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Study on phytoplankton diversity and fisheries potential in Lakhapura reservoir, Bhikangaon tehsil, Khargone district Madhya Pradesh, India

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Abstract
Phytoplanktons are the subject of great interest becomes of their role as primary producers in an aquatic ecosystem. The quantitative and qualitative studies of phytoplankton may provide good index of water quality and capability of water to sustain heterotrophic communities. The phytoplanktonic community are 36 species of the following 5 class were reported from the study area viz. Bacillariophyceae, Chlorophyceae, Cyanophyceae, Dinophyceae and Euglenophyceae. has been observed Lakhapura reservoir during study period from July 2016 to June 2017. The diversity of the different phytoplankton more in summer season than during winter and rainy season.

Keywords: diversity, phytoplankton, fisheries, Lakhapura reservoir

Introduction
The reservoirs have played a significant role in the India's social-economic status during the past 5 decades. Without water resources dams and reservoirs India would have been a thirsty, hungry dark land ravage with floods and draughts each year. These reservoirs store rainwater to irrigate farmlands, generate electricity, supply drinking water and save land from floods and draughts. Reservoir fishery in India is also significant from socio-economic point of view as it has the potential of providing employment to about 2 million citizens and the food demand of millions of citizens.

Plankton is the most responsive floating community on water which is life form the first target of water pollution, thus any undesirable change in aquatic ecosystem affects diversity as well as biomass of this community. Phytoplankton are autotrophs and belong to first trophic level (producer). The ecological variables such as temperature, pH and phosphate play significant role in altering the phytoplankton density. The phytoplankton and zooplankton are always inversely proportional in an aquatic environment because the zooplankton feed on the phytoplankton. Thus diversity of phytoplankton is directly correlated with fishery potentiality of an aquatic ecosystem (Qasim, 1973) [5].

The plankton study is very valuable tool for the assessment of biotic potential and contributes to overall estimation of basic nature and universal economic potential of water body Pawar *et.al.* (2006) [2]. The diversity and seasonal fluctuation of Phytoplankton observed in Lakhapura reservoir throughout one year study period. Similar attempts have also been made in different freshwater body of India Davis C.C.(1955) Zafar A.R.(1957), Philipose M.T.(1960), Zafar (1967), Mishra, N.K. (2005),Shanker (2010), Leela *et al*. (2010), Nafeesa *et al*. (2011) Purushothama *et al*. (2011) and Roy *et al*. (2011).

Materials and Methods
Sample were collected from Lakhapura reservoir, Bhikangaon tehsil, Khargone district for plankton analysis once in a month throughout the study period from July 2016 to June 2017. Surface water samples were collected from the collection site and 100 liters of surface water from selected site was filtered through a plankton net of bolting silk No. 20 (76mm mesh size) and a concentrate sample of 200 ml was prepared 100 ml of sieved residue was transfer to a bottle and preserved in Lugol's solution and 4%formaline for identification using Identifications were made by standard methods (Adoni, 1985, Philipose, 1959 and Prescott, 1970) [1, 4].

Result
Phytoplankton collected from Lakhapura reservoir were identified up to generic and species level Table-1 and Class wise individual in Table-2. The phytoplanktons were mostly represented by algal qualitative composition and seasonal distribution of algal was observed Table- 3.Composition percentage showing in Fig-1.

Table 1: List of Phytoplankton from Lakhapura reservoir

S. No	Class	Abundent species
1	Bacillariophyceae	*Nitzschia vermicularis*
2		*Nitzschia subtilis*
3		*Nitzschia sublinearis*
4		*Navicula accomoda*
5		*Navicula simplex*
6		*Navicula complanatula*
7		*Achanthes exigua*
8		*Cyclotella operaculata*
9		*Cymbella var. ventricosa*
10	Chlorophyceae	*Scenedesmus armatus*
11		*Scenedesmus obliquus*
12		*Chlorella canglomerata*
13		*Closterium limnetium*
14		*Ankistrodesmus falcatus*
15		*Spirogyra purvula*
16		*Pediastrum duplex*
17		*Chlorococcum infusionum*
18		*Oedogonium patulum*
19		*Tetradon minimum*
20		*Microspora floccose*
21	Cynophyceae	*Oscillatoria subuliftormis*
22		*Oscillatoria limosa*
23		*Oscillatoria gloiophila*
24		*Phormidium bohneri*
25		*Phormidium inundatum*
26		*Anthrospira platensis*
27		*Spirulina major*
28		*Spirulina subsala*
29		*Anabaena constricta*
30		*Aphanotheca microscopia*
31		*Microcystis aeruginosa*
32		*Chlorococcus minutes*
33	Dinophyceae	*Gymnodonium aeruginosum*
34		*Gymnodinium stein*
35	Euglenophyceae	*Euglena granulate*
36		*Euglena viridis*

Table 2: Class wise Phytoplankton species at Lakhapura reservoir

S. No	Class	Number of Species
1	Bacillariophyceae	09
2	Chlorophyceae	11
3	Cynophyceae	12
4	Dinophyceae	02
5	Euglenophyceae	02
	Total =	36

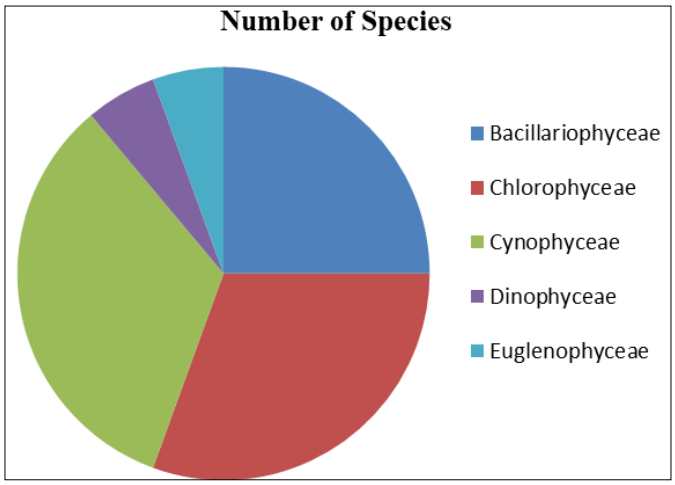

Fig 1: Composition of Phytoplankton species

Table 3: Phytoplankton count per/ml in the reservoir

S. No	Phytoplankton	Rainy	Winter	Summer
1	Bacillariophyceae	770	700	1350
2	Chlorophyceae	1050	950	1190
3	Cynophyceae	540	450	630
4	Dinophyceae	170	100	250
5	Euglenophyceae	250	310	560

Discussion

Plankton is one of the vital food items of the fishes and many other aquatic animals. Most of the fishes in their larval stages were depends on it and some of them entirely feed on plankton. The distribution of phytoplankton depends upon many environment factors. The water quality parameters have a straight influence upon distribution and ecology of phytoplankton.

During the study period from July 2016 to June 2017s total 36 species of phytoplankton were reported. Only 5 planktonic classes were reported from the area Bacillariophyceae, Chlorophyceae, Cyanophyceae, Dinophyceae and Euglenophyceae. The study confirms 9 species belonging to Bascillariophyceae, 11 were Chlorophyceae, 12 were belonging to Cynophyceae, 2 were belonging to Dinophyceae and 2 were belonging to Euglenophyceae. Similar observation also notices by Pawar *et al*. 2006, Sudha 2012, Kadam *et al*. 2014, Mandal *et al*. 2014, Manjre 2014. Mishra *et al*. 2017 and Tyagi *et al*. 2017 noticed 36 and 31 species respectively.

The phytoplankton diversity is represented by 5 class and 36 species. Density of the different class of phytoplankton is more in the summer season than during winter and rainy season. Phytoplankton were the most valuable compound of total plankton population. In lakhapura reservoir most of the energy fixed by the phytoplankton is used by planktonfeeder fishes and carp fishes particularly *Labeo rohita*, *Catla catla* and *Cirrihinus mrigala* which was about 30% of the total fish population.The water of reservoir used for drinking purpose, fish culture and Irrigation.

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