



RESEARCH ARTICLE

PHYTOPLANKTON DIVERSITY OF PAGARA RESERVOIR OF MORENA DISTRICT, MADHYA PRADESH

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ABSTRACT

A study was carried out to assess the phytoplankton diversity of Pagara reservoir of district Morena of Madhya Pradesh from June 2016 to May 2017. During the study period total 20 species, belonging to six families, were identified. Out of these 9 species belonged to Chlorophyceae, 3 species belonged to Bacillariophyceae, 3 species to Myxophyceae, 2 species to Euglenophyceae and 1 species to Dinophyceae. Chlorophyceae was the most dominant family with 9 species and Dinophyceae was the least dominant family during the study period.

Key words:

Pagara Dam, Phytoplankton,
Asan River, Diversity.

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INTRODUCTION

Planktons are the weakly swimming but mostly drifting small organisms that inhabit fresh water bodies. Planktons are of two types – Zooplanktons and Phytoplanktons. Phytoplanktons include algae that live near surface where there is sufficient light to support photosynthesis. They are the autotrophs and constitute the primary producers of fresh water ecosystems. The phytoplankton, in a reservoir, is an important biological indicator of the water quality. Phytoplanktons are the important primary producers and the basis of the food chain in an aquatic ecosystem. Some species of planktons have significantly contributed to the pollution and toxicity of aquatic system. Phytoplanktons occur in different forms, such as unicellular, colonial and filamentous, which are mainly photosynthetic in nature. Zooplanktons are found to graze on these phytoplanktons. Fish diversity also depends on plankton productivity. Some species of phytoplanktons are also used in bioremediation. Phytoplankton studies are useful for the control of the physico – chemical and biological conditions of the water.

Study area

Pagara Dam is situated at about 13 Km from Jaura town of Morena District of Madhya Pradesh. The dam is located on Aasan river (Fig-1).

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It is a masonry dam which was constructed in 1931. The dam is located at latitude 26°13' 39.7"N and longitude 77°48' 56.9"E. The FTL (Full tank Level) of the dam is 199.34 m. The dam was constructed mainly for irrigation purpose. The water is used for irrigation of 870 acre land of the nearby villages. Pagara is the nearest village, after the name of which the dam is known as Pagara dam. Besides irrigation, the water of the dam is also used for drinking purpose and fish culture by local fishermen.

MATERIAL AND METHOD

Study on phytoplanktons diversity was carried out for one complete year from June 2016 to May 2017. Samples were collected, once in a month, in the morning hours between 9.00 A.M. and 11.00 A.M at four different sites. The phytoplankton samples were collected and preserved by Lugol's Iodine solution. The preserved samples were brought to the laboratory for qualitative and quantitative analysis. The phytoplankton samples were allowed to settle for some time. After the sample were settled, the sample were properly agitated to distribute the organisms evenly. Phytoplanktons were observed and counting was made under inverted microscope. By using a pipette, one ml of sample was transferred onto the Sedgwick rafter cell. The cover slip was placed properly, avoiding any air bubble. All the planktons, present in the cell, were counted by moving the cell, vertically and horizontally, covering the whole area. Both qualitative and quantitative studies were under taken.



Fig 1 . The view of Pagara Reservoir

Table 1. Phytoplankton species checklist and distribution at different sampling stations of Pagara reservoir during the study period from June 2016 – May 2017

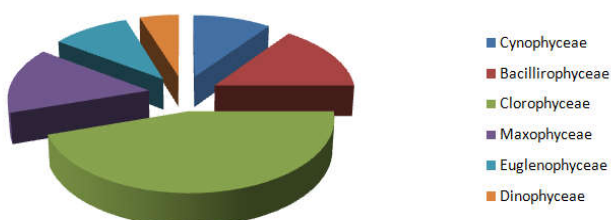
S.No.	Species	Family	Order
1	<i>Aphanocapsa montana</i>	Cynophyceae	Cynophyta
2	<i>Aphanocapsa grevillei</i>		
1	<i>Cymbella affinis</i>	Bacillariophyceae	Bacillariophyta
2	<i>Nitzschia holsatica</i>		
3	<i>Gomphonema herculeanum</i>		
1	<i>Pediastrum duplex</i>	Chlorophyceae	Chlorophyta
2	<i>Pediastrum duplex v. gracillimum</i>		
3	<i>Pediastrum simplex v. duodenarium</i>		
4	<i>Pediastrum tetras</i>		
5	<i>Pediastrum ovatum</i>		
6	<i>Scenedesmus obliquus</i>		
7	<i>Cosmarium monomazum</i>		
8	<i>Cosmarium</i> sp.		
9	<i>Closteriopsis longissima</i>		
1	<i>Merismopedia punctata</i>	Myxophyceae	Myxophyta
2	<i>Oscillatoria princeps</i>		
3	<i>Spirulina labyrinthiformis</i>		
1	<i>Euglena acus</i>	Euglenophyceae	Euglenophyta
2	<i>Euglena proxima</i>		
1	<i>Ceratium hirudinella</i>	Dinophyceae	Dinophyta

Phytoplanktons were identified by using standard literature (Edmondson, 1959, Smith, 1950, and Philipose 1970).

Observations

Phytoplanktons, collected from four different sampling stations are enlisted in table no.1. Photographs are given as 1 to 20.

Phytoplankton (species wise) diversity of Pagara reservoir from June 2016-May 2017



RESULT AND DISCUSSION

In the present study total 20 species of phytoplankton were identified during the study period, which belonged to six families: Chlorophyceae (9 species), Bacillariophyceae (3 species), Myxophyceae (3 species), Cyanophyceae (2 species), Euglenophyceae (2 species) and Dinophyceae (1 species). Singh (1990) studied the phytoplanktons of McPherson lake and observed the presence of almost all groups of planktonic algae. Goel and Autade (1995) recorded 61 species of phytoplanktons in Panchganga river at Kolhapur. Jeelani (2005) studied distribution and ecology of phytoplanktons in Dal lake. Adesalu and Nwankwo (2005) identified three classes of phytoplanktons-Bacillariophyceae, cyanophyceae and xanthophyceae in Olerocreek and Besin river, Nigeria. Tiwari and Chauhan (2006) studied seasonal diversity of planktons of Kitham lake in Agra. Sharma (2013) studied the seasonal variations in the distribution of plankton of Tighra reservoir. He found total 26 genera of phytoplanktons. Laskar and Gupta (2009) studied the phytoplankton diversity in Chatla floodplain wetland of Barak Valley, Assam.



Photo No. 1 *Aphanocapsa montana*



Photo No. 2 *Pediatrum duplex*

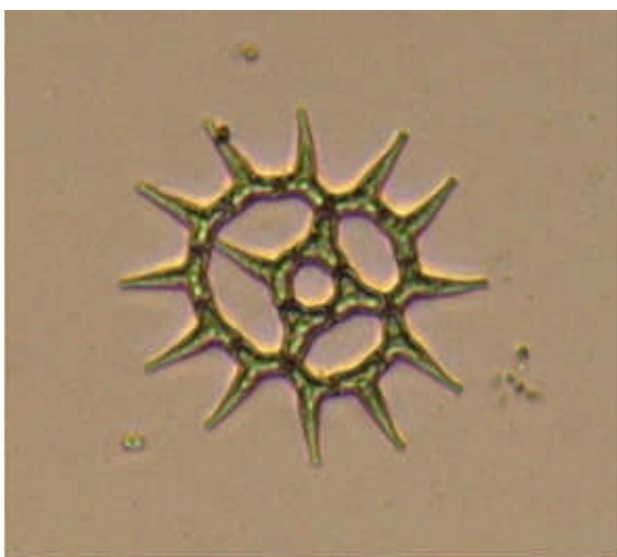


Photo No.3 *Pediatrum simplex v. duodenarium*



Photo No.4 *Nitzschia holsatica*

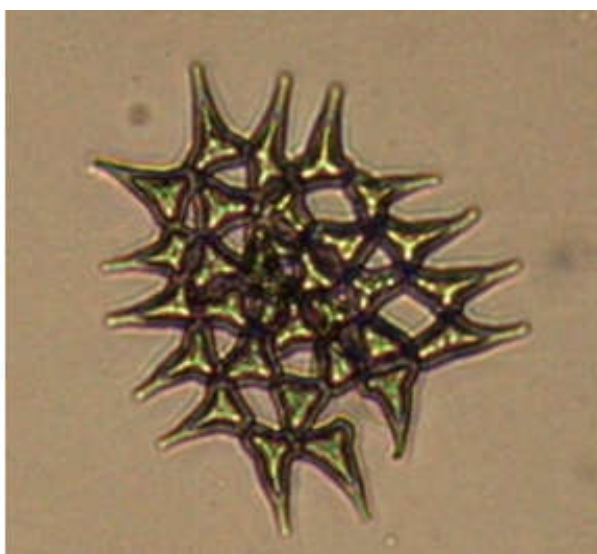


Photo No.5 *Pediatrum duplex v. gracillimum*



Photo No.6 *Cosmarium monomazum*



Photo No. 7 *Ceratium hirudinella*



Photo No.8 *Cymbella affinis*

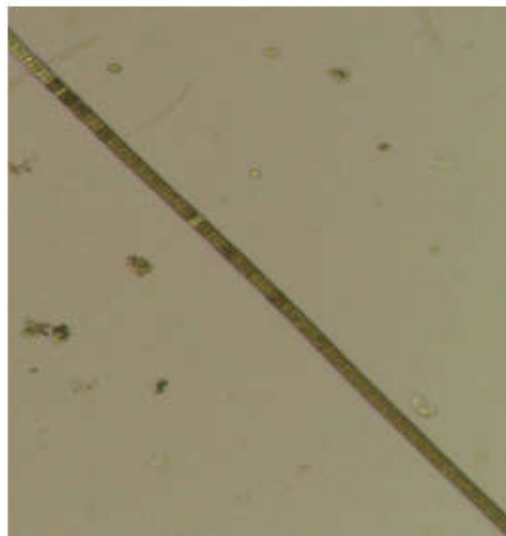


Photo No.9 *Oscillatoria princeps*

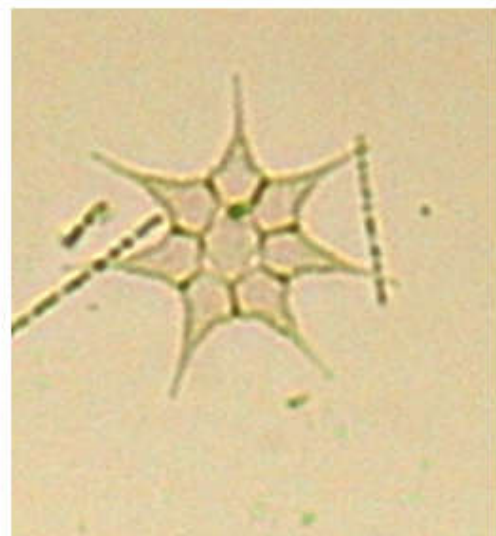


Photo No.10 *Pediastrum ovatum*



Photo No.11 *Spirulina labyrinthiformis*



Photo No.12 *Merismopedia punctata*

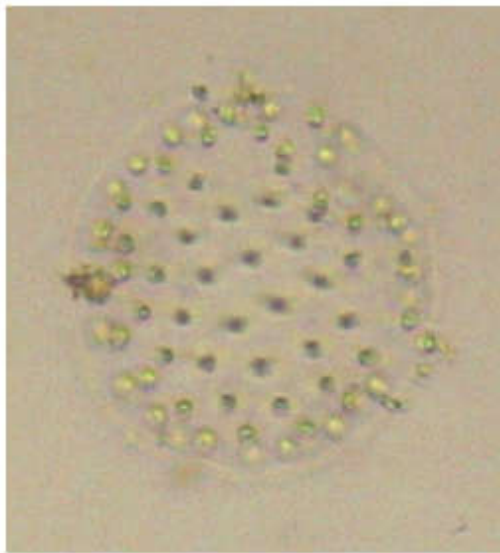


Photo No.13 *Aphanocapsa grevillei*



Photo No.14 *Scenedesmus obliquus*



Photo No.15 *Gomphonema herculeanum*

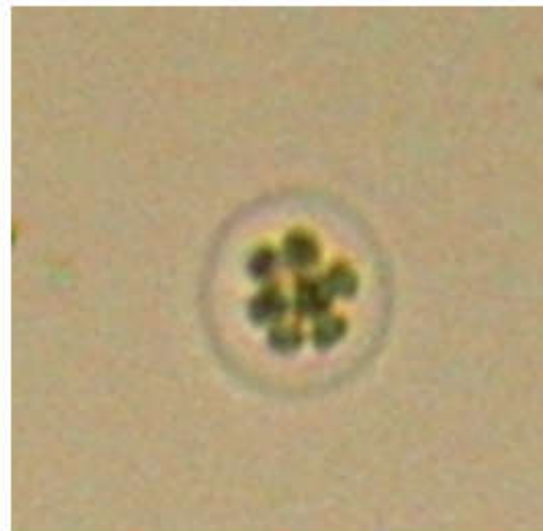


Photo No.16 *Cosmarium sp.*

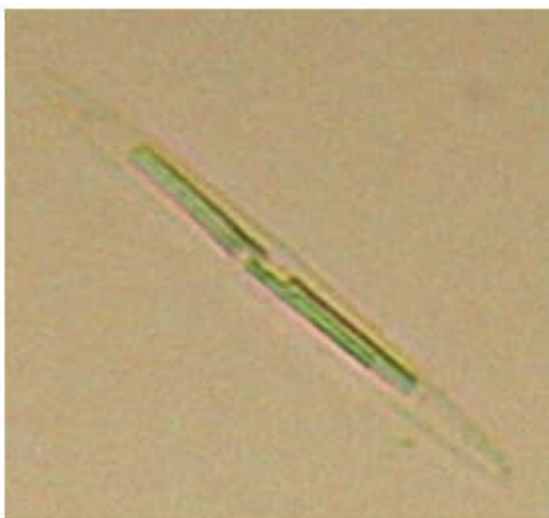


Photo No.17 *Closteriopsis longissima*

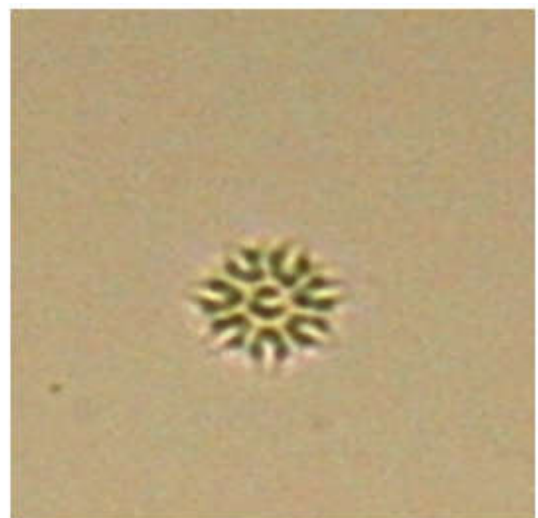


Photo No.18 *Pediastrum tetras*



Photo No.19 *Euglena acus*



Photo No.20 *Euglena proxima*

They identified 53 taxa of phytoplankton. Ferdoushi *et al.* (2015) identified total 21 species of phytoplankton from Ramsagar lake in Dinajpur district. Badsa *et al.* (2012) reported total 105 species of phytoplankton during the study period in Massa Estuary. They found 64% Diatoms, 14% Dinophyceae, 10% Chlorophyceae, 9% Cyanophyceae, and 3% Euglenophyceae. Shrotriy *et al.* (2014) recorded total 60 species of phytoplanktons in their study on Harsi reservoir. They also reported Chlorophyceae to be in the highest number, as reported in the present study. Pawar and Phulle (2006) also recorded Chlorophyceae to be the most dominant throughout their study of Pethwadaj dam in taluka Kandhar of Dist. Nanded, Maharashtra. Kather *et al.* (2015) studied the plankton diversity and water quality of Ambattum lake Tamil Nadu. During their study period, they identified total 22 species of planktons. Recently, Tyagi and Malik (2017) identified 31 species of phytoplanktons, belonging to groups Chlorophyceae, Bacillariophyceae and Cyanophyceae. Sasikala *et al.* (2017) identified 15 species of phytoplanktons in Varaha reservoir. In their study, 10 species of Chlorophyceae, 2 species of Bacillariophyceae and 3 species of Cyanophyceae were found. They also reported Chlorophyceae to be the most dominant group with 10 species. Pandiammal *et al.* (2017) reported total 5 groups of phytoplankton (Chlorophyceae, Bacillariophyceae, Cyanophyceae, Euglenophyceae, Dinophyceae) in Temple Pond at Thiruvottiyur, Chennai. The present study revealed Chlorophyceae (9 species) as the most dominant family, followed by Bacillariophyceae and Myxophyceae (3 species each); Cyanophyceae and Euglenophyceae (2 species each). Dinophyceae was least abundant with just one species.

Conclusion

Total 20 species of phytoplanktons were identified belonging to six groups: Chlorophyceae, Bacillorophyceae, Myxophyceae, Cyanophyceae, Euglenophyceae and Dinophyceae in the present study. Out of these Chlorophyceae was the most dominant and Dinophyceae was the least dominant group.

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