

# Studies on Phytoplankton Diversity and abundance in Tiru Dam, Udgir, Maharashtra

Nagpurne VS\* and Allapure RB

Dept. of Botany, Maharashtra Udayagiri Mahavidyalaya, Udgir. Dist. Latur (MS)

\*Correspondence: \*Corresponding author: E. Mail- [vinaynagpurne@gmail.com](mailto:vinaynagpurne@gmail.com)

## Manuscript Details

Available online on <https://www.irjse.in>  
ISSN: 2322-0015

Editor: Dr. Arvind Chavhan

### Cite this article as:

Nagpurne VS and Allapure RB. Studies on Phytoplankton Diversity and abundance in Tiru Dam, Udgir, Maharashtra, *Int. Res. Journal of Science & Engineering*, 2020, Special Issue A10: 93-96.

Article published in Special issue of International e-Conference on "Role of Science and technology in Sustainable development-2020" organized by Department of Zoology & IQAC, Digambarrao Bindu ACS College, Bhokar, Dist. Nanded, Maharashtra, India date, August 17-18, 2020.



Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/>

## Abstract

Phytoplankton is the abundant microbial community in the water bodies and which is one of most significant as bio-indicator of the water pollution. Assessment of diversity of phytoplankton is having its key role in maintaining the aquatic fauna. Sampling of Tiru dam was carried out during the period of June 2017 to May 2018 to assess the phytoplankton diversity and their seasonal abundance for their seasonal diversity to indicate the sustainability of water quality.

The present study indicates the abundance of various groups and among the groups of phytoplankton's the Chlorophyceae was recorded maximum (36.88%) and followed by Bacillariophyceae (29.06), Cynophyceae (19.04) and Euglenophyceae (15.00 %). The above study helps to ascertain the anthropogenic activities causing eutrophication and pollution status of the Tiru dam.

**Keywords:** Phytoplankton, water bodies, pollution status, Bio-indicator, aquatic ecosystem.

## Introduction

Phytoplankton is the most sensitive floating community which is being the first target of water pollution, thus any undesirable change in aquatic ecosystem affects diversity as well as biomass of this community. Phytoplanktons are the primary producer from the lowest trophic level in the food chain of fresh water ecosystem and play a key role in fish culture.

The assessment of phytoplankton productivity helps to understand conservation ratio at various trophic level and resources as an essential input for proper management of reservoir. Some notable studies on phytoplankton and zooplankton diversity have been made by Rao and Choubey, [1]. Use of variety of agrochemicals in the catchment causing depletion of aquatic biota due to water pollution. In the monsoon season turbidity caused by agricultural and surface runoff and soil erosion severely affect the production of plankton [2]. The man's influence on these water bodies caused by rapid cutting of surrounding vegetation thus increasing silt and nutrient load, disposal of sewage and industrial water. Use for defecation, cultural activities and agriculture chemicals greatly increased the quantity of nutrients and organic input into a water body [3-4]

Study of phytoplankton diversity and its relationship to the physicochemical environment [5-6] worked on phytoplankton fluctuation under the stress of a biotic factor at Kohargaddi dam. Phytoplanktons have long been used as indicator of water quality. Plankton responds quickly to environmental changes and hence their standing crop and composition are more likely to indicate the quality of water mass in which they are found. They strongly influence non biological aspects of water quality like Ph, Temperature, dissolved oxygen and chlorides. Algal bloom frequently occurs during the summer and early fall months.

## Methodology

**Study area:** The Tiru dam is situated near Udgir about 22 km away in Latur district. It is formed by Government of Maharashtra under major irrigation project on Tiru River. Tiru dam is constructed on the Tiru River in 1976. It is cover free catchment area of 311

km<sup>3</sup> and it lies between latitude 18.5555° N and longitude 77.0736° E. The dam is situated near Handerguli village in Udgir Tahsil of Latur district. It is good source of drinking water supply and also agriculture irrigation besides this it is providing a good yield of fish.

Survey of Tiru dam was carried out to assess the phytoplankton quantification and their seasonal abundance for their seasonal diversity to indicate the sustainability of water quality. The water samples for phytoplankton analysis were collected from the Tiru dam once in a month during the period of June 2017 to May 2018. The samples were collected from four sampling stations such as Chimachiwadi-S1, Adolwadi-S2, Handerguli- S3 and Shivankhed- S4. The sample was collected with the help of plankton net. Sample were taken into 200 ml bottle and preserved in 2ml lugol's solution and 2 ml of 4% formalin solution, for identification of phytoplankton in difference class of different genera was carried out by using standard literature [7-10].

The survey of Tiru dam water is carried out with references to species diversity of flora such as location, nature of catchment area and main human activities.

## Results and Discussions

Phytoplankton collected from Tiru dam of Handerguli near Udgir were identified up to class and generic level. The phytoplanktons were mainly represented by algal qualitative composition and monthly distribution of algae was observed. In the present study among the group of phytoplanktons the Chlorophyceae were recorded maximum followed by Bacillariophyceae, Cynophyceae and Euglenophyceae (Table-1).

**Table: 1 Monthly variation of Phytoplankton along four sites (S-1, S-2, S-3 & S-4) of Tiru dam.**

Sr.No.	Phytoplankton	June to Aug.	Sept. to Nov.	Dec. to Feb.	March to May	Total	% of contribution
1.	Chlorophyceae	750	790	523	452	2515	36.88
2.	Bacillariophyceae	640	658	437	247	1982	29.06
3.	Cynophyceae	420	380	289	210	1299	19.04
4.	Euglenophyceae	350	343	190	140	1023	15.00



Photo 1 Tiru dam near Udgir dist. Latur

The Chlorophyceae was dominant group containing 36.88% of phytoplankton. It was maximum during the month of June to November and minimum during the month of December to May, similar results were recorded by Kaparapu and Geddad[11]. Bacillariophyceae was second dominant group contributed 29.06% among phytoplankton. It was maximum during month of June to November and minimum during December to May. These results were agreed by Ahmad et.al [12]. Cynophyceae was contributed 19.06% of phytoplankton population and observed maximum during June to November and minimum during December to May. Euglenophyceae was contributed 15.00% among the phytoplankton. It was also maximum in monsoon season and minimum in summer season.

The production of phytoplankton is directly correlated with sources of agricultural pollution from surrounding area as well as the area is under the agricultural practice and there is heavy use of fertilizer. This indicates that the dam is turning towards the mesotrophic status level. This study will help in understanding the amount of toxic compounds being received in dam and its biological magnification in animal particularly those at the lower level of food chain.

**Conflicts of interest:** The authors stated that no conflicts of interest.

## References

1. Rao KS and Choubey U. 1990. "Studies on Phytoplankton Dynamics and Productivity fluctuation in Gandhi Sagar reservoir" National workshop on reservoir fisheries special publication A.F.S.I., Branc, 1990, Vol. 3, Pp-103-106.
2. Akhtar R, Jyoti MK., N. Sawhney and Rajander Sing. "Studies on population Dynamics of Cladocerans and Coperpods in Sarkoot pond, dist. Doda, Jammu and Kashmir, J. Aqa, Biol, 2007, Vol. 22; No-2, Pp. 15-18.
3. Patil SS and Ghorade IB. "Management of water and Eco-sustainability Assessment of Godavari River from Maharashtra state for sustainable utilization" Indian Journal of Applied research ref. 2011, Vol.-1, issue-2, Pp. 19-22.
4. Patil SS and Ghorade IB. Phytoplankton diversity from Godavari River water (Maharashtra). Indian Journal of Applied Research 2012, Vol.-1(4), Pp. 112-114.
5. Ariyadej C, Tansakul R, Tansakul P, and Angsupanich S. Phytoplankton diversity and its relationship to the physic-chemical environment, Yala province, song Klanakarim; Journal of Science and Technology; 2004 , (5): 595-607.

6. Mishra BB, Chaturvedi GB and Tewari DD. Phytoplankton fluctuations under the stress of abiotic factor at Rohargaddi Dam, Balrampur; Journal of Experimental Science, 2010, 1(5): 22-24.
7. Trivedi RK and Goel PK. Chemical and Biological methods for water pollution studies, Environmental Publications, 1986, Karad, India.
8. Prescott GW. Algal of the Western Ghat lakes, Otto Koeltz science publishers, Germany, 1982.Pp. 662-962.
9. APHA. Standard method for examination of water and waste water 19th edition, American Public Health Association, 1995, Washington D.C.
10. John DM. The freshwater algal flora of British Isles; Cambridge University press, 2005, London.
11. Kaparapu J and Geddada MNR. Seasonal distribution of Phytoplankton in Riwada Reservoir, Visakhapatnam, Andhrapradesh, India, Notulae Science Biologicae, 2013,5(3):290-295.
12. Ahmad V, Hussain G, Tharani M, Hussain A. Diversity and Seasonal fluctuation of Phytoplankton of Pahuj Reservoir, Jansi (U.P.), International Journal of Pharmaceutical of Biological Archives, 2013,4(1): 66-69.