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Short Communication

Phytoplankton diversity of the Gharni Reservoir in Latur district, Maharashtra, India

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Abstract

The phytoplanktonic samples were collected from the Gharni Reservoir of Latur district of Maharashtra for a period of one year, from June 2013 to May 2014. Totally 18 species of phytoplankton belonging to different taxonomic groups were identified. Among these 7 species belong to Chlorophyceae, 5 species to Cyanophyceae, 3 species to Bacillariophyceae and 3 species to Euglenophyceae. The phytoplankton productivity fluctuated seasonally and the maximum number of 560 units/liter was recorded during month of February and March and minimum number of 95 units/liter during the month of September.

Keywords: Phytoplankton diversity, seasonal variations, Gharni Reservoir, Maharashtra

INTRODUCTION

Phytoplankton, the major primary producer in an aquatic food chain which are grazed by zooplankton, constitute an important link in energy flow. They fix solar energy and convert it into chemical energy which is transformed from one level to another level of the food chain. By phtotosynthetic activity phytoplankton re-oxygenate the waters in which they are growing (Venkateswaralu 2006). Keeping these points in view, a study was undertaken to find phytoplankton diversity in the Gharni Reservoir of Latur district, Maharashtra.

The Gharni Reservoir was impounded on river Gharni in Shirur Anantpal tehsil of Latur district. The reservoir is located at latitude $18^0$22'30" and longitude $76^0$49'15". The total water spread area of reservoir is 949 ha at FRL with a catchment area of 243.66 sq. km. The gross storage capacity of the reservoir is 25.9 mm^3.

METHODOLOGY

Phytoplankton collection was made towing a net made-up of bolting silk net No. 25 for five minutes. Sedimentation of phytoplankton was made in 5% formaldehyde. Algal monographs of Scott and Prescott (1961), Desikachary (1967), Prescott (1982) and Tripathi and Pandey (1990) were followed to identify the phytoplankton. Drop count method of Trivedy and Goel (1984) was followed for enumeration of phytoplankton and expressed as units per liter.

RESULTS AND DISCUSSION

Phytoplankton community of Gharni reservoir comprised of 18 species of which 7 belong to Chlorophyceae, 5 to Cyanophyceae, 3 to Bacillariophyceae and 3 to Eugelnophyceae. The phytoplankton productivity fluctuated seasonally and the maximum number of 560 units/liter was recorded during the month of February and March and minimum number of 95 units/liter during the month of September (Table 1). During the present investigation, the phytoplankton consisted of 41.57% of Chlorophyceae, 33.61% of Cyanophyceae, 16.16% of Bacillariophyceae and 8.66% of Euglenophyceae (Figure 1).

In case of Chlorophyceae, *Scendesmus armatus, Oedogonium patulum* and *Ankistrodesmus falcatus* were recorded in all months. Their number was high in summer and low in monsoon season. *Chlorella vulgaris* was not seen in rainy season. Similarly *Cosmarium contractum*

was also absent in three months of rainy season. *Zygnema sp* and *Pediastrum duplex* were not recorded in month of September. The density of this group ranged from 15 units/liter (September) to 240 units/liter (April) with annual average of 148 units/liter.

Table 1: Monthly analysis of phytoplankton diversity in the Gharni Reservoir, Maharashtra

Species/Month	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Chlorophyceae												
Zygnema sp	15	20	15	00	10	15	20	25	25	35	35	30
Pediastrum duplex	05	15	15	00	15	20	20	25	25	35	35	35
Scendesmus armatus	20	20	10	05	25	25	25	30	35	30	35	35
Oedogonium patulum	25	20	10	05	30	25	30	35	35	40	35	30
Ankistrodesmus falcatus	20	20	10	05	15	20	20	25	30	30	35	35
Chlorella vulgaris	00	00	00	00	10	20	15	25	35	35	35	30
Cosmarium contractum	10	00	00	00	15	15	20	25	30	30	30	25
Total	***95***	***95***	***60***	***15***	***120***	***140***	***150***	***190***	***215***	***235***	***240***	***220***
Cyanophyceae												
Oscillatoria limnosoa	15	10	00	10	15	20	25	20	35	30	35	35
Oscillatoria chlorine	20	10	00	00	20	20	25	25	30	30	30	30
Anabaena constricta	25	20	20	05	20	15	35	35	45	45	40	35
Merismopedia punctata	20	15	20	15	25	25	30	35	40	35	35	35
Microcystis aerugenose	10	15	00	10	15	25	30	35	40	35	30	30
Total	***90***	***70***	***40***	***40***	***95***	***105***	***145***	***150***	***190***	***175***	***170***	***165***
Bacillariophyceae												
Navicula gracilis	10	10	05	10	10	15	20	20	30	25	25	20
Nitzschia subtilis	05	05	00	10	15	20	25	25	35	35	30	30
Bacillaria paradoxa	10	05	05	15	20	25	30	35	35	30	25	20
Total	***25***	***20***	***10***	***35***	***45***	***60***	***75***	***80***	***100***	***90***	***80***	***70***
Euglenophyceae												
Euglena pisciformis	00	00	10	00	15	15	20	20	35	35	20	30
Euglena viridis	10	05	05	05	10	10	15	10	15	20	20	15
Euglena stellata	00	00	00	00	00	00	00	00	05	05	10	10
Total	***10***	***05***	***15***	***05***	***25***	***25***	***35***	***30***	***55***	***60***	***50***	***55***

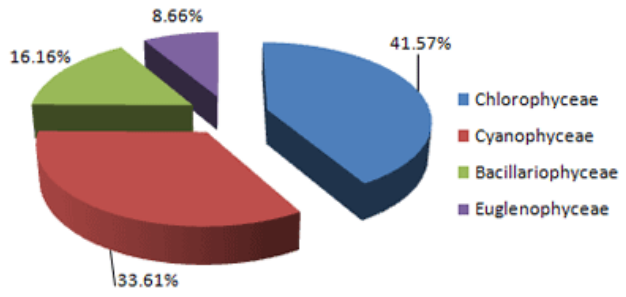

Figure 1: Quantitative occurrence of phytoplankton in the Ghrani Reservoir

The class Cyanophyceae was represented by five species, out of which two species (*Anabaena constricta* and *Merismopedia punctata*) were seen throughout the investigation. *Oscillatoria limnosoa* and *Microcystis aerugenose* were absent in August. *Oscillatoria chlorine* was absent in two months of rainy season *i.e.*, August and September. The density of this group ranged from 40 units/liter (August and September) to 190 units/liter (February).

Among Bacillariophyceae, *Navicula gracilis* and *Bacillaria paradoxa* were recorded throughout the study period, while *Nitzschia subtilis* was absent in one month *i.e.*, August. The density of Bacillariophyceae ranged from 10 units/liter to 100 units/liter. It was maximum in February and minimum in August. The annual average of this group was 57 units/liter.

In case of Euglenophyceae three species were recorded, out of which only one *i.e.*, *Euglena viridis* was recorded throughout the third year of investigation. *Euglena stellata* was not seen in monsoon and winter season. *Euglena pisciformis* was absent in three months of rainy season. The density of this group fluctuated from 5 units/liter to 60 units/liter with annual average of 31 units/liter.

Summer is the most suitable season for the growth of phytoplankton in freshwater lakes because of long duration of sunshine period, increased salinity and pH. Individual phytoplankton population dynamics clearly indicated that all groups showed maxima in summer with increasing temperature. Summer peak in total phytoplankton population was due to higher temperature (Chandrakiran *et al.* 2014). Phytoplankton maxima in summer is also reported by Naik *et al.* (2013) and Chandrakiran *et al.* (2014). Decline in phytoplankton population in monsoon was a result of flushing due to incessant rain in regions which also hamper light penetration decreasing photosynthesis (Chandrakiran *et al*. 2014). Similar opinion was also proposed by various workers who suggested that the heavy rainfall, over flooding, dilution and turbidity are the factors responsible for the reduced population of phytoplankton during monsoon season despite of increased nutrient levels during the period (Tripathi and Pandey 1990; Kumar and Gupta 2002; Laskar and Gupta 2013).

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