

International Multidisciplinary  
Research Journal

*Indian Streams*  
*Research Journal*

Executive Editor  
Ashok Yakkaldevi

Editor-in-Chief  
H.N.Jagtap

---

## Welcome to ISRJ

RNI MAHMUL/2011/38595

ISSN No.2230-7850

Indian Streams Research Journal is a multidisciplinary research journal, published monthly in English, Hindi & Marathi Language. All research papers submitted to the journal will be double - blind peer reviewed referred by members of the editorial board. Readers will include investigator in universities, research institutes government and industry with research interest in the general subjects.

### International Advisory Board

Flávio de São Pedro Filho  
Federal University of Rondonia, Brazil

Kamani Perera  
Regional Center For Strategic Studies, Sri Lanka

Janaki Sinnasamy  
Librarian, University of Malaya

Romona Mihaila  
Spiru Haret University, Romania

Delia Serbescu  
Spiru Haret University, Bucharest, Romania

Anurag Misra  
DBS College, Kanpur

Titus PopPhD, Partium Christian  
University, Oradea, Romania

Mohammad Hailat  
Dept. of Mathematical Sciences,  
University of South Carolina Aiken

Abdullah Sabbagh  
Engineering Studies, Sydney

Ecaterina Patrascu  
Spiru Haret University, Bucharest

Loredana Bosca  
Spiru Haret University, Romania

Fabricio Moraes de Almeida  
Federal University of Rondonia, Brazil

George - Calin SERITAN  
Faculty of Philosophy and Socio-Political  
Sciences Al. I. Cuza University, Iasi

Hasan Baktrir  
English Language and Literature  
Department, Kayseri

Ghayoor Abbas Chotana  
Dept of Chemistry, Lahore University of  
Management Sciences[PK]

Anna Maria Constantinovici  
AL. I. Cuza University, Romania

Ilie Pinteau,  
Spiru Haret University, Romania

Xiaohua Yang  
PhD, USA

.....More

### Editorial Board

Pratap Vyamktrao Naikwade  
ASP College Devrukh, Ratnagiri, MS India Ex - VC. Solapur University, Solapur

R. R. Patil  
Head Geology Department Solapur  
University, Solapur

Rama Bhosale  
Prin. and Jt. Director Higher Education,  
Panvel

Salve R. N.  
Department of Sociology, Shivaji  
University, Kolhapur

Govind P. Shinde  
Bharati Vidyapeeth School of Distance  
Education Center, Navi Mumbai

Chakane Sanjay Dnyaneshwar  
Arts, Science & Commerce College,  
Indapur, Pune

Awadhesh Kumar Shirotriya  
Secretary, Play India Play, Meerut (U.P.)

Iresh Swami  
Ex - VC. Solapur University, Solapur

N.S. Dhaygude  
Ex. Prin. Dayanand College, Solapur

Narendra Kadu  
Jt. Director Higher Education, Pune

K. M. Bhandarkar  
Praful Patel College of Education, Gondia

Sonal Singh  
Vikram University, Ujjain

G. P. Patankar  
S. D. M. Degree College, Honavar, Karnataka

Maj. S. Bakhtiar Choudhary  
Director, Hyderabad AP India.

S. Parvathi Devi  
Ph.D.-University of Allahabad

Sonal Singh,  
Vikram University, Ujjain

Rajendra Shendge  
Director, B.C.U.D. Solapur University,  
Solapur

R. R. Yallickar  
Director Management Institute, Solapur

Umesh Rajderkar  
Head Humanities & Social Science  
YCMOU, Nashik

S. R. Pandya  
Head Education Dept. Mumbai University,  
Mumbai

Alka Darshan Shrivastava  
Shaskiya Snatkottar Mahavidyalaya, Dhar

Rahul Shriram Sudke  
Devi Ahilya Vishwavidyalaya, Indore

S. KANNAN  
Annamalai University, TN

Satish Kumar Kalhotra  
Maulana Azad National Urdu University

DENSITY OF ZOOPLANKTON AND PHYTOPLANKTON IN RELATION  
TO PHYSICO-CHEMICAL PARAMETERS OF DHANEGAON RESERVOIR  
WATER, DHANEGAON, OSMANABAD, MAHARASHTRA (INDIA).



Lokhande M. V.

Department of Zoology, Indira Gandhi (Sr) College, CIDCO, New Nanded,  
Maharashtra, India .



**ABSTRACT:**

In the present investigation was undertaken to study of the physico-chemical parameters with relation to the phytoplankton and zooplankton composition of Dhanegaon reservoir water. The physico-chemical parameters of Dhanegaon reservoir were found favorable range for the growth of the phytoplankton and zooplankton. The present investigation the three spots were selected for the study and named as Spot A, B and C respectively. The study carried out the one year during the June- 2003 to May-2004. The dominant trend of phytoplankton in the present investigation was Chlorophyceae > Bacillariophyceae > Cynophyceae > Euglenophyceae. The total count of phytoplankton was 675 to 786 number/lit at Spot A, 550 to 824 number/lit at Spot B and 643 to 693 number/lit at Spot C. The dominant trend in the zooplankton was Rotifera > Cladocera > Copepoda >

Ostracoda. and total count of zooplankton was 62 to 84 number/lit at Spot A, 86 to 122 number/lit at Spot B and 75 to 104 number/lit at Spot C .

**KEYWORDS**

*Phytoplankton, Zooplankton, Physico-chemical parameters, Dhanegaon reservoir.*

## INTRODUCTION:

The Dhanegaon reservoir is large sized reservoir constructed on the Manjara river. It is 60 km away from Latur District. It is situated in Taluka Kallamb, Dist. Osmanabad. The Latur M.I.D.C. is getting water supply from it. But recently i.e. from 13th May 2005 it is supplying the drinking water to Latur district. This scheme is inaugurated by the Chief Minister of Maharashtra Mr. Vilasraoji Deshmukh. Dhanegaon reservoir is constructed in 1980 on Manjara River, near village Dhanegaon. Reservoir is constructed particularly for irrigation purpose. The catchments area is about 2371 sq. kms. More than 79 villages from Beed, Osmanabad and Latur district have been benefited from this project. Besides its use in industrial, agricultural and fishery purposes, it is also the source of drinking water for entire Latur city. The study of biological parameters i. e. plankton is important component of reservoirs. The study of plankton gives their number, kinds and occurrence in a reservoir. The planktons are of two types phytoplankton and zooplankton. They serve as food for many aquatic animals especially fishes and play key role in maintaining proper equilibrium between abiotic and biotic components of the reservoir. Plankton encountered in the reservoir reflect the average ecological condition and therefore, they may be used as indicator of water quality. Hence the studies of plankton are taken for investigation as the growths of fishes are totally depends on availability of plankton population.

## MATERIALS AND METHODS

Monthly sampling was conducted around two year of study from three different spots A, B and C respectively during the June 2003 to May 2004. The collections of samples were done from subsurface. For collection of large water (one liter) was sieved through plankton net. A simple type of plankton net was used. The separate sample was collected for phytoplankton and zooplankton. Collection of phytoplankton concentration was made and preserved in 4% formalin solution. The qualitative and quantitative analysis of phytoplankton was done with the help of sedwick rafter cell and identification was done by referring standard text Adoni et.al (1985). The zooplankton samples were collected with the help of plankton net made up to bolting silk No. 20 (Mesh 75mm) and preserved in 4% formalin and counting was done with the help of Sedgwick rafter cell counting chamber and zooplankton identified following the keys provided by Edmondson (1959). Michael (1968), Adoni (1985) Dhanapathi (2000).

## RESULTS AND DISCUSSION

The phytoplankton community, chlorophyceae ranges between 120 to 245 number/lit at spot A, 130 to 310 number/lit at spot B and 200 to 345 number/lit at spot C. The cyanophyceae ranges between 150 to 215 number/lit at spot A, 135 to 185 number/lit at spot B and 108 to 160 number/lit at spot C. The bacillariophyceae ranges between 245 to 295 number/lit at spot A, 170 to 285 number/lit at spot B and 215 to 2600 number/lit at spot C. The euglenophyceae ranges between 85 to 143 number/lit at spot A, 55 to 122 number/lit at spot B and 60 to 160 number/lit at spot C. The monthly variation of phytoplankton is represented in table no. 1, 2, 3 and graphically represented in fig no. 1, 2, 3 respectively. The physico-chemical parameters of Dhanegaon reservoir are represented in table no. 7.

The zooplankton community, rotifera ranges between 12 to 29 number/lit at spot A, 25 to 48 number/lit at spot B and 16 to 41 number/lit at spot C. The cladocera ranges between 14 to 25 number/lit at spot A, 22 to 38 number/lit at spot B and 12 to 30 number/lit at spot C. The copepoda

ranges between 09 to 18 number/lit at spot A, 14 to 24 number/lit at spot B and 12 to 28 number/lit at spot C. The ostracoda ranges between 08 to 14 number/lit at spot A, 08 to 22 number/lit at spot B and 16 to 24 number/lit at spot C. The monthly variation of zooplankton is represented in table no. 4, 5, 6 and graphically represented in fig no. 4, 5, 6 respectively. The phytoplankton population in Dhaegaon reservoir water was composed of four major groups namely Bacillariophyceae (33.72%), Chlorophyceae (30.15%), Cynophyceae, (22.15%) and euglenophyceae (13.96%). The present investigation Bacillariophyceae was the dominant group at three spots of the Dhanegaon reservoir. The count of the phytoplankton and quality of an aquatic ecosystem is dependent on the physical and chemical qualities of water also on biological diversity of the system. The peak of the phytoplankton density in Dhanegaon reservoir water recorded in November and December months. Similar observations were also recorded by Nazeen (1980) and Krishnan et.al (1999). In the present investigation phytoplankton density was recorded during the winter season may be due to higher amount of dissolved oxygen in winter season. The similar results were made by Vanketeshwarlu (1969). Traphiti and Pandey (1989) reported that the maximum phytoplankton population in winter season. The high value of pH and presence of nutrients in the form of nitrate and phosphorous is an important factor controlling the occurrence and abundance of phytoplankton.

The zooplankton population in Dhaegaon reservoir water was composed of four major groups namely Rotifera (32.50%) Cladocera (26.77%), Copepoda, (19.58%) and Ostracoda (16.97%). The present investigation Rotifera was the dominant group at three spots of the Dhanegaon reservoir. The peak of the zooplankton density in Dhanegaon reservoir water recorded in April and May months. Rotifer richness and its biodiversity were found to be maximum in summer in Dhanegaon reservoir indicating the influence of temperature which was supported by direct relation between summer temperature and Rotifera population. This observation is in concurrence with work of Kaushik and Sharma (1994) and Singh (2000) who have studied Zooplankton population in Malsya Sarovar Gwalior and in tropical lake respectively.

The maximum population of cladocera in summer may be attributed to favourable temperature and availability of food in the form of bacteria, nanoplankton and suspended detritus. While in monsoon the factors like water temperature, DO and Turbidity play an important role in controlling the diversity and density of cladocera (Edmondson, 1965; Baker 1979). The copepod population in Dhaegaon reservoir is due to richness of organic matter. Similar observations were also made by Somani and Pejaver (2004) in Lake Masunda.

## CONCLUSION:

In conclusion, the phytoplankton bacillariophyceae and zooplankton rotifera appeared to be most dominating community throughout the study period. Overall Zooplankton and phytoplankton population fauna of the reservoir was much more diversified indicating the Dhanegaon reservoir as nutrient rich water body which is useful for the fish culture. It may be undergo the state of eutrophication, if not managed properly.

## REFERENCES

1. Adoni, A.D. (1985), work book of Liminology, Indian Mab. Committe, Department of Environment, Govt. of India, Prathiba Publishers, Sagar.
2. Baker S.L. (1979) Specific status of *Keratella cochlearis* (Gosse) and *K. Ahlastrar* (Rotifera :

- Brachionidae): Ecological considerations, *Can. J. Zool*, 7(9): 1719-1722.
3. Dhanapathi, M.V.S.S.S. (2000), The rotifers IAAB publication No. 10.
4. Edmondson W.T., *Freshwater Ecology*, 2nd Ed. Periodicals supply service, New Delhi, P. 1248. International books and periodicals supply services, New Delhi, 1248, (1992).
5. Kaushik. S and D.N. Sharma (1994) Physico-chemical characteristic and Zooplankton population of a perennial lake, Malsya sarovar, Gwalior, *J. Environ. Ecol.*, 1: 429-434.
6. Krishnan H. K., Thomas S, George S, Murugan R.P., Mundayoor, S and Das M.R. (1999): A Study on the distribution and ecology of phytoplankton in Kuttanad wetland ecosystem, Kerala. *Poll. Res.* 18 (3): 261-269.
7. Michael, R.G. (1968), Studies on the Zooplankton tropical fish pond. *Hydrobiologia* 32: 47-68 p.p.
8. Nazneen, S. (1990): Influence of hydrobiological factors on seasonal abundance of phytoplankton in Kinjhar lake, Pakistan. *Int. Rev. Ges. Hydrobiolo.* 65 (2): 269-282.
9. Singh D.N. (2000) Seasonal variation of Zooplankton in a tropical lake, *Geobios*, 27:92-100.
10. Somani, V. and M. Pejawar (2004) Crustacean Zooplankton population of the lake Masunda, Thane, Maharashtra: *J. Aqua. Biol.* Vol. 19(1): 57-56.
11. Traphati A. K. and Pandey S.N. (1989): Studies on algae of polluted ponds of Kanpur II. Qualitative Quantitative and periodical occurrence of the blue green algae of Chabndori pond. *Res. J. Pl. Environ.* 5 (1): 89-93.
12. Vanketeshwarlu V. (1989): An ecological study of the river Moosi, Hyderabad (India) with reference to water pollution. *I Physico-chemical Complexes. Hydrobiol.* 33: 117-143.

Table No. 1 Composition of Phytoplankton density in Dhanegaon reservoir of Spot A (Numbers/liter)

Phytoplankton	Chlorophyceae	Cynophyceae	Bacillariophyceae	Euglenophyceae	Total Phytoplankton
Months					
June-2003	120	160	290	105	675
July	145	170	280	110	705
August	135	160	295	112	702
September	140	150	285	103	678
October	240	190	260	137	827
November	245	205	265	143	858
December	237	215	257	140	849
January 2004	228	180	248	130	786
February	180	215	250	90	735
March	160	210	260	87	717
April	170	210	265	88	733
May	200	205	245	85	735
Total	2200	2270	3200	1330	9000
Total Mean	183.33	189.16	266.66	110.83	750
Percentage	24.44	25.22	35.55	14.77	100

Table No. 2 Composition of Phytoplankton density in Dhanegaon reservoir of Spot B (Numbers/liter)

Phytoplankton	Chlorophyceae	Cynophyceae	Bacillariophyceae	Euglenophyceae	Total Phytoplankton
Months					
Jun-03	130	140	280	80	630
July	145	135	285	85	650
August	130	145	277	75	627
September	135	140	268	80	623
October	300	157	238	118	813
November	290	160	240	120	810
December	310	150	242	122	824
Jan-04	280	163	230	110	783
February	140	170	175	65	550
March	130	180	180	60	550
April	150	185	175	70	580
May	180	145	170	55	550
Total	2320	1870	2760	1040	7990
Total Mean	193.33	155.83	230	86.66	665.83
Percentage	29.03	23.4	34.54	13.01	100

Table No. 3 Composition of Phytoplankton density in Dhanegaon reservoir of Spot C (Numbers/liter)

Phytoplankton	Chlorophyceae	Cynophyceae	Bacillariophyceae	Euglenophyceae	Total Phytoplankton
Months					
Jun-03	200	108	245	90	643
July	220	115	255	95	685
August	218	120	260	95	693
September	212	117	260	100	689
October	340	135	215	150	840
November	337	139	219	155	850
December	345	134	216	160	855
Jan-04	328	142	220	155	845
February	290	150	235	90	765
March	300	160	238	72	770
April	295	152	237	60	744
May	295	158	240	68	761
Total	3380	1630	2840	1290	9140
Total Mean	281.66	135.83	236.66	107.5	761.65
Percentage	36.98	17.83	31.07	14.11	100

Table No. 4 Composition of zooplankton density in Dhanegaon reservoir of Spot A (Numbers/liter)

Zooplankton	Rotifera	Cladocera	Copepoda	Ostracoda	Total Zooplankton
Months					
Jun-03	12	21	16	14	63
July	15	22	16	10	63
August	13	22	20	14	69
September	15	25	18	12	70
October	20	18	14	10	62
November	22	16	18	8	64
December	24	22	16	8	70
Jan-04	29	24	17	14	84
February	22	16	10	8	56
March	24	14	12	9	59
April	26	16	9	8	59
May	28	18	14	10	70
Total	250	235	180	125	789
Total Mean	20.83	19.58	15	10.41	65.75
Percentage	31.68	29.78	22.81	15.84	100

Table No. 5 Composition of zooplankton density in Dhanegaon reservoir of Spot B (Numbers/liter)

Zooplankton	Rotifera	Cladocera	Copepoda	Ostracoda	Total Zooplankton
Months					
Jun-03	25	32	15	18	90
July	25	34	18	20	97
August	30	31	18	22	101
September	40	38	24	20	122
October	32	30	16	12	90
November	35	32	18	10	95
December	40	29	17	19	105
Jan-04	35	34	19	14	102
February	42	22	14	8	86
March	44	28	16	10	98
April	46	25	17	12	100
May	48	30	18	10	106
Total	442	365	210	175	1192
Total Mean	36.83	30.41	17.5	14.58	49.66
Percentage	37.08	30.62	17.61	14.68	100



Table No. 6 Composition of zooplankton density in Dhanegaon reservoir of Spot C (Numbers/liter)

Zooplankton Months	Rotifera	Cladocera	Copepoda	Ostracoda	Total Zooplankton
Jun-03	21	27	24	22	94
July	22	30	26	24	102
August	16	26	22	20	84
September	26	26	28	24	104
October	26	14	14	22	76
November	26	16	16	20	78
December	30	18	17	19	84
Jan-04	28	22	18	24	92
February	36	12	12	18	78
March	38	18	14	16	86
April	35	10	14	16	75
May	41	20	15	20	96
Total	345	239	220	245	1049
Total Mean	28.75	19.91	18.33	20.41	87.41
Percentage	32.88	22.78	23.35	23.35	100

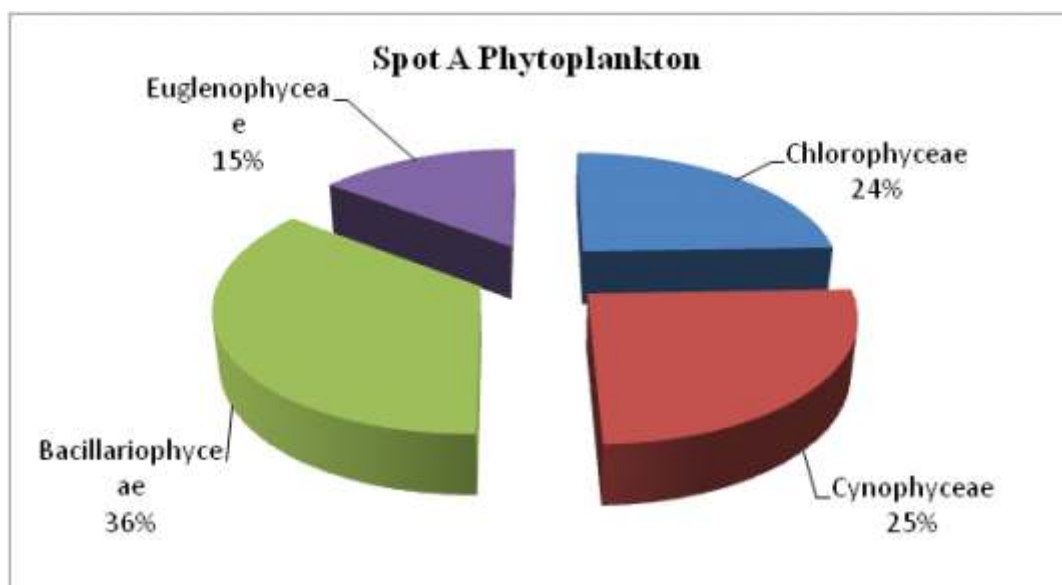


Fig No. 1 showing the phytoplankton density of Spot A (Numbers/liter)

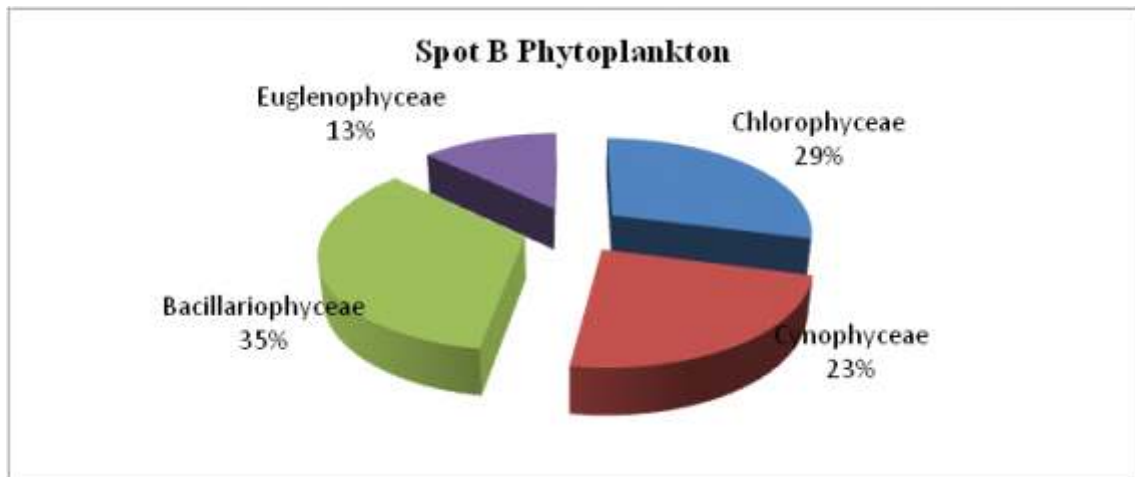


Fig No. 2 showing the phytoplankton density of Spot B (Numbers/liter)

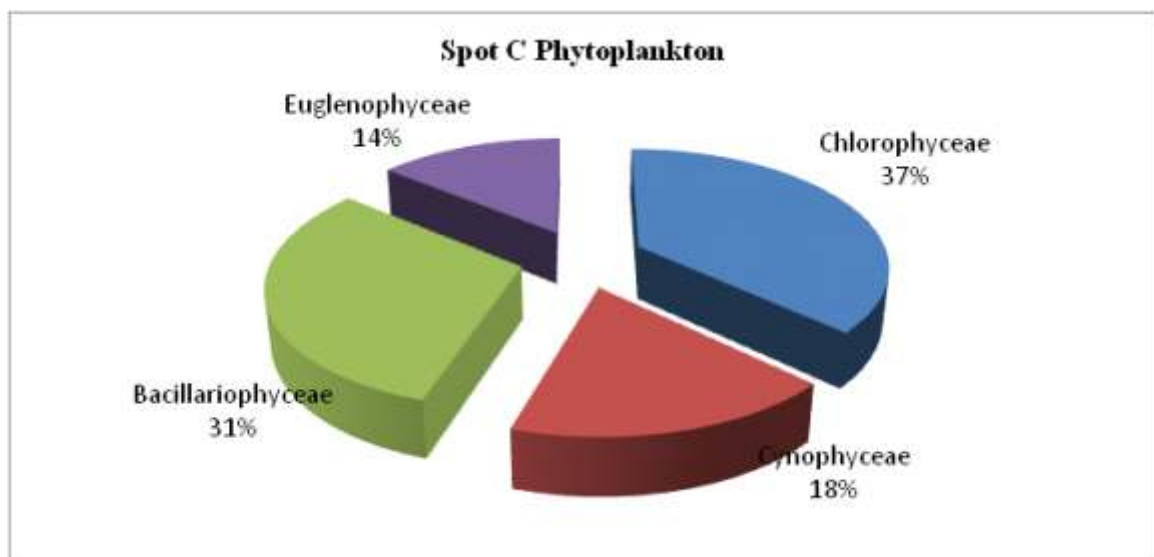


Fig No. 3 showing the phytoplankton density of Spot C (Numbers/liter)

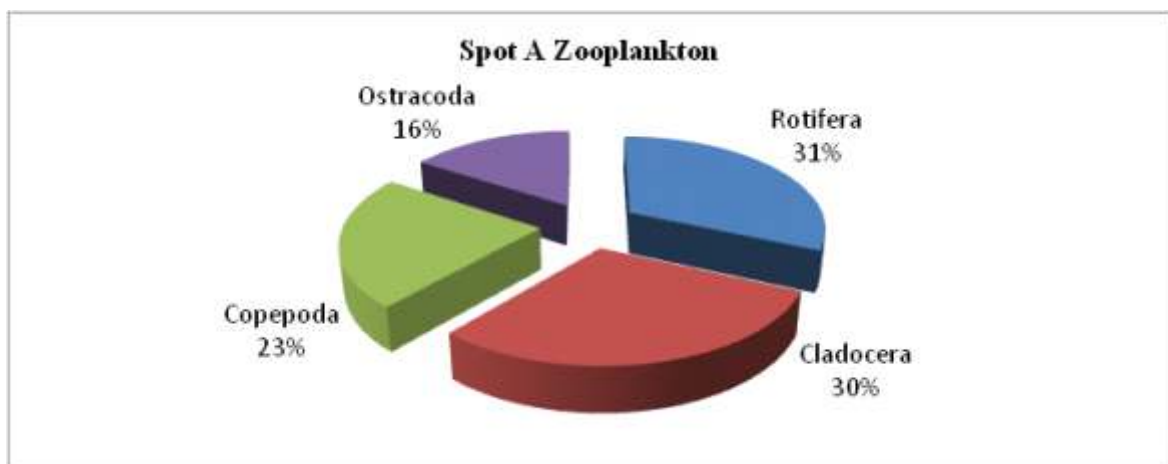


Fig No. 4 showing the zooplankton density of Spot A (Numbers/liter)

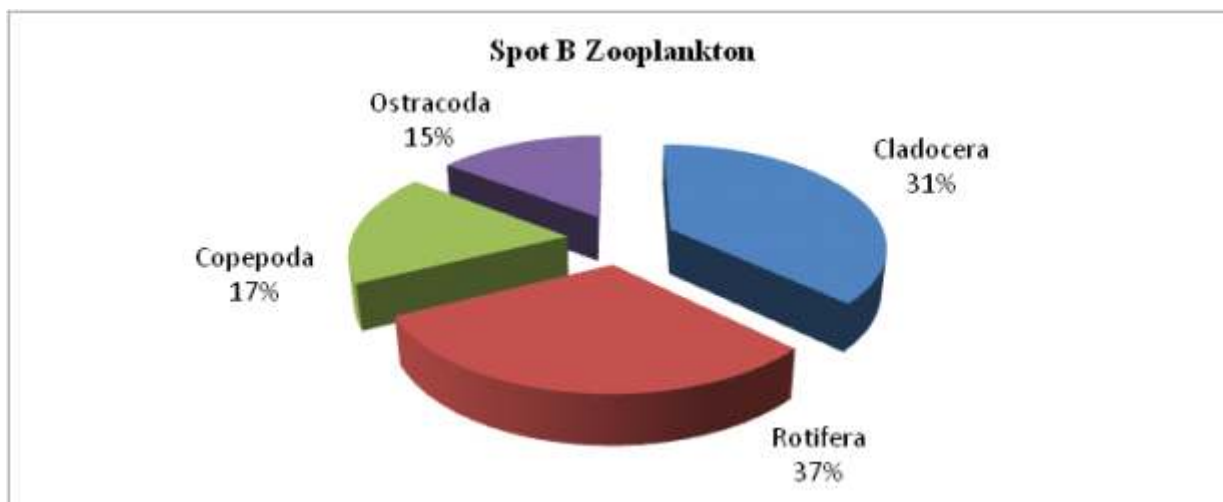


Fig No. 5 showing the zooplankton density of Spot B (Numbers/liter)

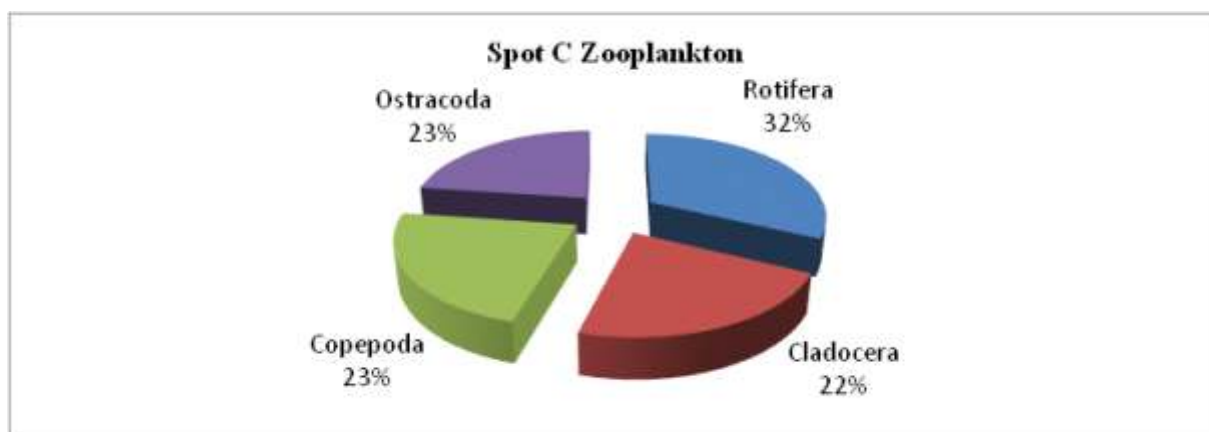


Fig No. 6 showing the zooplankton density of Spot C (Numbers/liter)

Table No. 7 Range of physico-chemical parameters of Dhanegaon reservoir.

Sr. No.	Parameters	Range
1	Taste	Acceptable
2	Turbidity (NTU)	74-135 (cms)
3	Water temperature	20.1 - 30.8 (°C)
4	pH	7.0-8.6
5	Conductivity (mhoms)	221-313
6	Free Co <sup>2</sup> (mg/l)	1.2-4.6
7	Total alkalinity (mg/l)	97-147
8	Chloride (mg/l)	9.94-36.92
9	Total hardness (mg/l)	75-126
10	Calcium hardness(mg/l)	40-93
11	Magnesium hardness (mg/l)	3.17-11.71
12	TDS (mg/l)	100-415
13	Sulphate (mg/l)	10-26
14	Phosphate (mg/l)	0.07-0.48
15	BOD (mg/l)	9.0-20.4
16	COD (mg/l)	3.36-12.96

# Publish Research Article

## International Level Multidisciplinary Research Journal For All Subjects

Dear Sir/Mam,

We invite unpublished Research Paper, Summary of Research Project, Theses, Books and Book Review for publication, you will be pleased to know that our journals are

### Associated and Indexed, India

- ★ International Scientific Journal Consortium
- ★ OPEN J-GATE

### Associated and Indexed, USA

- Google Scholar
- EBSCO
- DOAJ
- Index Copernicus
- Publication Index
- Academic Journal Database
- Contemporary Research Index
- Academic Paper Database
- Digital Journals Database
- Current Index to Scholarly Journals
- Elite Scientific Journal Archive
- Directory Of Academic Resources
- Scholar Journal Index
- Recent Science Index
- Scientific Resources Database
- Directory Of Research Journal Indexing

Indian Streams Research Journal  
258/34 Raviwar Peth Solapur-413005, Maharashtra  
Contact-9595359435  
E-Mail-ayisrj@yahoo.in/ayisrj2011@gmail.com  
Website : www.isrj.org