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Seasonal Diversity of Chlorophyceae in Gorja Lake of Bhadrawati, District Chandrapur (M.S.), India.

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ABSTRACT

The present seasonal study was conducted in the Gorja Lake near Bhadrawati. Monthly and seasonal variation in the biological parameters for phytoplanktonic study like Chlorophyceae in Gorja lake were studied during the study period of June 2024 to May 2025 in which 17 species were recorded. This study indicates that the lakes of central India exhibit substantial variation in their biotic and abiotic characteristics.

KEY WORDS: Gorja lake, Chlorophyceae diversity, Phytoplankton.

INTRODUCTION

Gorja lake is principal fresh water body located in Gorja village of Bhadrawati tahsil in Chandrapur district of Maharashtra state. Gorja lake is 10 km south side from Bhadrawati tahsil at about 198 m above mean sea level and is at 79°05’48’’E longitude and 20°05’59’’ N latitude. Gorja lake receives the water from the surrounding catchment areas during the monsoon period. Monthly and seasonal variation in the biological parameters for phytoplanktonic study like Chlorophyceae in Gorja lake were studied during the study period of June 2024 to May 2025.

MATERIAL AND METHODS

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. Sample for planktonic study were collected monthly from each pond. 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 a standard dropper, the whole drop was then 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 Prescott (1954), Edmonson (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.

RESULT AND DISCUSSION

Planktons are sensitive to the environment changes. Plankton diversity is mostly dependent on water quality, climatic factors and various physico-chemical and biological status of water body must be simultaneously taken into a consideration for understanding the fluctuations of plankton population (Davis, 1955). The study of planktons are very useful for the estimation of quality of water and also understand the basic nature and generally economy of the lake.

Chlorophyceae is (from the Greek word chloros, meaning "green") make up an extremely large and very important class of green algae but Chlorophyceae these are distinguished mainly in the basis of ultrastructural morphology. Members may be unicellular, filamentous or colonical. The Chlorophyceae are generally found on rocks or soil forming a blackish crust when dry. Chlorophyceae there are approximate 350 genera and total approximately 2650 living species of chlorophyceans. They come in a wide variety of shapes forms and including frce-swimming unicellular species, unicells, colonies, non-fllagellate, filament and more.

In the present investigation, 17 species are recorded among which *Ankistrodesmus sp.* (216 no./lit) was dominant followed by *Chlorella sp.* (173 no./lit), *Chlamydomonas sp*. (139 no./lit), *Volvox sp.* (127 no./lit), *Chara sp.* (47 no./lit), *Netriumdigitus* (34 no./lit), *Pediastrum tetras* (40 no./lit), *Hydrodictyon sp.* (41 no./lit), *Cosmarium granatum* (49 no./lit), *Vorticella sp.* (47 no./lit), *Oedogonium sp*. (44 no./lit), *Spirogyra sp.* (44 no./lit), *Pleurodiscus sp.* (39 no./lit), *Staurastrum sp*. (37 no./lit), *Closteridium lunula* (25 no./lit), *Cylindrospermum sp.* (12 no./lit) and *Fritschiella* (6 no./lit).

During present study, Chloarophyceae was found the most dominant group among all the phyplanktons. The abundance of Chlorophyceae was also observed by Sakhare and Joshi (2002) in Yeldari reservoir of Nanded District, Maharashtra. Kumawat and Jawale (2003) reported 14 genera belonging to Chlorophyceae from a freshwater pond at Dharmapuri in Beed District, Maharashtra. Pawar and Phulle (2006) observed Chlorophyceae were found to be dominant throughout the study of Pethwadaj dam at taluka Kandhar of District Nanded, Maharashtra, Pawar and Phulle (2006) observed 26 species of Chlorophyceae and reported *Ankistrodesmus falcatus* as a abundance species in Chlorophyceae in Petwadas dam of Kandhar of Nanded District, Maharashtra. Tiwari and Chouhan (2006) observed 34 species of Chlorophyceae in Kitham lake of Agra, Uttar Pradesh. Waghmare and Mali (2007) reported 10 species of the Chlorophyceae in a minor irrigation dam of Kalamnuri of District Hingoli, Maharashtra. and Jayabhaye, *et.al.,* (2007) in a Parola dam of Hingoli District of Maharashtra. Aijaz, *et.al.,*(2009) founded of 43 species Chlorophyceae from Wular lake., R. Prathap Singh and G.S. Regini Balasingh (2012) also observed that chlorophytae were the maximum number of genus in Kodaikanal lake of Dindugal District, R. Prathap Singh and G.S. Regini Balasingh (2012) noted 43 species belong chlorophyta in Kodaikanal lake of Dindugal District, D.S. Malik and Umesh Bharti (2012) reported 12 species of Chlorophyceaein Sahastradhara stream at Uttarakhand. R. Prathap Singh and M.R. Abadar (2013) collected only one species of Chlorophyceae in Morna lake Shirala (M.S.), K. Harish Kumar (2015) observed that Chlorophyceae with 27 species and Bacillariophyceae with 22 species were dominant in the Jannapura tank Bhadravati taluka of Karnataka. Patil Alaka A. (2015) reported the Chlorophyceae noted to be dominant over other groups in Bhambarde Reservoir of Sangli, Maharashtra. Sachinkumar R. Patil, *et.al.,* (2015) also founded that Chlorophyceae was dominant in Yarandol Khanapur in major freshwater bodies of Ajara Tahsil in Kolhapur District (M.S.). Sachinkumar R. Patil, *et.al,* (2015) observed 16 species belong to Chlorophyceae in major freshwater bodies in Ajara Tahsil of Kolhapur District (M.S.), Patil Alaka A. (2015) observed 22 species of Chlorophyceae in Bhambarde reservoir of Sangli,

Maharashtra. S. C. Chunne, P. N. Nasare (2018) reported a total 74 species of phytoplanktons were recorded during study period. In Nandgaon lake 43 species and in Arwat Lake 31 species of phytoplankton's were reported. Wasudha J. Meshram (2021) recorded 21 species of Chlorophyceae in Devtaki Pond, Gondia, Distt. Gondia. (M.S.). Rafiullah M Khan and Milind J Jadhav (2022) reported a total of 79 species of algae, under 39 genera in Lonar lake throughout the period of study. M. P. Nandeshwar, B. K. Mendhe & B. N. Pardhi (2023) reported 50 species were found in this study. All 50 species were found growing luxuriantly in different seasons. Out of these all 20 species of Cyanophyceae, 19 species of Chlorophyceae, 2 species of Charophyceae, 4 species of Euglenophyceae, and 5 species of Bacillariophyceae in Salekasa Tehsil of Gondia District, Maharashtra. Bibhishan Mahadik, Panchshila Kabnoorkar (2025) recorded 36 species belong to Chlorophyceae in Bhadalwadi Lake. Raut D. K., Raut R. R., Pathan T. S. (2025) reported a total of 19 phytoplankton species in Tarangwadi Perennial Lake, Indapur, District Pune. B. Mallesh Reddy (2025) reported a total of 64 taxa of phytoplanktons have been isolated from the lake out of which 50 species of Chlorophycea are found Perennial Lake of Bamanwada Village, Chandrapur District, Maharashtra.

In the present investigation the seasonal Chlorophyceae was found maximum during the winter season and minimum during the monsoon season. Jayabhaye, *et.al.,* (2007) observed maximum Chlorophyceae population during the summer seasion and minimum during the rainy season in Parola dam of Hingoli, Maharashtra. D.S. Malik and Umesh Bharti (2012) reported and revealed that Chlorophyceae was maximum during the winter season and minimum during the monsoon season in Sahastradhara stream at Uttarakhand. Wasudha J. Meshram (2021) observed chlorophycean abundance coincided with lower PH range. DO was recorded peak during the winter season while lower during the summer season in Devtaki Pond, Gondia, Distt. Gondia. (M.S.). Bibhishan Mahadik, Panchshila Kabnoorkar (2025) reported Chlorophyceae members mostly found in rainy and winter season whereas Cyanophycean and Bacillariophyceae found in summer season mainly in Bhadalwadi Lake. Raut D. K., Raut R. R., Pathan T. S. (2025) reported seasonal Variations Chlorophyceae showed peak abundance during summer months (April-June), attributed to higher temperatures and nutrient availability. Bacillariophyceae were prominent during winter (November-January), while Cyanophyceae exhibited sporadic blooms, particularly after monsoon inflows (July-September) in Tarangwadi Perennial Lake, Indapur, District Pune. In the present investigation the Chlorophyceae was found the maximum during the winter season may be due to high amount of dissolved oxygen and the minimum during the monsoon season may be due to low temperature and dilution due to rain water. Dissolved oxygen shows positive correlation with the Chlorophyceae species.

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Table 1 : Seasonal variation of Chlorophyceae of Gorja lake

S.N.	Parameters	MONSOON	WINTER	SUMMER	Total
1	Chlorophyceae	57.25 ± 14.08	130.25 ± 9.36	78.00 ± 30.12	88.50 ± 8.88