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DIVERSITY OF CYANOPHYCEAE IN GORJA LAKE OF BHADRAWATI, DISTRICT CHANDRAPUR (M.S.), INDIA

Zoology

KEYWORDS : Gorja lake, Cyanophyceae, Diversity

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ABSTRACT

The Gorja Lake is principal fresh water body located in Gorja village of Bhadrawati tahsil in Chandrapur district of Maharashtra state. Bhadrawati is a tahsil place and it is 25 km north side of Chandrapur and 125 km south east side from Nagpur. It is situated at about 211 m above the mean sea level. A Study of Cyanophyceae was undertaken during 2014 to 2016, two year to assess the types of Cyanophyceae present in this water body. This water body is used by local resident's people for washing cloth, open defecation and fishing activities. The Cyanophyceae is important group of fresh water blue green algae. They include some of the most common species which are important both ecologically and scientifically. During the present study 7 species of Cyanophyceae were found at all three sampling sites of Gorja lake.

INTRODUCTION

The Cyanophyceae means blue green algae may be unicellular organism or in the form of chain or filaments is called as trichon. Cyanophyceae one of the most significant algal groups among phytoplankton and it is also founded abundance in water bodies. The freshwater blue green algae occur in the unpolluted as well as polluted water body generally it exhibits a characteristic cyclic growth.

In present investigation Gorja lake is 10 km south side from Bhadrawati at about 198 m above mean sea level and is at 79o05'48''E longitude and 20o05'59'' N latitude. Gorja lake receives the water from the surrounding catchment areas during the monsoon period. The area of Gorja Lake is spread over 300 acres. The depth of water is 35 feet during the monsoon and 12 feet during the summer season. The water of this lake is primary used for washing, bathing fishing activities, agriculture and other domestic purpose but now it is at a transitional state with respect to degradation.

MATERIAL AND METHODS

Sample for planktonic study were collected monthly from three site of lake. The samples were collected in the morning hours between 8.30 a.m. to 10.30 a.m. 50 Lt. of water sample was filtrated through the plankton net made of bolting silk number 25 with mesh size 64 lime the collected samples were allowed to settle down by adding Lugol's Iodine. Normally sedimentation requires 24 hrs. after which supernatant was removed and concentrate was made up to 50 ml. depending the number of plankton and preserved in 5% formalin for further studies.

For the quantitative study the concentrated sample was shaken and immediately one drop of sample was taken on a clear micro side with the help of standard dropper the whole drop was then carefully covered with the cover glass and observed. Plankton identification up to genera and whenever possible upto species level was classified according to keys given by Prescott (1954), Edmonsonic (1959), Sehgal (1983), Adoni (1985), and APHA (1985) and standard analysis was undertaken as per Zar (2005).

Quantitative study of plankton was done by Sedgwick – Rafter Cell Method.

Sedgwick – Rafter Cell Method

The Sedgwick – Rafter Cell is a special kind of slide similar to the Haemocytometer. The cell has a 50 mm x 20 mm × 10 mm rectangular cavity that holds 1 ml. sample. The cell is moved in horizontal direction on the stage of an inverted microscope and plankton species encountered in the field are enumerated. A number of replicate samples are enumerated to calculate plankton/lit.

Plankton (units/lit) = n x C/V

Where, n = number of plankton in 1ml

C = Volume of Concentrate

V = Volume of sample in lit.

RESULT AND DISCUSSION

In the present investigation a total 7 species were recorded from the lake under study. In site A, Cyanophyceae were represented by 6 species in 2014-15 and 7 species in 2015-16, in site B, Cyanophyceae were represented by 6 species in 2014-15 and 6 species in 2015-16 and site C, Cyanophyceae were represented by 7 species in 2014-15 and 7 species in 2015-16.

Shirsat, *et.al.,* (2004) observed 6 species of Cyanophyceae from freshwater pond in Dharmapuri in Beed District, Maharashtra. Tiwari and Chauhan (2006) founded 21 species of Cyanophyceae from Kithan lake of Agra, Uttar Pradesh. Jayabhaye, *et.al.,* (2007) revealed 7 species of Cyanophyceae from Parola dam of Hingoli, Maharashtra. Aijaz, *et.al.,*(2009) reported Cyanophyceae contributed 10 species from Wular lake. R. Prathap Singh and G.S. Regini Balasingh (2011) observed 14 species of Cyanophyta in Kodaikanal lake of Dindugal District. D.S. Malik and Umesh Bharti (2012) reported 7 species belong to Cyanophyceae in Sahastradhara stream at Uttarakhand. M.R. Abdar (2013) observed seven taxa of Cyanophyceae from Morna lake of Shirala (M.S.), Sachinkumar R. Patil, *et.al.,* (2015) founded 1 species belongs to Cyanophyaceae in major freshwater bodies of Ajara Tahsil in Kolhapur District (M.S.), R. Prathap Singh and G.S. Regini Balasingh (2012) reported 18 species of Cyanophycaea in Kodaikanal of Dindigul District, Tamilnadu. Patil Alaka A. (2015) recored 5 species of Cyanophyceae in Sangli, Maharashtra. Priya Gopinath, T. and Ajit Kumar, K.G. (2015) observed 7 genera belong to Cyanophyceae in the fresh water lake in Thiruvananthapuram.

In present investigation in site A, During 2014-15, 6 species are recorded among which *Oscillatoria sp.* (122 no./lit) is dominant followed by *Microcystis sp.* (120 no./lit), *Agmenellum quadruplicatum* (55 no./lit), *Nostoc sp.* (51 no./lit), *Anabaena sp.* (43 no./lit) and *Spirulina sp.* (34 no./lit). In site A, during 2015-16, 7 species are recorded among which *Microcystis sp.* (198 no./lit) is dominant followed by *Gleotrichia echinulata* (151 no./lit), *Nostoc sp.* (150 no./lit), *Oscillatoria sp.* (149 no./lit), *Agmenellum quadruplicatum* (124 no./lit), *Anabaena sp.* (59 no./lit) and *Spirulina sp.* (45 no./lit).

In site B, during 2014-15, 6 species were recorded among which *Microcystis sp.* (145 no./lit) is dominant followed by *Oscillatoria sp*. (67 no./lit), *Nostoc sp.* (49 no./lit), *Anacystis cyanea* (41 no,/lit), *Agmenellum quadruplicatum* (34 no./lit) and *Anabaena sp.* (34 no./lit). In site B, during 2015-16, 6 species were recorded among which *Microcystis sp*. (293 no./lit), was dominant followed by *Oscillatoria sp.* (147 no./lit), *Nostoc sp*. (102 no./lit), *Analystis cyanea* (87 no./lit), *Anabaena sp.* (67 no./lit) and *Agmenellum quadruplicatum* (32 no./lit)

In site C, during 2014-15, 7 species were recorded among which *Microcystis sp.* (198 no./lit) was dominant followed by *Oscillatoria sp*. (196 no./lit), *Nostoc sp.* (143 no./lit), *Agmenellum quadruplicatum* (75 no./lit), *Spirulina sp*. (36 no./lit), *Anabaena sp.* (34 no./lit) and *Rivularia sp.* (12 no./lit). In site C, during 2015-16, 7 species were recorded among which *microcystis sp.* (233 no./lit), was dominant followed by *Oscillatoria sp.* (146 no./lit), *Gleotrichia echinulata* (133 no./lit), *Nostoc sp.* (91 no./lit), *Anacystis cyanea* (74 no./lit), *Anabaena sp.* (62 no./lit) and *Spirulina sp.* (27 no./lit).

Among the different species of Cyanophyceae in site A, *Microcystis sp.* was dominant followed by *Gleotrichia echinulata, Nostoc sp., Oscillatoria sp., Agmenellum quadruplicatum, Anabaena sp. and Spirulina sp.* in site B of lake *Microsystis sp.* was dominant followed by *Oscillatoria sp., Nostoc sp., Anacystis cyanea, Anabaena sp.* and *Agmenellum quadruplicatum* in site C of lake *Microsystis sp.* was dominant followed by *Oscillatoria sp., Nostoc sp., Angmenellum quadruplicatum, Gleotrichia echinulata* and *Anabaena sp*.

According to Harris and James (1974) presence of *Microcystic sp.* the toxin producing the blue green algae in abundance is a significant feature of tropical. Parmashivam and Sreenivasan (1981) recorded the polluted water bodies having heavy growth of the blue green algae. M.R. Abdar (2013) observed presence of organic pollution indicator algal species like *Microcystis aeruginosa, Oscillatoria limnetica,* at Morna lake Shirala (M.S.). Mischke and Nixdorf (2003) have observed that the presence of *Anabaena* and *Oscillatoria indicates* beginning of biological pollution.

Kamat, *et.al.,* (2006) was of the opinion that blue green algae occurred continuously in the contaminated tank while occasionally in less unpolluted tank. They reported frequent existence of species like *Microcystic, Oscillotoria* and *Anabaena* in the contaminated tanks of Shimoga District, Karnataka. Jindal and Gusain (2007) founded the presence of *Microcystis sp., Oscillotoria sp.* and the *Spirullina sp.* as a pollution indicator species of Bichorli pond, Rajasthan. Shashi Shekhar, *et.al.,*(2008) and Baruah and Bhaswati Kakati (2012) observed that *Microcystis aeruginosa* is related with highest degree of pollution and may be considered as the best single indicator of the organic pollution in any water bodies.

In the present investigation the Cyanophyceae was maximum during in Winter season and minimum during in the Monsoon season. Pendse, *et.al.,* (2000) observed the maximum population of in blue-green algae during winter season. Mazher Sultana and Dawood Sharif (2004) noted the maximum of blue-green percentage during Winter season and minimum during in Monsoon. D. S. Malik and Umesh Bharti (2012) founded that Cyanophyceae were maximum during in winter season and minimum during monsoon season in Sahastradhara stream at Uttarakhand. In the present investigation, the dominant of *Microcystis sp.* and *Oscillotoria sp.* in site A and site B and site C showed the polluted nature of the three sites shows lake is highly polluted.

CONCLUSION

In the present investigation, the maximum amount of Cyanophyceae during in Winter due to favorable sunlight, increase in domestic sewage, human generated pollution, an minimum quantity during the Monsoon season is probably due to increase in water quantity.

Table 1: Yearly variation of Phytoplankton from sites of Gorja Lake during year 2014-15

S.N.	Parameters	A	B	C	Total
1	Cyanophyceae	35.42 ± 37.63	30.83 ± 14.12	57.83 ± 22.07	45.00 ± 3.93

Table 2: Yearly variation of Phytoplankton from sites of Gorja Lake during year 2015-16

S.N.	Parameters	A	B	C	Total
2	Cyanophyceae	73.00 ± 51.05	60.67 ± 34.68	63.83 ± 28.44	65.83 ± 9.53

Table 3: Two yearly variation of Phytoplankton from sites of Gorja Lake during year 2014-16

S.N.	Parameters	A	B	C	Total
3	Cyanophyceae	54.21 ± 40.77	45.75 ± 20.94	60.83 ± 20.59	53.60 ± 9.43

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