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Phytoplankton diversity in Erai Reservoir of Chandrapur district, Maharashtra State, India

Kowe SM[1*], Dahegaonkar RR[1], Dahegaonkar NR[2]

[1]Center for Higher Learning and Research, Department of Botany, Dr. Ambedkar College Of Arts, Commerce and Science, Chandrapur, (M.S.) India.
[2]Arts, Commerce and Science College, Tukum, (M.S.) India
Corresponding author Email- sandhyakowe@gmail.com

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ABSTRACT

The assessment of biological communities present in an aquatic environment reflects the quality of the ecosystem. The major source of food material for the aquatic organisms is phytoplankton and hence they are very important. Their role as bio-indicators and purifiers of polluted aquatic habitat is well known. They play a very important role in regulating dynamics of the aquatic food web and become a driving force in shaping community structure. The present investigation was carried out to evaluate the population of phytoplankton of the Erai reservoir from June 2015 to May 2016. The Erai reservoir is situated nearly 16 kms away from the Chandrapur City. It is situated at 20.160N and 79.300E near Chandrapur city at a height of 321.95 M above MSL. The reservoirs catchment area is 55 thousand hectors having a maximum gross storage capacity of 193 MCM. During present investigation 38 species of phytoplankton recorded from four different groups namely Cyanophyceae, Euglenophyceae, Bacillariophyceae and Chlorophyceae. Among all four groups, group Chlorophyceae was dominant.

Keywords: Phytoplankton, Erai reservoir, Chandrapur, Maharashtra state.

INTRODUCTION

Phytoplankton are autotrophic, microscopic, unicellular organisms in aquatic ecosystem which plays an important role in food chain of aquatic ecosystem. Its density and diversity is mainly controlled by the water currents, quality of water and other biotic components in a water body. Phytoplankton are pioneer of an aquatic ecosystem. Phytoplankton maintain equilibrium between biotic and abiotic components of the aquatic ecosystem (Pandey *et al.,* 2004). The studies made on phytoplankton diversity all over the world has shown a marked difference in the floristic composition with different levels of pollution which prompted many workers to use

phytoplankton composition as the indicator of the level of pollution (Palmer 1969). Number of researchers studied phytoplankton diversity from different parts of India (Shastri et al., 1999, Pawar et al., 2006, Waghmare and Mali 2007, Jitesh and Radhakrishnan, 2015, Mithani and Dahegaonkar 2020). The present investigation was carried out to focus diversity of phytoplankton in Erai reservoir.

MATERIALS AND METHODS

The Erai reservoir is 16 Kms away from Chandrapur city, a district headquarters and is earthfill masonary reservoir with catchment area of 58000 km2. The samples for phytoplankton analysis were collected once in a month from the reservoir for a period of one year from June 2015 to May 2016 during 8.00 am. to 10.00 am. The samples were collected by filtering 50 liters of water through the plankton net. The sample centrifuged and the concentrate was made up to 50ml with preservation of 4% formalin preserved samples were examine under binocular microscope and identified with the help of available literature; Prescott (1982), Plaskitt (1997) and Kodarkar (1992).

RESULT AND DISCUSSION

Phytoplankton diversity of Erai reservoir is given in table 1. In present investigation total 38 species have been recorded from four groups namely Cyanophyceae (9), Euglenophyceae (2), Bacillariophyceae (12) and Chlorophyceae (15).

Table 1: Phytoplankton diversity of Erai reservoir from Chandrapur District of Maharashtra (India)

Sr. No.	Class	Sr. No.	Name of Phytoplankton
1.	CYANOPHYCEAE	1	*Gleotrichia spp.*
		2	*Microcystis spp.*
		3	*Oscillatoria spp.*
		4	*Anabaena spp.*
		5	*Nostoc spp.*
		6	*Scytonema spp.*
		7	*Phormadium spp.*
		8	*Anacystis spp.*
		9	*Spirulina spp.*
2	EUGLENOPHYCEAE	1	*Euglena spp.*
		2	*Phacus spp.*
3	BACILLARIOPHYCEAE	1	*Cocconeis spp.*
		2	*Fragilaria spp.*
		3	*Anomoeoneis spp.*
		4	*Diatoma spp.*
		5	*Pinnularia spp.*
		6	*Navicula spp.*
		7	*Synedra ulna*
		8	*Cyclotella spp.*
		9	*Nitzchia spp*
		10	*Cymbella aspera*
		11	*Anomoconeis Spp.*
		12	*Gomphonema spp.*

Table 1: Phytoplankton diversity of Erai reservoir from Chandrapur District of Maharashtra (India)

Sr. No.	Class	Sr. No.	Name of Phytoplankton
4	CHLOROPHYCEAE	1	*Chara spp.*
		2	*Spirogyra spp.*
		3	*Nitella spp.*
		4	*Vorticella spp.*
		5	*Volvox spp.*
		6	*Ulothrix spp.*
		7	*Cosmarium spp.*
		8	*Gloeocystis gigas*
		9	*Oedogonium spp.*
		10	*Pediastrum tetras*
		11	*Cladophora spp.*
		12	*Chlamydomonas spp.*
		13	*Hydrodictyon spp.*
		14	*Chlorococcum spp.*
		15	*Zygnema spp.*

The unique feature of Cyanophyceae is the primitive type of nucleus, which lack nucleolus and nuclear membrane. Cynophycae can tolerate very high temperature. In Cyanophyceae the photosynthetic pigments are localized in the peripheral portion of the protoplast. In the present investigation Cynophyceae comprises of total 9 species such as Nostoc species, Anabaena species, Anacystis species, Microcystis species, Oscillatoria spp. spirulina spp. Among Cyanophyceae Microcystis species was found in abundance.

Euglenophyceae are free swimming algal flagellates found in fresh water bodies. Free carbon dioxide, dissolved oxygen, phosphate are the main factors which controls and regulates the growth of Euglenophyceae in fresh water bodies. In present investigation 2 species of euglenophyceae were recorded, which were Euglena species and Phacus species.

Bacillariophyceae includes large number of unicellular and colonial genera which differs from each other in their shapes. In the present investigation total 12 species were recorded including Cocconies, Fragilaria, Diatoma etc. The main feature of Diatoms is the presence of highly silicified cell wall.

Clorophyceae is the group of large algae. Chlorophyceae have their photosynthetic pigments localized in chromatophores. Chlorophyceae are free living algae mostly found in lake water, generally attached to the submerged plants. Photosynthetic reserves usually stored as starch. In present investigation total 15 species of Chlorophyceae were recorded such as Chara spp, Pediastrum tetras, Spirogyra spp, volvox spp etc

CONCLUSION

Phytoplankton is the major producer of all aquatic ecosystem and it shows a great diversity. Phytoplanktons can grow very well in stagnant water and shows great variation in their types and population.

In the present investigation total 38 species were found belonging to four different groups. Among four phytoplankton groups Chlorophyceae were found to be dominant over all other groups. In Chlorophyceae total 15 species were found. Similarly, Chlorophyceae dominance was also shown by other researchers like Khanna and Singh (2000). Most of the dominant species of phytoplankton were not considered as

harmful and dangerous for human health. It is recommended that the proper sanitation measures and environmental education to the people are necessary to keep the water bodies neat and clean for the safety of aquatic organisms as well as humans. Proper maintenance of water bodies is necessary.

Conflicts of Interest: The author declares no conflict of interest

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