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BIODIVERSITY AND POPULATION ECOLOGY OF PHYTOPLANKTON

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ABSTRACT

In Indian subcontinent the literature on freshwater fauna and physico-chemical parameter is being scattered because findings of one reservoir may not hold good for another. The long old idea that a suitable environment is necessary for any organisms, since life depends upon the continuance of proper exchanges of essential substances and energies between organism and its surroundings (Russo, 1978)

Plankton can be studied as predators and consumers. The study of biomass, spatial distribution in time and their importance in transformation of energy from one tropic level to next highest and overall energy dynamics contributes to the limnology of a reservoir (Vijaikumar and Paul, 1990, Kodarkar et al., 1998). Plankton consisting plant parts is called as ***Phytoplankton.*** *Zacharies (1998) was the first to recognise the existence of planktons in river and designated them as potamoplankton. Plants which inhabit the bottom of large water bodies are called as Benthos. The benthic organisms, their number and biodiversity pattern also depend on the physico-chemical characteristics of water. The plankton can also be classified according to size of the constituents as nano, micro and macro plankton. The small phytoplankton is called micro-phytoplankton. The micro phytoplankton has size less than 3 mm and dimensions between 0. 06 mm to 3.0 mm (Patil and Marathe, 1982; Patil, 1987).*

KEY WORDS

Biodiversity Population, Ecology, Phytoplankton etc.

RESEARCH PAPER

INTRODUCTION:

Micro-phytoplankton, having diameter less than 60 micron is called Nano phytoplankton. These can pass through a collecting net of bolting silk having mesh opening of 30 micron to 40 micron, only Nano-phytoplankton mostly consists of plants like Coccolithophores, Silicoflagellates, many diatoms, some unicellular algae, bacteria. Nano-phytoplankton are not studied so extensively because of their minute size. The largest plankton forms are known as Macro-phytoplankton that is larger than 3 mm in size and visible with the naked eye. The largest forms are also called Megalo-phytoplankton.

Phytoplankton in stream is derived from lake or ponds. Phytoplankton are not uniformly distributed (Patil, 1988). Lakes at high altitudes have more phytoplankton as compared to temperate regions, while lakes of low altitudes are extremely variable in their phytoplankton. Horizontal distribution of phytoplankton in the lake is irregular due to the current of waters. However, vertical distribution is the peculiar feature varies widely. Light requiring green algae depending upon it are always found abundant in upper layers of lake. During summer period, phytoplankton varies depending upon the locality and the physical and chemical nature of the lake.

In spring overturn of water gets stirred from top to bottom, nutrients from the bottom are brought to the surface of water. Hence there is increase of phytoplankton in spring, the diatom is first to show increase. Different species develop in different environment, which is suitable for their reproduction. Some species of phytoplankton bloom early in the season as it forms the basic link of food chain in aquatic ecosystem. Phytoplankton population constitutes the very basis of nutritional cycle of an ecosystem (Kaushik et al., 1991). In present investigation a detailed study on biodiversity and population of phytoplankton of Yeldari reservoirs has been carried out, in order to enhance our knowledge in this field.

MATERIALS AND METHODS:

The Yeldari reservoir water spread area is 41.25 square miles with catchment area 2830 square miles. Monthly sample collection for phytoplankton was done fortnightly between 8 to 10 am for the period of one year. Specifically an attention was imparted on the occurrence, population dynamics, and biodiversity pattern of phytoplankton. About 50 litters of water at 1 meter depth from the surface was taken with in to a plastic bucket of 10 litre capacity and filtered through plankton net made of bolting silk No. 16 bearing 10,000 meshes per square inch to which a Borosil glass jar of 250 ml capacity was attached. All care was taken to avoid spilling of the water. Plankton samples collected were transferred into 500 ml wide mouth, screw-capped polythene bottle and preserved in 10 per cent formalin solution (Trivedy and Goel, 1986). Phytoplankton was enumerated by Lackey's (1938) drop method under high magnification of 440 X as mentioned in Pearsall et at, (1946); Welch (1948) and standard methods modified by Saxena (1987). On an average three counts were made for each sample and the mean concentration were calculated. For this data the total count per litre was calculated and the various phytoplankton were considered as units of organisms per litre of water.

OBSERVATIONS AND RESULTS:

Phytoplankton identification of the various forms up to species level was done. During the one year from **October 2021 to September 2022**, 126 species of algae were recorded. Of these 47 species belonged to Myxophyceae, 34 were of Chlorophyceae, 7 grouped under Euglenophyceae, 34 belonged to Bacillariophyceae and 4 were of Dinophyceae. The percentage of major genera of phytoplankton during the year was noted. The data showed the abundance of the phytoplankton population in the reservoir. The percentage of phytoplankton ranged from 56.9 to 6.6 per cent for the year.

1. Myxophyceae: The members of this class otherwise are called Cyanophyceae or Blue-Green Algae. This class includes 5 orders, 18 families with about 150 genera and 1500 species. The present findings are quite interesting; that Myxophyceae phytoplankton population was very rich dominated. The maximum Myxophyceae phytoplankton population was found in the month of February, while the minimum was found in the month of May.

2. Chlorophyceae: The members of this class are otherwise called Green Algae. This class includes 9 orders, 43 families with 360 genera and about 57oo species. These algae have

grassy green chromatophores.In the present investigation the members of Chlorophyceae showed seasonal variations in their numbers. The reservoir had moderate chlorophyceae population and maximum was observed in the month of January while the minimum was found in July.

3. Euglenophyceae: Euglenophyceae is divided into 11 families with 29genera and about 800 species. The members of this class have pure green chromatophores. Almost all members are flagellates and unicellular, having one or two flagella. Members have chloroplast and depend for their nutrition on photosynthesis. In the present investigation only one genus Euglena showed the various peak of population percentage. The major pulses were observed in Marchwhile the minor in July.

4. Bacillariophyceae: Bacillariophyceae (Golden-Brown-Algae or Diatoms) includes two orders, 11 families with about 170 genera and 5300 species. Bacillariophyceaephytoplanktons**'s** population of Achanthes, Cyclostella, Nitzschia, Novicula and Synodra genus in November and January.

5. Dinophyceae: This class incudes 6 orders, 25 families with 58 genera and more than 200 living species. The members of this class bear numerous discoid chromatophores which are dark yellow or brown in colour However; in some species the chromatophores are colourless. In the present investigation genus Gjymnodinium and Peridinium was observed especially in winter and summer season. The Dinophyceae phytoplankton population showed winter minima in the month of October while the maxima were found in the month of May.

CONCLUSION :

Phytoplankton population composed of major groups namely Myxophyceae, Chlorophyceae, Euglenophyceae, Bacillariophyceae and Dinophyceae. The annual average percentage composition of these five groups of phytoplankton shows that the Myxophyceae populations were the dominant. During the course of study the phytoplankton population was quite rich and the major pulses were found the months November, February and March (Fogg, 1965, Hutchinson, 1967) The 47 species of Myxophyceae, 37 species of Chlorophyceae population, 7 species of Euglenophyceae, 35 species of Bacillariophyceaeand 4 species of Dinophyceae population were recorded (Komarovsky, 1953). The Yeldari reservoir is stocked with large number of fish.

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