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STUDY OF PHYCO – BIODIVERSITY AND WATER QUALITY IN KOILSAGAR PROJECT OF MAHABUBNAGAR DISTRICT, TELANGANA

Suresh S. and Ramamurthy N.*
Department of Botany, MVS Govt. Degree & P.G. College, Mahabubnagar, Telangana, India
*Author for Correspondence

ABSTRACT
The present study was to assess the water quality and to identify the importance of algal species in koilsagar project which is situated at Mahabubnagar district of Telangana. It is well established fact that life in water depends upon the Physico-Chemical factors. In the present investigation water samples were collected every two months once during July, 2013 to May, 2014. The Physico-Chemical parameters such as P^H, Total Dissolved Solids (TDS), Dissolved Oxygen (DO), Turbidity, Phosphates, Nitrates, Alkalinities, COD and BOD were studied from 4 different stations. The phytoplankton diversity was studied in relation to some Physico-Chemical parameters. A total of 20 species of phytoplankton were identified belongs to Chlorophyceae, Bascillariophyceae and cyanophyceae.

Keywords: Algae, Koilsagar, Physico-Chemical Parameters

INTRODUCTION
Koilsagar project is an existing medium irrigation project located near Bollarum (Vill), Devarakadra (Mandal) of Mahabubnagar district of Telangana. The project is a construction across Peddavagu stream which is a tributary of Krishna River. There are two main canals. The left flank canal is about 14.48 km length and it irrigates 3000 acres and the right flank canal length is 25.74 km and it irrigates 9000 acres. The project is completely enriched by hills on all sides except for a small portion on the South Eastern region where a raised bound extending for about 1.5Km marks its boundary (Figure 1). These water is using for irrigation and drinking purpose. The project remains totally isolated from all other aquatic systems in the area and is totally at the mercy of the monsoon rainfalls that lash the region.
Algae are widely distributed in different habitats (Figure 2). Algae are predominantly aquatic and found in both fresh and marine water. In aquatic system whether it is lentic or lotic phytoplankton is an important biological characteristic. It initiates food chain as producer affecting abundance and distribution of micro and macro-organisms depending directly or indirectly upon it. They bring about changes in chemical composition of water.

Figure 1: View of Koilsagar Project, Mahabubnagar dist

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Figure 2: Algal distribution at Koilsagar Dam

Phytoplankton which includes green algae, blue green algae, diatoms and desmids etc. are important among aquatic flora. The phytoplankton diversity responds rapidly to changes in the aquatic environment particularly in relation to nutrients (Chellappa *et al*., 2008). The algal diversity and occurrence of specific taxa in a water body varies considerably based on the change in physico-chemical parameters like pH, BOD, COD, and alkalinity (Tiwari *et al*., 2001).

MATERIALS AND METHODS
Surface water samples were collected from the project every two months once during 2013-14 and analysed in the laboratory for important physico-chemical parameters like pH, COD, BOD, Nitrates and Phosphates. Analysis has been done according to the methods described by APHA (APHA, 1988) and as per the workbook on Limnology (Adoni, 1985). A litre of water sample was collected every two months once separately for the qualitative and quantitative estimation of phytoplankton study. Plankton samples were collected by filtering water through plankton net. The filtrate was immediately preserved putting Lugol's Iodine solution and 4% formaldehyde for the identification of phytoplankton up to species (Fritsch, 1935; Anand, 1998; Krishnamurthy, 2000).

RESULTS AND DISCUSSION
Results
The physico-chemical parameters of Koilsagar project have been given in table-1. The phytoplankton communities of the present water were represented by mainly 3 classes of algae viz. Chlorophyceae, Bacillariophyceae, Cyanophyceae as given in table-2.
Chlorophyceae: It was the most significant group having a contribution of 62.38% to the total phytoplankton population. It exhibit higher density i.e., 70.23% during September and lower density in May (55.23%). This class includes Spirogyra, Chlamydomonas, Cladophora, Scenedesmus, Closteridium, Eudorina, Desmidium and Zygnema.
Bacillariophyceae: It accounted for a contribution of 29.32% to the total phytoplankton population. Its maximum periodicity was noticed during July (38.27%) and least in September (22.56%). This includes Diatoms, Botridium, Pinnularia, Navicula and Chloridella
Cyanophyceae: It contributes to 8.29% of the total population. The maximum periodicity was recorded in May (15.21%) and the minimum in November (4.72%). This includes Nostoc, Anabaena, Aulosira, Gleocapsa, Oscillatoria, Chroococcus and Lyngbya.

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Table 1: Mean physico-chemical parameters of Koilsagar Project in 2013-2014.

	July	Sept	Nov	Jan	Mar	May
Turbidity	0.9	0.8	0.9	1.0	0.6	0.9
TDS	295	358	376	287	280	276
COD	6.8	6.1	6.3	8.7	9.5	9.8
BOD	0.9	1.0	1.4	1.87	2.0	2.4
pH	7.1	7.23	7.19	7.28	7.3	7.4
Nitrate	6.4	5.3	5.7	10.1	16.8	7.9
Phosphate	7.2	7.5	6.2	7.9	15.7	10.4
Tot.N_2	3.6	2.96	3.2	4.3	4.6	5.2
DO	7.9	9.6	7.3	6.5	5.3	4.6
Alkalinity	104.2	98.5	95.4	116.4	128.5	132.2

Table 2: Phytoplankton communities in Koilsagar Project in 2013-14

Month	Chlorophyceae	Bacillariophyceae	Cyanophyceae
July	56.47	38.27	5.26
Sept	70.23	22.56	5.21
Nov	64.52	30.76	4.72
Jan	62.52	30.45	7.03
March	65.32	24.32	12.36
May	55.23	29.56	15.21

Discussion
The plankton community on which whole aquatic population depends is largely influenced by interaction of a number of physico-chemical and biological factors acting simultaneously must be taken into consideration in understanding the fluctuations of plankton population (Davis, 1955). From the present observation it is difficult to point out any single factor which is responsible for the fluctuation in abundance of plankton. Chlorophyceae and Cyanophyceae were more during summer season. The phosphate showed lower values during July to December but there was a difinite increase in phosphate concentration during January to May. Nitrate content also increased from January to May.

The Bacillariophyceae population was found to be closely associated with pH. It is observed that the acidic water do not support an abundance of Bacillariophyceae while in alkaline water with pH upto or above 8 their density is more. In the present study the pH ranged upto about 8. Goel *et al*., (1992) have stated that Bacillariophyceae occurs in all types of water. Navicula and Cyclotella indicate pollution in the present water body that occurred commonly. Dissolved oxygen (DO) ranged from 4.0 to 10.5 corroborating the findings Yousuf *et al*., (1986). More over DO content was found to be considerably high in cold months. The solubility of oxygen in water increased by lowering the temperature (Reid, 1961) that is solubility of oxygen in water was known to be affected inversely by the rise in temperature (Moss, 1988).

A gradual increase of phytoplankton was noticed just after the rains and remained higher from post-monsoon to the late spring season. This may be caused by the suitable range of water temperature and penetrating light, intensity due to low turbidity.

In general plankton biomass and composition in a shallow water bodies fluctuate as a reaction to several interacting driving forces which may include polymix, water level changes, weather conditions, nutrient loading and feeding management (Bories *et al*., 2000). In the present investigation, it is revealed that Koilsagar project is enriched with different groups of algal flora especially Chlorophyceae.

Conclusion
The present study ensures that variation in the abundance of phytoplankton can be best explained when environmental factors jointly influence. Thus it may be concluded that the density of phytoplankton is dependent on different abiotic factors either directly or indirectly.

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