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ISSN 2348-0416
USA CODEN: JASRHB

Journal of Applied Science And Research, 2015, 3 (6):16-24

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Phytoplankton Comparative Studies of Polluted And Non- Polluted Ponds of Jammikunta & Huzrabad Mandals, Karimnagar, Telangana State. India.

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ABSTRACT

There are diversity of alga and its abundance exhibiting seasonal variations in productivity. Pollution levels and types of causative factors changes from place to place as like industrial wastage, dumping of solid waste by several cities and towns. The pollution index is based on the relative number of total points scored by each alga. These are mostly near to human civilization, so it is easily contaminated with eutrophication. The temperature vary throughout the study area in rainy season 27-35,in winter 16-25,summer 35-43. Water temperature also one of the major determinant factors for the growth of phytoplaktons and zooplanktons. 74 algal species occurred, genera 46. Observation made that, the month of June to September Chlorophyceae members dominant over the other classesin that Pediastraum, Closterium, Casmarium, Scenidesmus, dominant other species. Bacllariophyceae members particularly Navicula appear good above period. The major threats to lentic ecosystems by bathing using of soaps, washing clothes, cleaning vehicles (source of automobile discharge) dumping of garbage, hospital wastage, pesticide remains etc. This is done by only ignorance of illiterates, but some activities are as a functional.

Keywords : Pollution, Domestic Use of Water, Organic Substances, Seasonal Variations, Karimnagar

INTRODUCTION

Polluted water means, when there releases of organic substances not in appropriate ratio. It ultimately leads to organic pollution, pollution levels and types of causative factors changes from place to place as like industrial wastage, dumping of solid waste by several cities and towns. Palmer (1969) was established a method to identify the algal index of pollution. Now a day's several methods are available for measure pollution levels, but several scientists are followed the palmer method for classical studies. The pollution index is based on the relative number of total points scored by each alga. Recently Louis-Laclereq (2008) proposed that, the occurrence of diatom species in any water body. It is used in organic pollution status, range.

Domestic use of water released to ponds and lakes causes' selective minerals or chemicals deposition in particular area or site. Like phosphate less soluble and take more time to volatile or less volatile. So it is deposited in high amount, in another way it forms salts with magnesium and calcium to high density reaches and form sedimentation. They are not simply melted into small

particles. Phosphate has capability to attract phytoplankton's and bacteria to colonies. Indirectly phosphate causes eutrophication and species distribution determinant. Discharge of domestic water from source vary season to season. Like summer season phosphate deposited in drains, edges of aquatic body due to its solidification and high temperature causes water evaporation. But in rain season i.e. July to September plenty of water resources are available and dilution of eutrophicated solids. Pesticides are used in various fields to control pests also influence the non targeted micro flora particularly phytoplankton. Using of pesticides in agricultural practices show their effect on morphological and physiological sometimes molecular levels changing factors.

There are diversity of alga and its abundance exhibiting seasonal variations in productivity. There is no clear evidence for a single factor can determine the algal abundance and diversity, due to the several factors collectively play role in diversity and abundance. These are also causative factors for algal population fluctuations. The organisms in aquatic systems either autotrophic in nature or heterotrophic are indicators of that. It also indicates that the levels of anthropogenic intervention like pollution. Phytoplankton's are good resource for zooplanktons as food.

STUDY AREA

We take four lakes for studying of phytoplankton distribution, diversity, and dominance of some species. Among these four lakes we expressed in terms of four sites. In this we divide each site into three areas based on their catchment of water, storage and downstream distribution water. In this some areas divides into sub areas due to some are having more upstream catchment areas and also downstream distribution .Site I located in west part of Jammikuta town (it is one of Tahasil of Karim Nagar district,Telangana, India. All four sites are in Karimnagar district but distributed in two Tahasils namely i.e. Jammikunta and Huzurabad. Site I having its border with villages Mothkula gudem, Machanapally, Jaggaiapally, Abadi, and itself Jammikunta Town. It occupies nearly acres (500). This water formerly used as irrigation, drinking, and pisciculture. Now a day's also used as irrigation. It distributed nearly seventy five percent urbanized areas. Only 25% part non urbanized area. Its main water source upstream ponds and one of the drains of upstream. It has two downstream canals, one is severely polluted with rice mill effluents, dumping of polythene bags, which are used and throwing, and domesticated water. Site II was situated north side to near the town of Huzurabad. It was a revenue division in Karimnagar district. Borders with own itself and Joopaka, Rangapoor and Rampoor, site having of two upstream catchments, in this one is polluted another one irrigated water catchment and combination with domesticated water .But not polluted as much as of site I. It occupies nearly acres of (300). Site III located in village south part of Chelpur. It occupies nearly 400 acres borders with West side Thokalapally, North part of Chelpur, south Joopaka. East another two villages it has two upstream catchment purely rain water and sometimes canal water from S.R.S.P.L.M.D. Karimnagar,and also upper parts of paddy fields. This one is free from pollution, it has two down streams to irrigation purpose and drinking water. Site IV was located in village Thanugula west Ganrapally, East Rachapally and South Nagampet. It occupies nearly (350) acres, having with two catchment areas, two down steam. This lake water mainly used for irrigation, Present study area belonging to lentic water ecosystem in terms of ecological conditions. These are mostly near to human civilization, so it is easily contaminated with eutrophication. The temperature vary throughout the study area in rainy season 27-35,in winter 16-25,summer 35-43. Water temperature also one of the major determinant factors for the growth oh of phytoplaktons and zooplanktons.

MATERIALS AND METHODS

The Water Samples From these lakes were collected fortnightly during the period of June 2013 to May 2015. The data was pooled together and was represented annually. The physico chemical

analysis of water samples performed as per the procedures. Samples were subjected to use for further investigation by standard methods. Phytoplankton were identified according to Fritsch (1975*)*, and standard Manuals and published papers, Sreenivasa *et.al.* (1973), Santhanam *et.al.* (1987) and Tomas (1995).

RESULTS AND DISCUSSION

In present observation, 74 algal species occurred, 15 from Bacillariophyceae with 19.5% of total species contribution, among them Navicula genera with two species and dominant within Bacillriophyceae class. Cyclotella 2.21 species from class Cyanophyceae, 11 genera species 21contribution nearly 30%, among these Oscillatoria genera with four species, followed by Phormordium, Nostoc, Anabeana. Oscillatoria, Phormordium are dominant over all the sites, followed by Anabeana, Nostoc, Arthospira also observed in sites. Spirulina observed in tiny amount.

33 species from Chlorophyceae, species contribution 44%, with 22 genera Scenidesmus,5 Pediastraum,4, Cosmarium, 3, Clamydomonas, 2 Chlorella,2 show species composition with 2 species, in these Spirogyra, Cladphora, Oedogonium, Zygnema, Chlorella, Scenedesmus present in all sites. Euglenophyceae with genera 4, species 5.7% species composition.

.site wise analysis in table no.2

Observation made that, the month of June to September Chlorophyceae members dominant over the other classesin that Pediastraum, Closterium, Casmarium, Scenidesmus, dominant other species. Bacllariophyceae members particularly Navicula appear good above period, October to March Cyanophyceae show dominance because of the Chlorophyceae depleted from the month ending of September, due to the capability of Chlorophyceae members in cold conditions in winter and summer high temperatue due high intensity of light in late summer, favours the growth of BGA.

Chlorophyceae and Cyanophyceaedominant in summer season –due tothe phosphate concentrates to high, by decline the water levels and accumulates with calcium and magnesium salt and in July to November phosphate low levels ,plenty of water and its runoff . Another causative factor nitrate concentration high during spring to summer. If we take into consideration of polluted aquatic systems phosphate levels high compare to site III, IV. Especially Cyanobacteria more dominant over Chlorophyceae in summer season. During rainy period phytoplankton population low due to floods and water currents variation and it's unclear surface unfavourable to penetrate the light. But September onwards water settle down and clears its surface. In present study, its water levels decline from November onwards, but in site I, Regularly intake the domestic water flow causes continuous eutrophication of its one three sub sites, another two sub sites are plain. Site II also receive domestic water flow as like site I, but not as much as.

From the Indian civilization all the wellknown are,based on fresh water ecosystems. Telangana state as under semi arid climatic region except some area ,since 13^{th} century its agricultural system based on lentic ecosystem. Lentic ecosystems are integral part of social development and economical development of this area. So phytoplankton's are indirectly responsible for many families' economical developments. Site III,IV, both far from anthropogenic activities, this water majorly used for irrigation and also its main source of water by rain small rivulets.

The major threats to lentic ecosystems by bathing using of soaps, washing clothes, cleaning vehicles (source of automobile discharge) dumping of garbage, hospital wastage, pesticide remains etc. This is done by only ignorance of illiterates, but some activities are as a functional.

CONCLUSION

Fresh water ecosystems are good source for diversity of flora, fauna lentic ecosystems are play major role in social and economic development of this region. If these human interventions continuous no longer of the fresh water ecosystems to sustain.

ACKNOWLEDGEMENTS

The author grateful thank to Prof. S. Seeta Ram Rao, Professor, Department of Botany, Plant Physiology And Molecular Biology Lab.UCS, Osmania University, Hyderabad, Telangana.

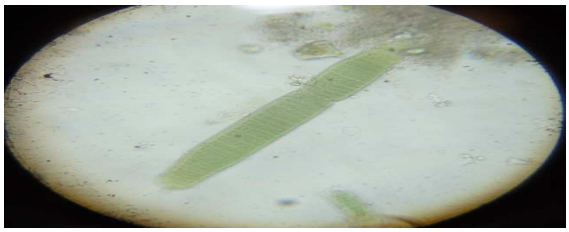
Table.No.1. Documentation of phytoplankton species

S.NO	ALGAL SPECIES	CLASS	SITE I	SITE II	SITE III	SITE IV	TOTAL
1	Ankistrodesmus falcatus (Corda) Ralfs	Chlorophyceae	*	*	*	*	**4**
2	Chara vulgaris	Chlorophyceae	-	*	*	*	**3**
3	Chlamydomonas dinobryni	Chlorophyceae	*	-	*	*	**2**
4	C.globosa	Chlorophyceae	*	*	**	*	**4**
5	Chlorella vulgaris Beyernick	Chlorophyceae	*	*	*	*	**4**
6	Cladophora cryspata	Chlorophyceae	-	-	*	*	**2**
7	Closterium acerosum (Schrank) Ehr.	Chlorophyceae	-	-	*	*	**4**
8	Cosmarium constuctum	Chlorophyceae	-	*	**	*	**3**
9	C.reiniformis	Chlorophyceae	*	-	*	**	**3**
10	C.tumidum	Chlorophyceae	-	-	*	**	**2**
11	Eudorina elegans	Chlorophyceae	-	*	**	*	**3**
12	Nitella batracosperma	Chlorophyceae	-	-	*	*	**2**
13	Microspora sp	Chlorophyceae	-	-	*	*	**2**
14	Oedogonium borisianum	Chlorophyceae	*	*	**	*	**4**
15	Oocystis gigas	Chlorophyceae	*	*	**	*	**4**
16	Pandorina morum Bory	Chlorophyceae	*	-	*	*	**3**
17	Pediastrum biradiatum Presc	Chlorophyceae	-	*	*	**	**3**
18	P.duplex	Chlorophyceae	*	-	**	*	**3**
19	P.simplex	Chlorophyceae	-	*	**	**	**3**
20	P.tetras	Chlorophyceae	*	-	*	*	**3**
21	Pithophora varia	Chlorophyceae	*	-	**	**	**3**
22	Scenidesmus acuminatus	Chlorophyceae	*	*	**	**	**4**
23	S.amarus	Chlorophyceae	*	-	*	*	**3**
24	S.bicaudatus	Chlorophyceae	-	*	**	*	**3**

25	S.quadracauda	Chlorophyceae	*	-	**	**	**3**
26	S.spinosus	Chlorophyceae	*	*	**	**	**4**
27	Spirogyra plana	Chlorophyceae	*	*	**	**	**4**
28	S.variance	Chlorophyceae	*	**	**	**	**4**
29	Staurastrum pinnatum	Chlorophyceae	*	-	**	*	**3**
30	Stegeoclonium sp.	Chlorophyceae	*	-	*	*	**3**
31	Tetraedron quadratum	Chlorophyceae	**	**	*	*	**4**
32	Ulothrix sp	Chlorophyceae	*	*	*	*	**4**
33	Zygnema czurde	Chlorophyceae	**	*	**	**	**4**
34	Cyclotella oscitella	Bacillariophyceae	*	-	*	*	**3**
35	Cymbella cymbiformis	Bacillariophyceae	**	*	**	**	**4**
36	C.tumida	Bacillariophyceae	-	-	*	**	**2**
37	Diatoma elangata	Bacillariophyceae	-	-	*	*	**2**
38	Fragillaria intermedia	Bacillariophyceae	*	-	**	**	**3**
39	Fragillaria.sp	Bacillariophyceae	-	-	**	**	**2**
40	Gomphronema accuminatum	Bacillariophyceae	*	*	*	*	**4**
41	G.gracile	Bacillariophyceae	-	-	*	-	**1**
42	Navicula anglica	Bacillariophyceae	*	*	**	**	**4**
43	N.cyprinus	Bacillariophyceae	-	*	**	**	**3**
44	Nitzschia acuta	Bacillariophyceae	-	-	**	*	**2**
45	N.sigma	Bacillariophyceae	-	-	**	**	**2**
46	Suriella ovate	Bacillariophyceae	*	-	*	*	**3**
47	Synedra capitata	Bacillariophyceae	-	*	**	**	**3**
48	S.ulna	Bacillariophyceae	*	*	*	*	**4**
49	Anabaena constricta	Cyanophyceae	*	*	*	*	**4**
50	A. variabilis	Cyanophyceae	*	*	-	*	**3**
51	Arthrospira platensis (Nordst	Cyanophyceae	**	*	*	-	**3**
52	Chroococus dispenses	Cyanophyceae	*	*	*	-	**3**
53	C.turgidus	Cyanophyceae	**	*	*	*	**4**
54	Lyngbya ceylanica	Cyanophyceae	**	-	*	*	**3**
55	Microcystis elegans	Cyanophyceae	**	**	-	-	**2**
56	M. aerusinosa	Cyanophyceae	**	**	-	-	**2**
57	Nostoc commune	Cyanophyceae	**	*	*	-	**3**
58	N.tennue	Cyanophyceae	**	*	*	*	**4**
59	Oscillatoria limosa	Cyanophyceae	**	*	*	*	**4**
60	O.planktonica	Cyanophyceae	*	*	-	-	**2**
61	O.subtillissima	Cyanophyceae	*	**	*	*	**4**
62	O.suraliformis	Cyanophyceae	**	*	-	*	**3**
62	Phormidium molle	Cyanophyceae	**	**	-	*	**3**
64	P.fragile	Cyanophyceae	**	*	*	*	**4**
65	P.tennue	Cyanophyceae	**	*	-	-	**2**
66	Pseudanabeanopsis sp	Cyanophyceae	**	**	*	*	**4**
67	Spirulina major	Cyanophyceae	*	**	-	-	**2**

	(Kütz) Gomont						
68	S.subtlisima	Cyanophyceae	*	*	*	-	**3**
69	Synechococcus aponina	Cyanophyceae	*	**	*	*	**4**
70	Euglena cadata	Euglenophyceae	**	*	-	*	**3**
71	Phacus acuminatus	Euglenophyceae	*	**	*	-	**3**
72	P.longicauda	Euglenophyceae	*	*	*	-	**3**
73	Trachelomonas sp	Euglenophyceae	**	*	-	*	**3**
74	Lepocinclis fusiformis	Euglenophyceae	**	*	-	-	**2**
Total			**55**	**49**	**63**	**61**	

Plate.1

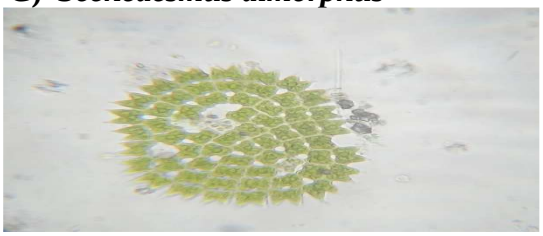


a) *Oscillatoria tenuis*

b) *Cosmarium margaritatum*

C) *Scenedesmus dimorphus*

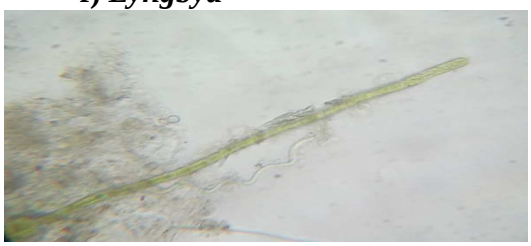
d) *Chlamydomonas globosa* Snow



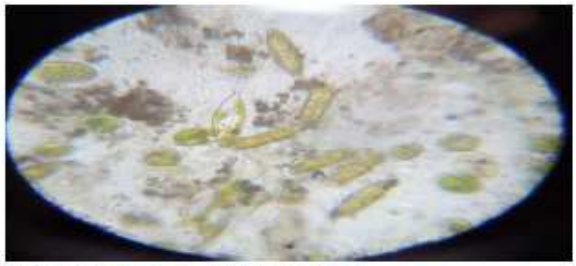
e) *Pediastrum duplex*

f) *Lyngbya*

f) *Pithophora* sp.



g) *Arthirospira & Oedogonium*



h)*Navicula cuspidate* Kuetz.

i) *Closterium acerosum* (Schrank) Ehr.

j) *Nostoc & spirogyra*

k) *Microcysis sp.*

Table No.2. Species Dominance

Species dominance	Site I	Site II	Site III	Site IV
Chlorophyceae	6.05	6.05	48.48	33.33
Bacillariophyceae	--	--	53.33	60.00
Cyanophyceae	61.00	30.33	12.11	10.22
Euglenophyceae	60.00	20.00	--	--

REFERENCES

[1]. https://www.google.co.in/maps/@18.2880983,79.4273392,5542m/data=!3m1!1e3
[2]. APHA **2012** Standard Methods for examination of water and wastewater (22nd ed.), 1175 pp. American Public Health Association, Washington DC.
[3]. Anitha, G.S.,V.A.Chandrasekhar and M.S.Kodarkar **2005** Limnological studies on MIR Alam lake Hydrabad. Poll. Res. 24:681 - 687.
[4]. Bhatt, L. R., P. Lacoul, H. D. Lekhal and P. K. Jha **1999** Physico-chemical characteristic and phytoplanktons for Taudha lake, Kathmandu. Poll. Res. 18 (4): 353-358.
[5]. Carpenter, S. R., N. F. Caraco, D. L. Correll, R. W. Howarth, A. N. Sharpley, and V. H. Smith **1998** Nonpoint pollution of surface waters with phosphorus and nitrogen. Ecological Applications. 8:559–568.

[6]. Chaudhari A.M., Mahajan S.R. and Nandan S.N. **2007**. Some *Nostocaceae* from paddy field soils of North Maharashtra, Research link-37(2); 13-15.
[7]. Desikachany, T.V. **1959** Cyanophyta.686pp. ICAR Monograph, New Delhi. India.
[8]. Dhanalakshmi, V., K.Shanthi and K.M.Remia **2013** Physicochemical study of Eutrophic pond in Pollachi town, Tamilnadu, India. Int.J.Curr.Microbiol.App.Sci. 2013, 2(12): 219-227.
[9]. Dhande J.S. and Jawale A.K. **2009**. Genus *Cosmarium corda* from Hratala lake District Jalgaon Maharashtra, Shood samiksha aur Mulyacan,7, 196-198.
[10]. Dhande J.S. and Jawale A.K. **2008**. *Oedogonium (Chlorophyceae, Oedogoniales)* from Jalgaon District, Indian Hydrobiology, 11(1), 43-46.
[11]. Dhande J.S. and Jawale A.K. **2008**. On Genus *Fragilaria lyngbye* and *Synedra* Ehr. From Hartala lake, Maharashtra, Indian Hydrobiology, 11(2), 217-222.
[12]. Dhande J.S. and Jawale A.K. **2006**. On *Oedogonium* (Link) Hirn from Jalgaon District, Maharashtra, GEOBIOS 33(4); 321-322.
[13]. Dhande J.S. and Jawale A.K. **2007**. On *Spirogyra* (Link) from Hartala lake, District Jalgaon, Maharashtra, Proceeding Nat. Symp. "Recent Trends in Algal Biodiversity" , 101-103.
[14]. Dutta, S.**1985** The Mataks and Their Kingdom: Castes and Tribes of Assam. Chugh Publications. Assam (India), 279 pp.
[15]. Fokmare, A. K. and M. Musaddiq **2001** Comparative Studies of Physico-Chemical and Bacteriological Quality of Surface and Ground Water at Akole (MS). Pollution Research. 4(1): 56-61.
[16]. *J. Algal Biomass Utln*. **2014**, 5 (2): 1 - 7 Assessment of water quality using phytoplankton ISSN: 2229- 69055
[17]. Fritsch, F.E. **1961** The structure and the reproduction of the algae, Vol II. 791pp. University Press, Cambridge.
[18]. Fritsch, F.E.**1935** The structure and the reproduction of the algae. Vol I. 791pp. University Press, Cambridge.
[19]. Goel, P.N., A. Y. Khatavkar, A. Y. Kulkarni and R. K. Trivedy **1986** Limnological studies of a few freshwater bodies in southwestern Maharasthra with special reference to their chemistry and pollution. Poll. Res. 5 (2): 79-84.
[20]. Hulyal S.B. and B.B. Kaliwal **2011** Seasonal Variations in Physico-Chemical Characteristics of Almatti Reservoir of Bijapur district, Karnataka State. I.J.E.P. 1(1):58-67.
[21]. Jawale A.K, Kumawat D.A. and Chaudhari N.A. **2010**. Additions to the *Volvocales* Maharashtra I, Indian Hydrobiology, 13(1); 13-18.
[22]. Jawale A.K, Kumawat D.A. and Chaudhari N.A. **2009**. Fresh water *Chlorophyceae* from Jalgaon District, North Maharashtra I-Unicellular Volvocales, Indian Hydrobiology, 12(1); 1-9.
[22]. Jawale A.K, Kumawat D.A. and Chaudhari N.A. **2009**. Fresh water *Chlorophyceae* from Jalgaon District, North Maharashtra II-colonial Volvocales, J. Indian bot. Soc., 88(3 & 4); 231-235.Haranbaree dam and Mosam river of Maharastra. J. Environ. Biol. 26:223-227
[23]. Jawale A.K, Kumawat D.A. and Chaudhari N.A. **2010**. Some members of order *Chlorococcales* new to Maharashtra, BIOINFOLET, 7(2); 94-97.
[24]. Jawale A.K, Kumawat D.A. and Chaudhari N.A. **2010**. Some taxa of *Chlamydomonas* (*Chlorophyceae: Volvocales*) new to Maharashtra, BIOINFOLET, 7(4); 298-301.
[25]. Jawale A.K, Kumawat D.A. and Dhande J.S. **2005**. Desmids from fish ponds at Anjale District Jalgaon (M.S.) India, Proceeding National conference in Plant Science, Pravaranagar, 472-478.
[26]. Jawale A.K. and Dhande J.S. **2005**. A Preliminary survey of *Chlorococales* from Hartala lake – Genus *Scenedesmus meyen*, Plant Diversity and Biotechnology, 45-48.

[27]. Jawale A.K. and Dhande J.S. **2005**. Some species of *Oedogonium* form Hartala Lake, District Jalgoan, Maharashtra, J. Aqua. Biol. Vol. 20(2), 17-20.

[28]. Kannan V. and S.V. Job 1980 Diurnal depth wise and seasonal changes of physicochemical factors in Sathio reservoir. Hydrobiol.70 :103-117.

[29]. Karr, J .R., J D. Allen, and A. C. Benke **2000** River conservation in the United States and Canada. In P. J. Boon, Davies and B .R. Petts, G E (Ed.), Global perspectives on River conservation, pp 3–39 Science, Policy, and Practice. Wiley, New York.

[30]. Khurshid, S. Zaheeruddin and A.Basheer **1997** Pollution assessment and water quality status in parts of Cochin. I.J.E.P.18(4):246-249.

[31]. Koshy, M. and T. V. Nayar **1999** Water quality aspects of river Pampa. Poll. Res. 18(4):501-510.

[32]. Kützing, F. T. **1895** Species Algarum VI (1) 922pp, Brockhaus, Leipzing.

[33]. Mahajan Neelama and Mahajan A.D. **1990**. On some fresh water Blue green algae form Satpuda ranges in Jalgaon District (M.S.), Persectives in Phycology; 157-159.

[34]. Mahajan S.R. and Nandan S.N. **2004**. Blue green algae of Hartala lake of Jalgaon, Maharashtra, J.Aqua.Biol. 19(1): 11-12, 2004