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Research Article

Preliminary Investigation on Phytoplankton Composition of Shirsufal Dam of Baramati Tahsil of Maharashtra

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Abstract

Phytoplanktons are key regulators in aquatic ecosystem. They helps in both photosynthesis as well as acts as producers in trophic level. The zooplankton and fishes mainly feeds on them to fulfill nutritional requirements. The present preliminary study was conducted between January-2026 to March-2026 on phytoplankton composition of Shirsufal dam of Baramati Tahsil of Maharashtra. A total of 22 species were reported belonging to 4 taxonomic groups namely Chlorophyta, Bacillariophyta, Cyanophyta and Euglenophyta. The chlorophyta was found to be dominant with 9 species followed by Bacillariophyta (8 species), Cyanophyta (4 species) and single genus *Euglena* of Euglenophyta.

Keywords: Phytoplankton; Diversity; Chlorophyta; Bacillariophyta; Cyanophyta

Abbreviation

MKVDC: Maharashtra Krishna Valley Development Corporation.

Introduction

Phytoplanktons are microscopic and a photosynthetic biotic component of aquatic bodies occurs on the water surface layer of oceans and freshwater bodies on Earth. They are the primary producers of the aquatic food chain and form the fundamental base of the food web [23]. Due to presence of chlorophyll, they convert inorganic nutrients and carbon dioxide into complex organic compounds through photosynthesis process by using sunlight [17]. This supports diverse trophic levels ranging from zooplankton to consumers. A study by Field., *et al.* [5] reported that phytoplanktons contribute about 50% of the global photosynthetic activity.

Apart from being a food source, phytoplanktons are key regulators of the earth climate. They have been reported to play a significant role in the sequestering of atmospheric carbon dioxide through the process of biological pump and transport it to the deep ocean to reduce the greenhouse effect [4]. They produce a large portion of the oxygen in the world. Excessive growth of phytoplankton leads to harmful algal bloom formation and negatively affects the survival of aquatic animals and water utilization. They also serves as sources of essential biochemical constituents like vitamins, minerals, antioxidants, carotenoids, amino acids and trace elements [9].

The primary representative groups of phytoplankton are Chlorophyta, Bacillariophyta, Cyanophyta and Dinoflagellates. Chlorophyta consists of green algae which are abundant in chlorophyll a and b along with few other pigments like lutein,

carotene and xanthophylls [27]. The Bacillariophyta comprise diatoms and are the most diverse group of autotrophic algae throughout freshwater, brackish and marine environments. The Bacillariophyta are the most species-rich group of autotrophic algae, inhabiting almost every aquatic habitat including freshwater, brackish water and marine water sources worldwide. They occur in unicellular as well as filamentous form depending upon species [12]. Dinoflagellates possess two flagella including one conventional and another complex flagellum in the form of a ribbon-like unique helical appearance and shows both phototrophic and heterotrophic nutrition varying species to species [2]. The Cyanophyta also referred as blue-green algae are important components of dinoflagellates with both phototrophic and heterotrophic nutrition varying according to the species. Cyanophyceae are the autotrophic, small and usually unicellular to multicellular prokaryotes, which are important in the nitrogen, carbon and oxygen biogeochemical cycles in aquatic habitats. Most of the time, they consists of chlorophyll contributing to photosynthesis and other unique pigments like phycocyanin and phycoerythrin [14,21].

There are several reports available on phytoplankton diversity and distribution in various lakes, reservoirs and riverine sources from Pune district of Maharashtra. The Shirsufal dam was not evaluated for fishery aspects. The present study was conducted on preliminary investigations on phytoplankton composition of Shirsufal Dam of Baramati tahsil of Maharashtra.

Materials and Methods

Study area

The present work was conducted on Shirsufal Dam, which is an earthfill dam located in Baramati tahsil of Maharashtra at 18°20′29″ N & 74°36′54″ E and build in 1879 mainly for the irrigation purpose (Figure 1). The height of the dam is about 20.11m above lower foundation level with length of 741m. Currently, it is owned and monitored by the Maharashtra Krishna Valley Development Corporation (MKVDC) which is part of the Government of Maharashtra.

The dam receives its primary water supply from the Khadakvasala reservoir via the Janai-Shirsai Yojana lift irrigation scheme. It's total volume capacity is approximately 1.601 million m^3 with an Effective storage capacity of 9520.00 m^3 and designed spillway capacity of 112 m^3/s. The dam is the main water resource

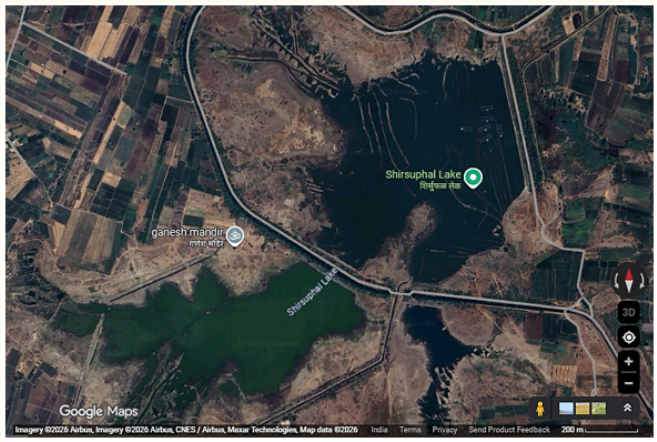


Figure 1: Map of Shirsufal Dam (Taken from Google Map).

for regional water management as it is supporting a command area of approximately 1800 hectares in the Baramati tahsil and 235 hectares of nearest village Ravangaon. Apart from these all, it has been well known for fishery purpose and under the control of fishery cooperative society named "Jay Tuljabhavani Matsya Sahkari sanstha maryadit, Ganjpeth, Tal. Baramati".

Sample collection and analysis

The water samples were collected between the January-2026 to March-2026 for 3 months on monthly basis from three sites of study area. A total of 100 litre of water was filltered using plankton net and finally 15ml concentrated sample was collected in 15 ml Tarson tube. The collected sample were brought to laboratory and fixed in Lugol's iodine till further investigation. The microscopic photographs of phytoplankton were taken by using Labomed LX 400 microscope and identification was carried out by using standard identification keys [3,7,11,25,28].

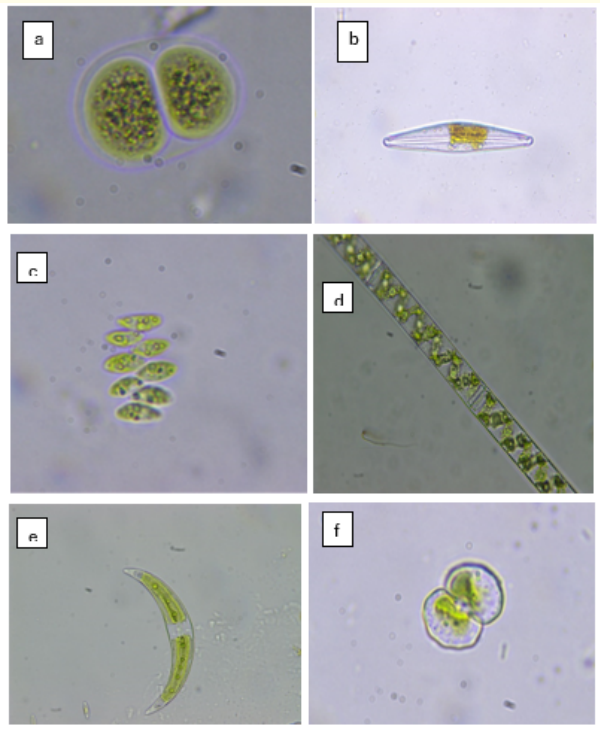
Results and Discussion

A total of 22 phytoplankton species belonging to 4 taxonomic groups were reported during present investigation (Table-1 and Photoplate-1). The Chlorophyta was found to be dominant with 9 species and 7 genera (Figure 2). Chlorophyta represented by 3 species under *Scenedesmus* genus along with other genera namely *Chlamydomonas, Pediastrum, Cosmarium, Closterium, Zygnema* and *Spirogyra*. The Bacillariophyta was represented by 8 genera namely *Fragilaria, Synedra, Cymbella, Gomphonema, Navicula, Caloneis,*

Nitzschia and *Surirella*. The Cyanophyta represented by 4 species namely *Chroococcus turgidus, Merismopedia elegans, Microcystis sp.* and *Oscillatoria sp.* Euglenophyta represented by one single genus *Euglena.*

Sr. No.	Phytoplankton group	Species
1	Cyanophyta	*Chroococcus turgidus*
2		*Merismopedia elegans*
3		*Microcystis sp.*
4		*Oscillatoria sp.*
5	Chlorophyta	*Chlamydomonas sp.*
6		*Pediastrum sp.*
7		*Scenedesmus quadricauda*
8		*Scenedesmus bijugatus*
9		*Scenedesmus obtusus*
10		*Cosmarium sp.*
11		*Closterium leibleinii*
12		*Zygnema sp.*
13		*Spirogyra sp.*
14	Bacillariophyta	*Fragilaria sp.*
15		*Synedra sp.*
16		*Cymbella sp.*
17		*Gomphonema sp.*
18		*Navicula sp.*
19		*Caloneis sp.*
20		*Nitzschia sp.*
21		*Surirella sp.*
22	Euglenophyta	*Euglena sp.*

Table 1: List of phytoplankton recorded during investigation from Shirsuphal Dam of Baramati Tahsil.



Photoplate 1: Microphotographs of commonly reported phytoplanktons- (a) Chroococcus turgidus (b) Cymbella (c) Scenedesmus (d) Spirogyra (e) Closterium leibleinii (f) Cosmarium.

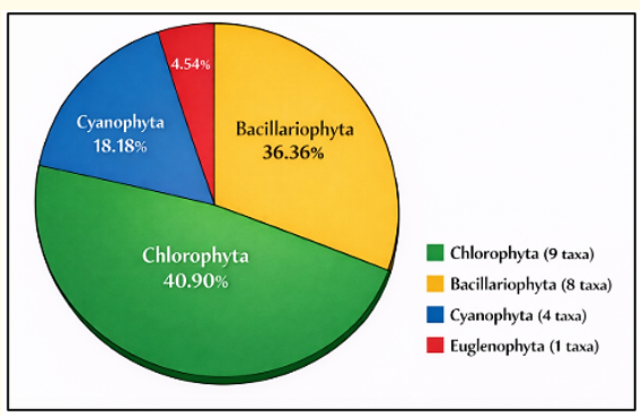


Figure 2: Overall phytoplankton composition of Shirsufal Dam.

Several reports recorded phytoplankton diversity and composition of various inland water bodies throughout the Maharashtra state. Bolch and Tamloorkar [1] documented a total of 11 phytoplankton species from Ambona Lake of Yavatmal district. Kadam., *et al*. [8] recorded a total of 129 phytoplankton species from Masooli and Yeldari reservoirs in Parbhani district. Sakhare and Chalak [18] reported a total of 18 phytoplankton species from Gharni reservoir in Latur district. Sakhare and Jetithor [20] also reported phytoplankton diversity of Siddeshwar reservoir in Hingoli district (Maharashtra). Korgaonkar and Bharamal [10] reported 10 phytoplankton species from Dhamapur Lake of Sindhudurg district. Sakhare., *et al*. [19] recorded a total of 17 phytoplankton species from seasonal eutrophic wetland in Ambajogai. Nigam [13] observed maximum peak of phytoplankton diversity in June and minimum in December month. Rathod [15] recorded 17 phytoplankton species from Aloor perculation lake of Omerga tashil. Giripunje., *et al*. [6] recorded a total of 52 phytoplankton species from Futala lake, Gandhisagar lake and Ambazari lake of Nagpur of Maharastra. Raut., *et al*. [16] reported 15 phytoplankton species from Tarangwadi perennial lake of Pune district. Tabbasum and Nasare [26] observed 87 species of phytoplankton from Gaurala Lake of Chandrapur District. Suryawanshi., *et al*. [24] investigated correlation between physicochemical parameters and phytoplankton composition of Nathsagar reservoir of Godavari River network. Shitole., *et al*. [22] noticed 35 phytoplankton species from Warwand lake of Pune district.

On the same plane, the present investigation on Shirsufal Dam of Baramati tahsil of Maharashtra reported a total of 22 phytoplankton species with dominance of Chlorophyta.

Conclusion

The present investigation was conducted at Shirsufal Dam of Baramati tahsil of Maharashtra on preliminary basis. A total of 22 phytoplankton species belonging to 4 taxonomic groups were recorded with Chlorophyta was found be dominant followed by Bacillariophyta and Cyanophyta. Euglenophyta reported a single genus.

Conflict of Interest

All authors declare that there is no any financial of nonfinancial conflict of interest.

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