

DIVERSITY OF CHOLOROPHYCEAE IN VALVAN LAKE OF MAVAL

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ABSTRACT: -

Valvan Lake is a principal fresh water body located in Maval Tehsil, Pune, Maharashtra. It is situated at about 159 m above the mean sea level. A study of Rotifer was undertaken during 2014 to 2015, one years to assess the types of Chlorophyceae present in this water body. This water body is utilized by local residents for washing clothes and also for open defecation. Siltation is also responsible for polluting the water. The Chlorophyceae are large and an important group of freshwater green algae. They include some of the most common species which are important both ecologically and scientifically. During the present study 24 species of Chlorophyceae were found at all sampling sites of Lake.

Keywords: - Valvan Lake, Chlorophyceae, Diversity.

INTRODUCTION

Chlorophyceae (from the Greek word chloros, meaning “green”) make up an extremely large and important class of green algae and these are distinguished mainly on the basis of ultra structural morphology. Members may be unicellular, colonial or filaments. The green algae (Chlorophyceae) compose the largest and most varied phylum of algae and they are the most closely related to the higher plants because of their similar photosynthetic pigments, storage of starch and the fine structural organization of the chloroplast. (Happy Wood, 1988) The green algae include a greater diversity of cellular organization and morphological structure than are found in any other algal division. There are approximately 350 genera and 2650 living species of Chlorophyceans. They come in a wide variety of shapes and forms, including free-swimming unicellular species, colonies, non-flagellate unicellular, filaments.

MATERIAL AND METHODS

The water samples were collected from the four sites of Lake such as site A, site B, site C. and site D. The samples were collected in the morning hours between 8.30 a.m. to 10.30 a.m. 50 liters 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. Sedimentation of

the solution requires 24 hrs after which supernatant was removed and concentrate was made up to 50 ml depending on the number of plankton and preserved in 5% formalin for further studies.

For the quantitative study, the concentrated sample was shaken and one drop of sample was taken on a clear micro slide with the help of a standard dropper, the whole drop was carefully covered with the cover glass and observed. Plankton identification up to genera and whenever possible up to species level was classified according to keys given by Edmondson (1959), 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 x 10 mm rectangular cavity that holds 1 ml sample. The cell is moved in horizontal directions on the stage of an inverted microscope and planktonic species encountered in the field are enumerated. A number of replicate samples are enumerated to calculate plankton / lir.

$$\text{Plankton (Units /lir.)} = n \times c / v$$

Where,

n = number of plankton in 1 ml. c = volume of concentrate.

v = volume of sample in liters.

RESULT AND DISCUSSION

During the present study Chlorophyceae were observed as the most dominant group among all the phytoplanktons. The abundance of Chlorophyceae was also reported by Sakhare and Joshi (2002) in Yeldari Reservoir, Nanded District, Maharashtra. Pawar and Phulle (2006) recorded Chlorophyceae were found to be dominant throughout the study of Pethwadaj dam recorded the same Kandhar, Nanded, Maharashtra and Jayabhaye, *et.al.*, (2007) in Parola dam, Hingoli District, Maharashtra. R. Prathap Singh and G.S. Regini Balasingh (2012) also recorded that chlorophyta was maximum as genus in Kodaikanal Lake, Dindugal District. D.S. Malik and Umesh Bharti (2012) revealed that Chlorophyceae were dominant in Sahastradhara stream at Uttarakhand. K. Harish Kumar (2015) recorded that Chlorophyceae with 27 species and Bacillariophyceae with 22 species were dominant in Jannapura tank, Bhadravati, Karnataka. Patil Alaka A. (2015) recorded the Chlorophyceae were found to be dominant over other groups in Bhambarde Reservoir, Sangli, Maharashtra. Sachinkumar R. Patil,

et.al., (2015) revealed that Chlorophyceae were dominant at Yarandol Khanapur in major freshwater bodies of Ajara, Kolhapur, Maharashtra.

In the present investigation the dominance of Chlorophyceae may be due to high level of dissolved oxygen. Dhakar (1979) stated that the green algae prefer water with high concentration of dissolved oxygen.

A total of 24 species of Chlorophyceae were recorded in all the four sites of the Lake under study. The species diversity shows little variation in sampling sites of the lake. During the year in site A, Chlorophyceae were represented by 24 species in 2014-2015 in site B, Chlorophyceae were represented by 20 species in 2014-2015, in site C of Lake, Chlorophyceae were represented by 19 species in 2014-15 and in site D, Chlorophyceae were represented by 19 species in 2014-15 Kumawat and Jawale (2003) observed 14 genera belonging to Chlorophyceae from a freshwater pond at Dharmapuri in Beed, Maharashtra. Pawar, *et.al.*, (2006) recorded 26 species of Chlorophyceae and observed *Ankistrodesmus fal-catus* as a abundant species in Chlorophyceae in Petwadas dam, Kandhar, Nanded, Maharashtra. Tiwari and Chouhan (2006) collected 34 species of Chlorophyceae in Kitham Lake, Agra, Uttar Pradesh. Waghmare and Mali (2007) recorded 10 species of Chlorophyceae in a minor irrigation dam in Kalamnuri, Hingoli, Maharashtra. Aijaz, *et.al.*, (2009) observed of 43 species of Chlorophyceae in Wular Lake. R. Prathap Singh and G.S. Regini Balasingh (2012) recorded 43 species belonging to chlorophyta in Kodaikanal Lake, Dindugal District. D.S. Malik and Umesh Bharti (2012) recorded 12 species of Chlorophyceae in Sahastradhara stream at Uttarakhand. R. Prathap Singh and M.R. Abdar (2013) reported only one species of Chlorophyceae in Morna Lake Shirala, Maharashtra. Sachinkumar R. Patil, *et.al.*, (2015) recorded 16 species belonging to Chlorophyceae in major freshwater bodies of Ajara, Kolhapur, Maharashtra. Patil Alaka A. (2015) recorded 22 species of Chlorophyceae in Bhambarde reservoir, Sangli, Maharashtra.

In site A, during 2014-2015, 24 species were recorded among which *Cladophora sp.* (413 no./ltr.) were dominant followed by *Ankistrodesmus sp.* (327 no./ltr.), *Chlorella sp.* (316 no./ltr.), *Chla-mydomonas sp.* (131 no./ltr.), *Chara sp.* (110 no./ltr.). *Closteridium lunula* (72 no./ltr.), *Chlorococcum humicola* (59 no./ltr.), *Nitella sp.* (59 no./ltr.), *Cylindrospermum sp.* (53 no./ltr.), *Euastropsis richteri* (53 no./ltr.), *Pleurodiscus sp.* (53 no./ltr.), *Spirogyra sp.* (53 no./ltr.), *Hydrodictyon sp.* (51 no./lit.), *Trochiscia pachyderma* (44 no./lit.), *Staurastrum sp.* (44 no./ltr.), *Pediastrum tetras* (43 no./ltr.), *Gonichloris sp.* (42 no./ltr.), *Micrasterias pinnatifida* (40 no./ltr.), *pleurodiscus sp.* (40 no./ltr.), *Cosmarium granatum* (39 no./ltr.), *Gloeocystis gigas* (37 no./ltr.), *Oedogonium sp.* (36 no./ltr.), *Volvox sp.* (28 no./ltr.), *Cylindrospermum sp.* (25 no./ltr.) and *Closteridium linula* (22 no./ltr.)

In site B, during 2014-2015, 20 species were recorded among which *Cladophora sp.* (309 no./ltr.) were dominant followed by *Ankistrodesmus sp.* (223 no./ltr.), *Chlorella sp.* (183 no./ltr.),

Chlamydomonas sp. (116 no./ltr.), *Spirogyra sp.* (84 no./ltr.), *Coelasroum chodati* (67 no./ltr.), *Chara sp.* (62 no./ltr.), *Netrium digitus* (48 no./ltr.), *Staurastrum sp.* (47 no./ltr.), *Oedogonium sp.* (45 no./ltr.), *Euastropsis richtri* (42 no./ltr.), *Closteridium linula* (39 no./ltr.), *Microsterias pinnatifida* (39 no./ltr.), *Cosmarium granatum* (39 no./ltr.), *Pediastrum tetras* (33 no./ltr.), *Hydrodic-tyon sp.* (32 no./ltr.), *Pleurodiscus sp.* (27 no./ltr.), *Volvox sp.* (24 no./ltr.), *Cylindrospermum sp.* (23 no./ltr.) and *Gloeocystis gigas* (20 no./ltr.).

In site C, during 2014-2015, 19 species were recorded among which *Ankistrodesmus sp.* (233 no./ltr.) was dominant followed by *Chlorella sp.* (186no./ltr.), *Chlamydomonas sp.* (153 no./ltr.), *Pediastrum tetras* (64 no./ltr.), *Chara sp.* (59 no./ltr.), *Microsterias pinnatifida* (57 no./ltr.), *Netrium digitus* (57 no./ltr.), *Hydrodictyon* (55 no./ltr.), *Coelastrum chodati* (51 no./ltr.), *Euastropsis richteri* (46 no./ltr.), *Cosmarium granatum* (42 no./ltr.), *Chlorococcum humicola* (39 no./ltr.), *Spirogyra sp.* (38 no./ltr.), *Pleurodiscus sp.* (36 no./ltr.), *Oedogonium sp.* (36 no./ltr.), *Gloeocystis gigas* (21 no./ltr.), *Closteridium linula* (16 no./ltr.), *Cylindrospermum sp.* (15 no./ltr.) and *Trochiscia pachy-derma* (14 no./ltr.).

In site D, during 2014-2015, 19 species were recorded among which *Cladophora sp.* (299 no./ltr.) were dominant followed by *Ankistrodesmus sp.* (214 no./ltr.), *Chlorella sp.* (163 no./ltr.), *Chlamydomonas sp.* (102 no./ltr.), *Spirogyra sp.* (77 no./ltr.), *Coelasroum chodati* (47 no./ltr.), *Chara sp.* (42 no./ltr.), *Netrium digitus* (40 no./ltr.), *Staurastrum sp.* (40 no./ltr.), *Oedogonium sp.* (45 no./ltr.), *Euastropsis richtri* (42 no./ltr.), *Closteridium linula* (39 no./ltr.), *Microsterias pinnatifida* (37 no./ltr.), *Cosmarium granatum* (36 no./ltr.), *Pediastrum tetras* (35 no./ltr.), *Hydrodic-tyon sp.* (30 no./ltr.), *Pleurodiscus sp.* (24 no./ltr.), *Volvox sp.* (22 no./ltr.), and *Cylindrospermum sp.* (21 no./ltr.).

Among the different species in site A, *Cladophora sp.* was dominant followed by *Ankistrodesmus sp.*, *Chlorella sp.*, *Chara sp.*, *Cosmarium granatum* and *Chlamydomas sp.* In site B and D *Cladophora sp.* was dominant followed by *Ankistrodesmus sp.*, *Chlorella sp.*, *Cosmarium granatum*, *Chlamydomas sp.* and *Chara sp.* In site C, *Cladophora sp.* was dominant followed by *Ankistrodesmus sp.*, *Chlorella sp.*, *Chlamydomas sp.*, *Closteridium linula*, *Chlorococcum humicola*, *Chara sp.*, *Spirogyra sp.* and *Nitella sp.*

The presence of pollution indicates that species like *Ankistrodesmus sp.*, *Spirogyra sp.* as pollution indicators shows that the site A is eutrophic and site B is moving towards eutrophication. A.B. Sarwade and N.A. Kamble (2013) observed major species as *Chlorella sp.*, *Ankistrodesmus,sp.*, *Spirogyra sp.*, in Bharatnagar Lake, Miraj, Sangli Maharashtra. M.R. Abdar (2013) reported the presence of organic pollution indicator algal species like *Ankistrodesmus falcatus*, *Chlorella vulgaris* in Morna Lake, Shirala Maharashtra.

In the present investigation, Chlorophyceae were found maximum during the winter season at site A and minimum during the monsoon season at site C. Jayabhaye, *et.al.*, (2007) observed

maximum Chlorophyceae population during the summer and minimum during the rainy season in Parola Dam, Hingoli, Maharashtra. D.S. Malik and Umesh Bharti (2012) revealed that Chlorophyceae were maximum during the winter season and minimum during the monsoon season in Sahastradhara stream at Uttarakhand.

In the present investigation, Chlorophyceae were found maximum during the winter season due to high amount of dissolved oxygen and minimum during the monsoon season may be due to lower temperature and dilution resulting from rain water. It is also observed that dissolved Dissolved oxygen shows positive correlation with Chlorophyceae species.

Table No.1: Seasonal variation of Chlorophyceae in Valvan Lake at Site-A during year 2014-2015.

S.N.	Paramete	Summer	Monsoon	Winter	Total
1	Chlorophyceae	161.25±44.16	152.25± 21.66	217.00±16.48	12.02 ± 12.01

Table No.2: Seasonal variation of Chlorophyceae in Valvan Lake at Site-B during year 2014-2015.

S.N.	Paramete	Summer	Monsoon	Winter	Total
1	Chlorophyceae	72.00±26.47	175.75± 36.52	127.75± 36.50	125.17 ± 14.74

Table No.3: Seasonal variation of Chlorophyceae in Valvan Lake at Site-C during year 2014-2015.

S.N.	Paramete	Summer	Monsoon	Winter	Total
1	Chlorophyceae	65.75 ± 22.57	153.50 ± 20.95	85.25 ± 24.43	101.50 ± 1.42

Table No.4: Seasonal variation of Chlorophyceae in Valvan Lake at Site-D during year 2014-2015.

S.N.	Paramete	Summer	Monsoon	Winter	Total
1	Chlorophyceae	70..30±22.56	179.14± 34.92	131.02± 37.66	126.82 ± 6.47

Graphical representation of Seasonal variation of parameter Chlorophyceae of Diversity Chlorophyceae in Valvan lake at various site during year 2014-2015 is presented below

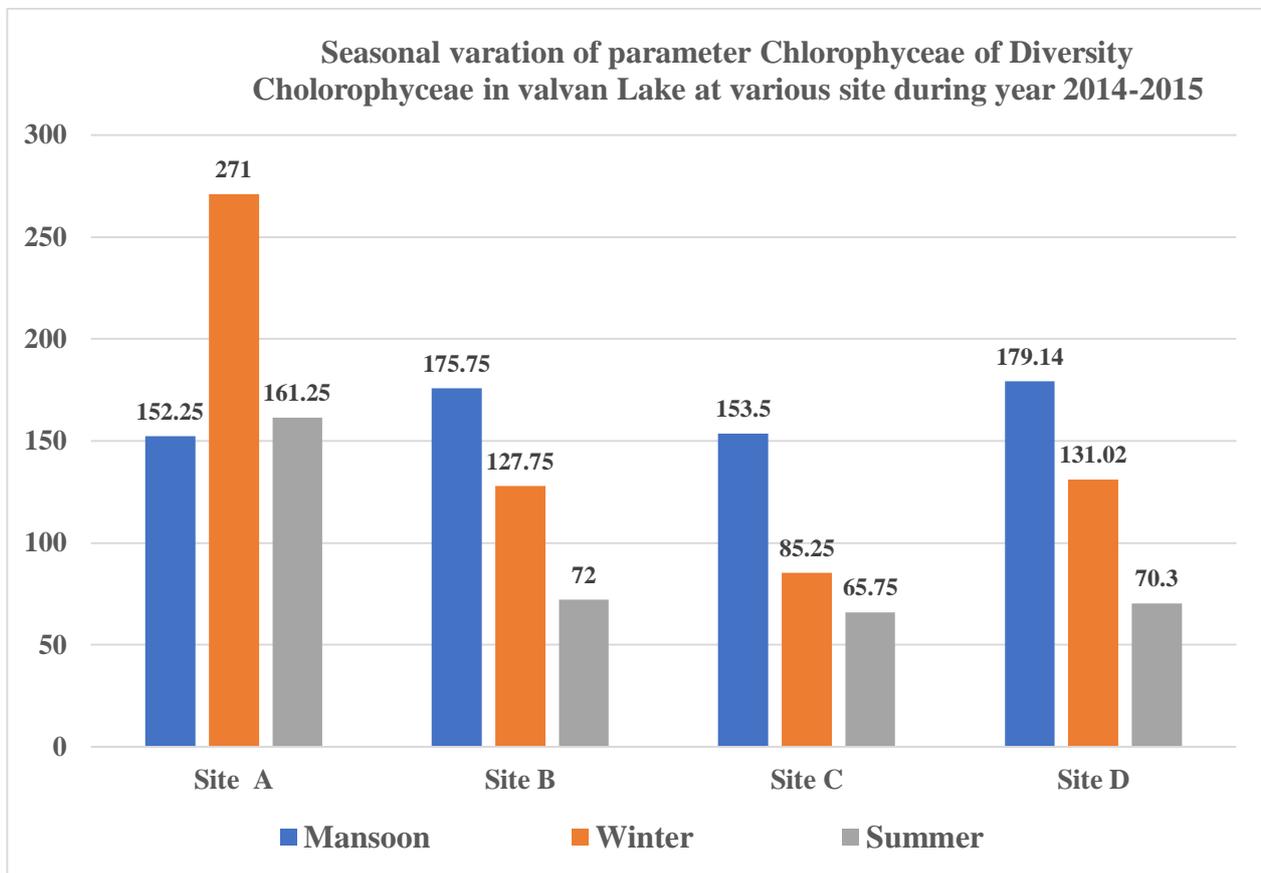


Figure 1`

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