indicated that Physico-chemical parameters and plankton diversity of water were within the acceptable range and can be used for pisciculture.

Key words- Plankton, Productivity, Ecosystem, Reservoir, Environment and Pisciculture

Introduction

Water is the basic unit of life .Water play a pivotal role for the survival of organisms. Plankton are vital for almost all the aquatic ecosystems as they play an important role in the food chain, they are also a useful tool for the assessment of water quality. Water quality indicates the relation of all hydrological properties including physical, chemical and biological properties of the water body. Hence, water quality assessment involves analysis of physico- chemical, biological and microbiological parameters that reflect the biotic and abiotic status of aquatic ecosystem (Smitha and Shivashankar, 2013). Plankton are microscopic organism that float or swim on the upper surfaces of water or are suspended in the water column, where they are dependent on sunlight for photosynthesis (Penny *et al*, 2003). Phytoplankton, being primary producers, holds a significant place in aquatic food chain and all the life forms including zooplanktons are dependent on them (Pace *et al*, 1991).

Phytoplankton and zooplankton retort rapidly to any alterations in nutrients changes in water bodies indicating the growing nutrient pollution. Effect of pollutants on aquatic life and a reduction in biotic diversity can be easily understood by analyzing plankton. Plankton analysis gives an overall idea of the environmental condition of the water body. So, the present study is to bring the facts about the selected water quality parameters such as Temperature, pH, Dissolved oxygen, Electrical conductivity, Hardness and Plankton diversity of Saroda Reservoir, District Kabirdham (Chhattisgarh).

Materials And Methods

Description of Study Area

The Saroda Reservoir is located at near Kanpa Village, Tehsil-Kawardha, at a distance of about 12 km from Kabirdham District which is located in Latitude: 21.9775°N, Longitude: 81.1334°E. Study was conducted from August- November (2018). The morphometric feature of Saroda Reservoir show in Table 1.Water samples from the Saroda Reservoir were taken from two pre-selected station referred as Station-I (Dam site) and Station-II (Back site) as indicated in Fig. 1-2, Station-1 was located at Dam site which represents deepest part of this reservoir. Only surface water were collected from these station using a plastic bucket.

Assessment Of Water Quality

The sampling frequency was kept from every fortnightly for a total period of over 3 months from (August to November, 2018). The water quality parameters such as water temperature, and dissolved oxygen were measured in the field itself. However, pH, electrical conductivity and hardness, samples were brought of the laboratory in plastic bottles of 500 ml capacity and analysed within 24 hours. For the collection and analysis of above selected water quality parameters standard methods such as Adoni (1985), Trivedi at.al. (1987), and APHA (1989) were followed. The qualitative analysis of phytoplankton has restricted to major group only via Cynophyceae, Chlorophyceae and Bacillariophyceae. The qualitative analysis of zooplankton was restricted to Rotifers, Copepods and Cladocerans. The identification for phytoplankton and zooplankton was made following the standard works (Edamondson,1959), Needham & Needham (1962), Pennak (1978) and Sharma (1983) were referred

Plankton Sampling

For the collection of plankton samples 50 lit of surface water from each of the sampling station was filtered through bolting silk net mesh size no. 16. The plankton samples obtained preserved in 5% neutral formalin for the qualitative (upto group level) and quantitative studies in the laboratory. Plankton analysis was made using a microscope, plankton pipette (1ml) and plankton counting chamber (SR cell) using standard method.

Results

The result on Physico-chemical features of surface water of Saroda Reservoir at two location (Fig.1) are presented in the (Table 2 & 3). During the study period there was a marked variation in different water quality characteristics. As evident from the result, the initial four months i.e. August, September, October and November represent relatively cold climate conditions. The appears to be close synchronization between water temperature recorded at both sampling Station. The value of water temperture varied between a minimum of 27˚C to maximum of 29.7˚C and from 27˚C to 29.9˚C at Station-I and Station-II. During the study, water of Saroda Reservoir remained alkaline wherein the value of pH fluctuated between 7.76 to 8.70 and 7.3 to 8.5 at Station-I & Station-II represented (Table 2 & 3). The station wise variation in the EC were 0.17 to 0.28mS/cm and 0.18 to 0.25 mS/cm at Station-I and Station-II. The mean value of EC which represent the total ionic load of water, the values at the two sampling Station-I & Station-II were comparable. From the data obtained for the dissolved oxygen content (Table no. 3 & 4) it is apparent that during summer months the value were comparatively lower. The dissolved oxygen content in Saroda Reservoir during study period varied between minimum of 5.5 mg/lit to highest of 7.34 mg/lit at both the Station. From the mean value of dissolved oxygen it is further evident that the value here slightly higher at Station-II (back site of Dam) compared to the Station-I (Dam site).The average hardness level were higher (86.57 mg/lit) at Station-II (back site of Dam) as compared to Station-I (Dam site). In general hardness is varried from 82 to 90 mg/liter at Station-I and Station-II respectively. The check list of plankton (Phytoplankton & Zooplankton) showed for Saroda Reservoir during the study period in (Table-4).

In present investigation group of phytoplankton, algae and zooplankton where found in the following order of abundance : others <Cynophyceae <Bacillariophyceae <Chlrophyceae and others <Bacillariophyceae <Cynophyceae <Chlorophyceae at Station-I (Dam site) and Station-II (back site) of Saroda Reservoir respectively. Data of phytoplankton further indicate that during the study period total phytoplankton attained highest Chlorophyceae 112 no./ml at Station-I and

109 no./ml at Station-II. Whereas best number of other phytoplankton group was reported from Station-I and Station-II (Table 5 & 7 and fig. 5 & 7). From the mean value of zooplankton for the two stations (Table 6 & 8) where total number was observed at Station-I as compared to Station-II. From the data on zooplankton, total number obtained for Cladocerans, Copepods, Rotifers and other forms. The following order of dominance water evident at Station-I and Station-II (Fig. 6 & 8); Cladocerans > Copepod > Rotifers > others and Copepoda > Cladocerans > Rotifers > others of Saroda Reservoir respectively. A list of zooplankton and phytoplankton forms recorded during the study period is present in (Table 5 to 8).

Discussion

The average temperature of the studied water bodies is recorded 28.57 ˚C from Station-I and 28.35˚C from Station-II. The standard temperature for sustaining aquatic life varies between 28˚C to 35˚C (Weldemariam, 2013). The highest water temperature 29.9˚C and whereas lowest water temperature 27˚C were recorded. The average pH value is recorded 8.12 from Station-I and 7.99 from Station-II which was found within the range (6.5 to 8.50) prescribed by the BIS(1991). It is indicating alkaline nature throughout the study period. Most of the similar study suggested that water samples are slightly alkaline due to presence of carbonate and bicarbonates (Tank and Chippa; 2013, Gopakrushna; 2011, Verma et al.;2012). Electrical conductivity is a good and rapid method to measure the total dissolved solids and is directly related to total solids (Mishra and Saksena, 1993). In the present study the average EC is recorded 220 µS/cm (0.22 mS/cm) for both station. Higher the value of dissolved solids, greater will be the amount of ions in water. The highest value (411 µS/cm) was recorded in the month of May and lowest (27 µS/cm) in December (L. R. Bhatt, et al., 1999) in Tripura. The DO value indicates the degree of pollution in the water bodies (Gopakrushna, 2011). The aquatic life distressed when DO level upto 4 mg/lit (Francis and Floyd, 2003). In this study the average DO is measured 6.46 mg/lit and 6.47 mg/lit for Station-I and Station-II respectively. In the present study, hardness ranged from 82 to 90 mg/lit and average value of Station-I 85.74 mg/lit and Station-II 86.57 mg/lit. This high value may be due to the addition of calcium and magnesium salts. The increase in hardness can be attributed to the decrease in volume.

The standing biomass of plankton represents the nutrients level of among water body. However, the grazing pressure of the available fish fauna is an important factor in determining the abundance of planktonic species. Considering this the observed density of the phytoplankton and zooplankton appears to be appearciably lower than the earlier records (Anon 1991) on this table (Table no. 5 to 8). However, during the present observation only 19 species of phytoplankton and 17 species of zooplankton were noticed (Table no. 4). The Saroda Reservoir is inhabited by mixed group of plankton species which indicated its nutritionally enriched status. Considering various physico-chemical parameters can be conducted that the present environmental of the Saroda Reservoir is quite congenial for the well being of aquatic planktonic diversity in perticular and exhibit potentiality of high aquatic productivity for reservoir fisheries as well as State fisheries.

References

- Anon, 1991. Final report of the D.S.T. Projects (Jaipur).
- APHA, 1989. *Standard methods for the Examination of water and waste water, 18th edition* American Public Health Association, Washington, DC.
- BIS, 1991. indian Standards for Drinking Water, Bereau of Indian Standards, New Delhi, IS: 10500.
- Edmondson, W.T., 1959. Rotifera. *Freshwater biology*, pp.420-494.
- Francis and Floyd, R. 2003. *Dissolved Oxygen for Fish Production. Fact sheet FA 27.* Florida : Department of Fisheries and Aquaculture, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida.
- Murhekar Gopalkrushna, H. and Rathod, R.G., 2011. Determination of physico-chemical parameters of surface water samples in and around Akot City. *International Journal of Research in Chemistry and Environment*, *1*(2), pp.183-187.
- Bhatt, L.R., Lacoul, P., Lekhak, H.D. and Jha, P.K., 1999. Physico-chemical characteristics and phytoplanktons of Taudaha lake, Kathmandu. *Pollution Research*, *18*(4), pp.353-358.
- Mishra, S.P. and Saksena, D.N., 1993. Planktonic fauna in relation to physico-chemical characteristics of Gauri Tank at Bhind, MP India. *Advances in Limnology. Narendra Publishing House. New Delhi*, pp.57-61.
- Needham, J.G. and Needham, P.R. (1962). A guide of the study of freshwater biology, Holden Day inc, San Francisco, 108 pp.

- Pace, M.L., Findlay, S.E. and Lints, D., 1992. Zooplankton in advective environments: the Hudson River community and a comparative analysis. *Canadian Journal of Fisheries and Aquatic Sciences*, *49*(5), pp.1060-1069.

- Williams, P., Whitfield, M., Biggs, J., Bray, S., Fox, G., Nicolet, P. and Sear, D., 2004. Comparative biodiversity of rivers, streams, ditches and ponds in an agricultural landscape in Southern England. *Biological conservation*, *115*(2), pp.329-341.

- Pennak, R.W. (1978), Freshwater invertebrates of the United States, 2nd Ed. John Willey and Sons inc, New York, 803 pp.

- Sharma, B.K., 1983. The Indian species of the genus Brachionus (Eurotatoria: Monogononta: Brachionidae). In*Biology of Rotifers* (pp. 31-39). Springer, Dordrecht.
  Smitha, A.D. and Shivashankar, P., 2013. Physico Chemical Analysis of the Freshwater at River Kapila, Nanjangudu Industrial Area, Mysore, India. *Int. Res. J. Env. Sci*, *2*(8), pp.59-65.

- Tank, S.K. and Chippa, R.C., 2013. Analysis of Water Quality of Halena Block in Bharatpur Area. *International Journal of Scientific and Research Publications*,

- Trivedy, R.K., Goel, P.K. and Trisal, C.L., 1987. *Practical methods in ecology and environmental science*. Environmental Publications.*57*.

- Verma, P., Chandawat, D., Gupta, U. and Solanki, H., 2012. Water quality analysis of an organically polluted lake by investigating different physical and chemical parameters.*International Journal of Research in Chemistry and environment*, *2*(1), pp.105-111.

- Weldemariam, M.M., 2013. Physico-chemical analysis of Gudbahri river water of Wukro, Eastern Tigrai, Ethiopia.*International Journal of Scientific and Research Publications*,*3*(11), pp.1-4.

Table. 1. Morphometric features of Saroda Reservoir, District Kabirdham, Chhattisgarh

Morphology	Distance (From Kawardha)	Latitude	Longitude	Area	Depth	Average depth	Tehsil	District
Saroda Reservoir	11.6 km	21.9775° N	81.1334° E	232 hac	36.61 m	18.3 m	Kawardha	Kabirdham

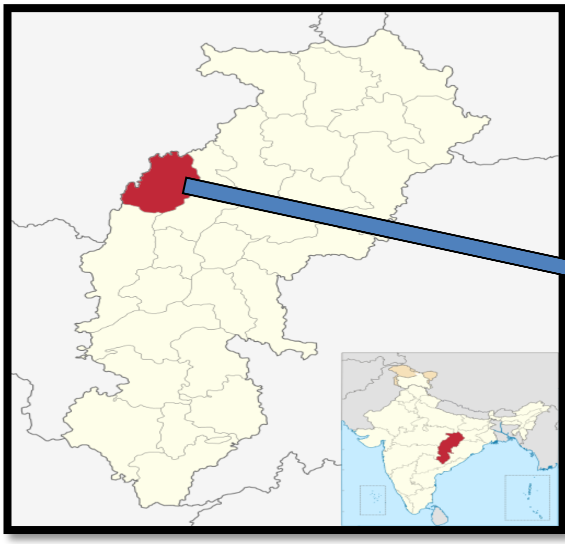


Fig. 1. Chhattisgarh

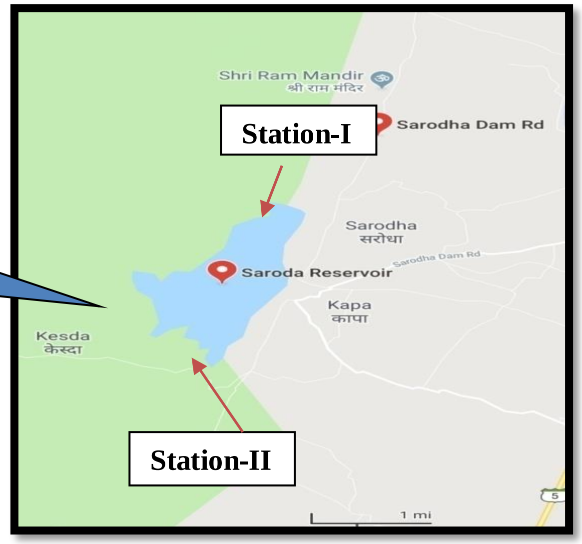


Fig.2. Saroda Reservoir

Plate.1. View of Station-I (Dam site)

Plate.2. View of Station-II (back site of Dam)

Table 2. Physicochemical characteristics at Station-I (Dam site) in Saroda Reservoir, District Kabirdham (Chhattisgarh) during August to November, 2018

S. no.	Parameters	Date of sampling							
		14.08.18	30.08.18	15.09.18	29.09.18	15.10.18	31.10.18	14.11.18	Avg.
1.	Temperature (°c)	28	28	29.7	29	27	28.8	29.5	28.57
2.	pH	7.76	7.76	8.70	8.3	7.97	8.38	8.6	8.12
3.	Electrical conductivity (mS/cm)	0.23	0.17	0.28	0.22	0.19	0.24	0.25	0.22
4.	Dissolve oxygen (mg/lit)	5.58	5.66	6.08	6.66	6.82	7.15	7.28	6.46
5.	Hardness (mg/lit)	84.2	84	90	88	85	88	88	85.74

Table 3. Physicochemical characteristics at Station-II (back site of dam) at Saroda Reservoir, District Kabirdham (Chhattisgarh) during August to November, 2018

S. no.	Parameters	Date of sampling							Avg.
		14.08.18	30.08.18	15.09.18	29.09.18	15.10.18	31.10.18	14.11.18	
1.	Temperature (°c)	27	28.3	28.8	28.5	27.3	29	29.9	28.35
2.	pH	7.38	7.74	8.02	8.01	7.92	8.36	8.5	7.99
3.	Electrical conductivity (mS/cm)	0.22	0.18	0.25	0.21	0.21	0.25	0.23	0.22
4.	Dissolve oxygen (mg/lit)	5.66	5.77	6.03	6.64	6.78	7.08	7.34	6.47
5.	Hardness (mg/lit)	82	87	87	87	85	89	90	86.57

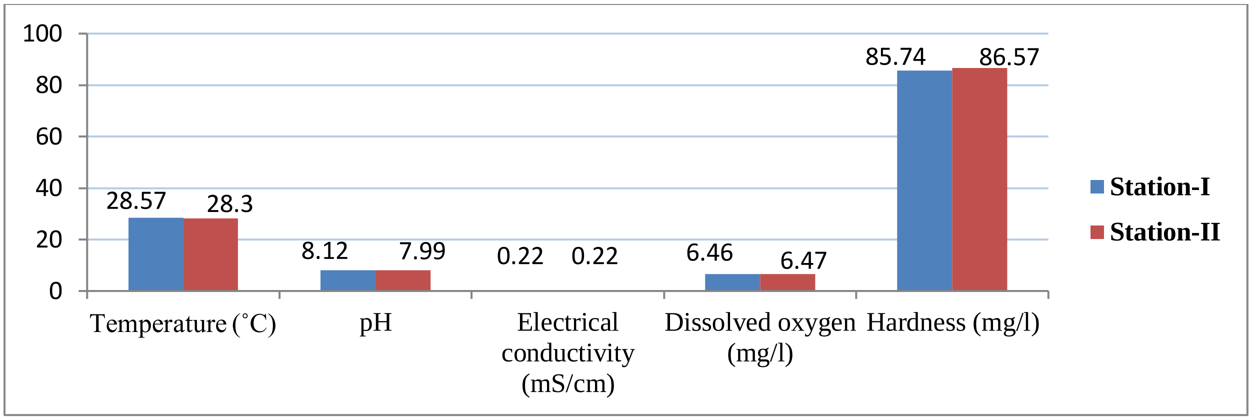


Fig-3. Comparison between physico-chemical parameters of Station-I and Station-II

Table 4. Check list of Plankton of Saroda Reservoir during the study period

S. no.	**Name of Plankton**	
	Phytoplankton	**Zooplankton**
1.	Anabeana	Moina
2.	Nostoc	Daphnia
3.	Polycystis	Diaphanosoma
4.	Microcystis	Macrothrix
5.	Synechocystis	Bosmina
6.	Ceratium	Sida sp.
7.	Volvox	Cyclops
8.	Scendesmus	Nauplius larvae
9.	Chlorella	Cyclopoid copepod
10.	Gonatogygon	Diaptomus
11.	Pediastrum	Calanoid copepod
12.	Cosmarium	Platyias
13.	Stephenodiscus	Brachionus caudatus
14.	Asterionella	Brachionus sp.
15.	Navicula	Keratella tropica
16.	Synedra	Lecane sp.
17.	Fragilaria	Polyarthra sp.
18.	Botryoccoceus	
19.	Diatoma	

Table 5. Variation in phytoplankton (No/ml) at sampling Station-I (Dam site) of Saroda Reservoir, District Kabirdham (Chhattisgarh) during August to November, 2018

S.no.	Phytoplankton	Date of sampling														Sum of total
		14.08.18		30.08.18		15.09.18		29.09.18		15.10.18		31.10.18		14.11.18		
		No./ml	Total	No./ml	Total	No./ml	Total	No./ml	Total	No./ml	Total	No./ml	Total	No./ml	Total	
I.	**Cynophyceae**															
1.	Anabeana	+++++	5	-	-	++++	4	++++++	6	+++++++	7	++++++	6	-	-	28
2.	Nostoc	+++++	5	-	-	+++++	5	+++++	5	++++++	6	+++++++	7	-	-	28
3.	Polycystis	++++++	6	-	-	-	-	-	-	-	-	-	-	-	-	6
4.	Microcystis	-	-	+++	3	+++++	5	-	-	+++++	5	-	-	+++++	5	18
5.	Synechocystis	-	-	+++++	5	-	-	-	-	-	-	-	-	++++	4	9
6.	Ceratium	-	-	-	-	-	-	++++	4	-	-	+++	3	-	-	7
	Total															96
II.	**Chlorophyceae**															
1.	Volvox	++++++	6	++++++	6	+++++++	7	+++++++	7	++++++	6	+++++++	7	-	-	39
2.	Scenedesmus	++++++	6	-	-	-	-	-	-	-	-	-	-	-	-	6
3.	Chlorella	++++	4	-	-	-	-	++++++++	8	+++++++	7	-	-	-	-	19
4.	Gonatozygon	-	-	++	2	++++	4	-	-	-	-	-	-	+++	3	9
5.	Pediastrum	-	-	+++++	5	++++++	6	+++++	5	-	-	++++	4	+++	3	23
6.	Cosmarium	-	-	-	-	-	-	-	-	+++++	5	++++++	6	+++++	5	16
	Total															112
III.	**Bacillariophyceae**															
1.	Stephenodiscus	+++++++	7	-	-	++++++	6	+++++++	7	++++	4	-	-	+++++++	7	31
2.	Asterionella	++++++	6	-	-	+++++	5	-	-	+++++	5	-	-	+++++++	7	23
3.	Navicula	+++++++	7	+++++	5	+++++++	7	+++++	5	++++++	6	++++++	6	+++++	5	41
4.	Synedra	-	-	+++	3	-	-	++++	4	-	-	+++++	5	-	-	12
5.	Fragilaria	-	-	-	-	-	-	-	-	-	-	+++	3	-	-	3
	Total															110
IV.	Others	++	2	+++	3	+++++	5	-	-	+++++	5	-	-	+++++	-	15
Grand Total																333

Table 6 . Variation in Zooplankton (No/ml) at sampling Station-I (Dam site) of Saroda Reservoir, District Kabirdham (Chhattisgarh) during August to November, 2018

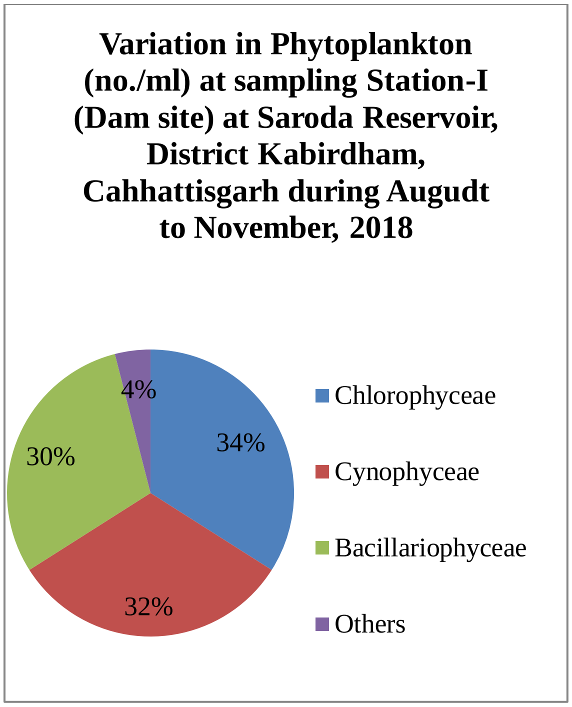
S..no.	Zooplankton	Date of sampling														Sum of totall
		14.08.18		30.08.18		15.09.18		29.09.18		15.10.18		31.10.18		14.11.18		
		No./ml	Total	No./ml	Total	No./ml	Total	No./ml	Total	No./ml	Total	No./ml	Total	No./ml	Total	
I.	**Cladocerans**															
1.	Moina	++++ ++++ +	9	+++++	5	++++ ++++ ++	10	+++++	5	+++++ +++	8	++++ ++++ ++	10	-	-	47
2.	Daphnia	++++ ++++ ++++	12	+++++ +++	8	++++ ++++	8	-	-	+++++ +++++ ++	12	-	-	++++ ++++ +	9	49
3.	Diaphanosona	++++ ++++	8	-	-	-	-	-	-	-	-	-	-	-	-	8
4.	Macrothrix	++++	4	-	-	-	-	+++++ +++++	10	+++++ +++	8	++++ ++	5	++++ ++	6	33
5.	Bosmina	-	-	+++++ +	6	++++ ++	6	++++	4	+++++	5	++++ ++++	8	-	-	29
6.	Sida sp.	-	-	-	-	-	-	-	-	-	-	++++ ++++	8	++++ ++++	8	16
	Total															182
II	**Copepoda**															
1.	Cyclops	++++ ++++	8	+++++	5	+++++ +	6	-	-	-	-	++++ ++	6	++++ +++	7	32
2.	Naupius larvae	++++ ++	6	-	-	+++++ +	6	-	-	++++	4	++++ ++	6	++++ +	5	27
3.	Cyclopoid copepod	++++ +	5	-	-	-	-	++++ +	5	+++++	5	-	-	-	-	15
4.	Diaptomus	++++ ++++ ++++	12	+++++ +++	8	+++++ ++++	9	+++	3	+++++ ++	7	+++++ ++++	9	++++ ++	6	54
5.	Calanoid copepod	-	-	-	-	-	-	++++ +++	7	-	-	-	-	++++ ++++	8	15
	Total															143
III.	**Rotifers**															
1	Brachionus caudatus	++++ +	5	+++++ ++	7	+++++	5	-	-	-	-	-	-	-	-	17
2	Platyias	++++ +	5	+++++ ++++	9	+++	3	++++ +++	7	-	-	-	-	++++ +	5	29
3.	Brachionus sp.	++++ +++	7	-	-	+++++ ++	7	++++ ++++	8	+++	3	++++ +++	7	++++ ++++	8	40
4.	Keratella tropica	-	-	-	-	-	-	++++ +	5	++++	4	++++ +	5	++++ ++++	7	21
	Total															107
IV.	**Others**	++++ ++++ +	9	+++++	5	-	-	++++ ++	6	+++++ ++	7	++++ +	5	+++	3	35
Grand total																467

Table 7. Variation in pytoplankton (No/ml) at sampling Station-II (Dam site) of Saroda Reservoir, District Kabirdham (Chhattisgarh) during August to November, 2018

S.no.	Phytoplankton	Date of sampling														Sum of total
		14.08.18		30.08.18		15.09.18		29.09.18		15.10.18		31.10.18		14.11.18		
		No./ml	Total	No./ml	Total	No./ml	Total	No./ml	Total	No./ml	Total	No./ml	Total	No./ml	Total	
I.	**Cynophyceae**															
1.	Anabeana	+++	3	+++++	5	+++++++	7	+++++++	7	+++++++	7	++++	4	-	-	33
2.	Nostoc	++++++	6	++++++	6	++++++	6	+++++	5	++++++	6	-	-	-	-	29
3.	Polycystis	++++++	6	-	-	-	-	-	-	-	-	++++++	6	-	-	12
4.	Microcystis	-	-	-	-	+++++	5	++++++	6	-	-	-	-	+++++	5	16
5.	Synechocystis	-	-	-	-	-	-	-	-	-	-	-	-	+++	3	3
6.	Ceratium	-	-	++	2	-	-	-	-	+++++	5	+++	3	++	2	12
	Total															105
II.	**Chlorophyceae**															
1.	Volvox	++++++	6	-	-	+++++++	7	++++++	6	+++++	5	+++++++	7	++++++	6	37
2.	Scenedesmus	+++++	5	-	-	-	-	-	-	-	-	++++++	6	-	-	11
3.	Chlorella	++++	4	++++++	5	++++++++	8	++++++	6	+++++++	7	+++++	5	+++++	5	40
4.	Gonatozygon	-	-	-	-	-	-	-	-	-	-	+++	3	-	-	3
5.	Pediastrum	-	-	++++	4	-	-	++++	4	-	-	-	-	-	-	8
6.	Cosmarium	-	-	++++	4	++++	4	-	-	-	-	-	-	-	-	8
7.	Botryoccocus	++	2	-	-	-	-	-	-	-	-	-	-	-	-	2
	Total															109
III.	**Bacillariophyceae**															
1.	Stephenodiscus	+++++++	7	-	-	+++++	5	-	-	++++++	6	+++	3	-	-	21
2.	Asterionella	+++++++	7	-	-	++++	4	-	-	-	-	-	-	-	-	11
3.	Navicula	++++++++	8	+++++	5	++++++	6	++++++	6	+++++	5	+++++++	7	-	-	37
4.	Synedra	-	-	-	-	+++	3	+++++	5	++++	4	+++++	5	+++++	5	22
5.	Diatoma	-	-	++	2	-	-	-	-	-	-	-	-	-	-	2
6.	Fragilaria	-	-	+++	3	-	-	-	-	-	-	-	-	++	2	5
	Total															98
IV.	Others	+++	3	-	-	-	-	++++++	6	-	-	-	-	++++	4	13
Grand Total																325

Table 8 . Variation in zooplankton (No/ml) at sampling Station-II (Dam site) of Saroda Reservoir, District Kabirdham (Chhattisgarh) during August to November, 2018

S..no.	Zooplankton	Date of sampling														Sum of total
		14.08.18		30.08.18		15.09.18		29.09.18		15.10.18		31.10.18		14.11.18		
		No./ml	Total	No./ml	Total	No./ml	Total	No./ml	Total	No./ml	Total	No./ml	Total	No./ml	Total	
I.	**Cladocerans**															
1.	Moina	++++++++++	10	++++++++	8	–	–	–	–	–	–	–	–	++++++++++	10	28
2.	Daphnia	+++++++++	9	+++++++	7	–	–	–	–	–	–	–	–	–	–	16
3.	Diaphanosona	++++++	6	++++++	6	–	–	+++++++	7	–	–	++++++++++	10	–	–	29
4.	Macrothrix	–	–	–	–	+++++++	7	+++++	5	+++++++++	9	+++++++	7	–	–	28
5.	Bosmina	–	–	++++++	6	+++	3	–	–	+++++++	7	+++++	5	++++++++	8	29
6.	Sida sp.	–	–	–	–	++++	4	+++++	5	–	–	–	–	++++++	6	15
	Total															145
II	**Copepoda**															
1.	Cyclops	+++++	5	++++++	6	++++++++	8	–	–	+++++++	7	++++++	6	–	–	32
2.	Naupius larvae	++++	4	++++++	6	–	–	+++++++++	9	+++++++++	9	+++++	5	–	–	33
3.	Cyclopoid copepod	++	2	–	–	++++++++++	10	+++++++	7	++++++	6	–	–	++++	4	29
4.	Diaptomus	++++++++	8	+++++++++	9	+++++++	7	–	–	+++++++++	9	+++++++++	9	++++++++++++	12	54
5.	Calanoid copepod	–	–	–	–	++++++	6	–	–	++++++	6	–	–	++++	4	16
	Total															164
III.	**Rotifers**															
1	Brachionus caudatus	+++	3	++++++	6	–	–	++++++	6	+++++++	7	++++++	6	–	–	28
2	Platyias	++	2	++++	4	–	–	++++++++	8	–	–	++++	4	+++	3	21
3.	Brachionus sp.	++++	4	++++++++	8	+++++++	7	+++++	5	+++++++	7	++++++	6	+++++++	7	44
4.	Keratella tropica	–	–	–	–	++++++	6	–	–	++++++	6	–	–	++++	4	16
5	Lecane sp.	–	–	–	–	++++++	6	–	–	–	–	–	–	–	–	6
6	Polyarthra sp.	–	–	–	–	–	–	–	–	+++++++	7	++++++++	8	–	–	15
	Total															130
IV.	**Others**	+++++++	7	–	–	+++	3	+++	3	++++++++++	10	+++++++	7	+++++	5	35
Grand total																474



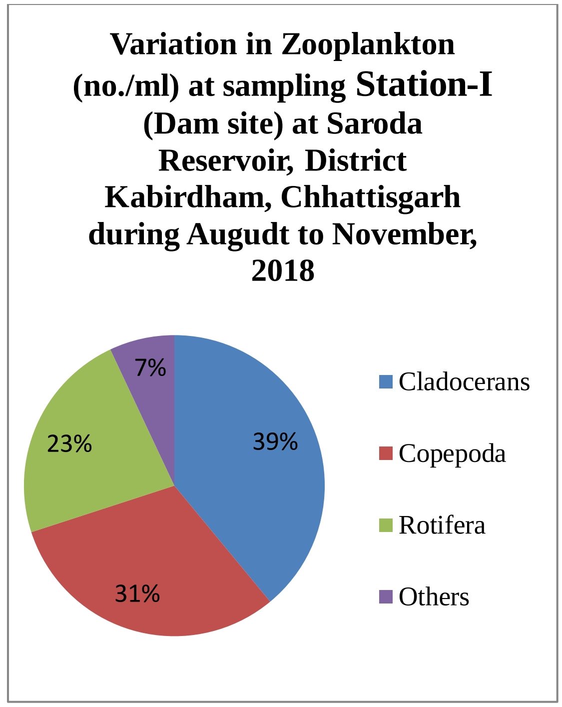


Fig. 4. Phytoplankton of Station-I

Fig. 5. Zooplankton of Station-I