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Phytoplankton Diversity of Shanigaram Lake, Siddipet District Telangana

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ABSTRACT

Algae constitute a part of food chain of aquatic life in the water; they influence the population of zooplankton and other aquatic organisms. Algae being the photoautotrophs are capable of energy synthesis and are chief food supplier for most of small aquatic animals. Lakes are the important water resources and used for several purposes. The present investigation is focused on the diversity of algae. The present work was carried out during January 2021 to June 2021. Shanigaram Lake is main source of drinking water for Shanigaram and surrounding villages, it is also used for agriculture and fish culture. All the collected water samples were preserved in 4% formalin and were observed under binocular microscope for identification of algae. Mainly four groups of fresh water algae recorded in Shanigaram Lake. They were Chlorophyceae, Cyanophyceae, Euglenophyceae, and Bacillariophyceae. The lake water is extensively used for drinking and irrigation purposes.

Key words: Shanigaram Lake, Algal diversity, Phytoplankton.

I.INTRODUCTION

Phytoplankton represents the microscopic algal communities of water bodies and the pioneer of aquatic food chain. The planktonic studies are very useful tool for assessment of water quality and the productivity of any type of water body and also contribute to understanding of water bodies (Pawar et.al 2006). Algae occur in wide range of aquatic environments like lotic as well as lentic habitat. In India studies on reverie ecosystem have attracted the attention of quite a few investigations in last few decades, e.g. Roy (1955), Chaco and Srinivasan (1955), Kudesia and Sharma (1981) and Mathur (1990) Raghuvamshi *et.al* (2011). The maintenance of healthy aquatic ecosystem is depends on the biological diversity of the ecosystem and the abiotic properties of water (Harikrishnan, et al, 1999). Algae are a large and diverse group of simple and typically autotrophic organisms they are ranging from unicellular to multicellular forms. Algae constitute a major part of the food chain of the aquatic life. Algae show distinct distribution and diversity and major food producer of all aquatic environments. Whatever alters the algal growth and composition also affects all other organisms (palmer, 1969). Phytoplanktons are often considered powerful biological indicators of fresh water ecosystems (Bellinger and singee 2011). Biological indicators act as important measures of the state of an Ecosystem more so when combined with chemical data (Dixit etal.1992). Planktonic algae are an integral part of lake food chains, nutrients cycles and oxygen production. Phytoplanktons take part in nutrient cycling via fixation, assimilation, and transfer through the food web, (Barasanthi and Gualtieri 2006) (Srinivas and Aruna 2018).The proper balance of biological, physical and chemical properties of water in lake is an essential ingredient for successful production of aquatic resources. Water is one of the important sources, to sustain life and has long been suspected of being the source of much human illness. Source of surface water and ground water become increasingly contaminated due to increase the industrial and agricultural activity. The phytoplankton in a reservoir is an important biological indicator of the water quality (Patil, *et al.*, 2013).Phytoplankton, which includes blue-green

algae, green algae, diatoms, desmids, euglenoids are important among aquatic flora. They are ecologically significant as they form the basic link in the food chain of all aquatic floras (Ravikumar, et al., 2006).

II. METHODS AND MATERIALS

Collection and preservation:

During present study, surface and ground samples were collected from different station of lake at monthly intervals in polythene cans and transported to laboratory for a period of six months. Phytoplankton samples were collected by using filtering water samples using plankton net (mesh size 105 µm) and preserved in 1000 ml plastic bottles by adding 5ml of formalin concentration. The collections were made early in the morning. Benthic and planktonic algae were collected separately and simultaneously along with water samples every month. The preserved samples were kept for 24 h undisturbed to allow the sedimentation of plankton suspended in the water. After 24 h, the supernatant was discarded carefully without disturbing the sediments and the final volume of concentrated sample was about 10ml. This concentrated material was used for species identification.

Counting and Identification:

From the collected and concentrated filtrate 1ml of sample was taken, analysis of phytoplankton was done by putting one drop of fixed sample on the glass slide and studying it under microscope. This analysis was repeated for 10 times and computed. For determine the frequency of different species of algae at each station, the drop method of Pearsall et al., (1946). Identification was done according to standard methods of (APHA, AWWA, WEF, 2005).Phytoplankton were examined and identified with the help of classified manuals (Desikachary, 1959: Anand, 1998; Krishnamurthy, 2000).

STUDY AREA:

Shanigaram project is an existing medium irrigation project constructed across Siddipet vagu a tribute of Mohidummed vagu in manair sub basin of Godavari basin near Shanigaram village koheda mandel, Siddipet district. Originally this project was constructed in the year 1653 and restored to PWD standards in 1891. This project is located a distance of 23 km from Siddipet and 1 km to Karimnagar –Hyderabad road near shanigaram village.

SALIENT FEATURES OF SHANIGARAM LAKE:

Gross storage 1.092 TMC, Utilization 1.092 TMC, Lowest Still level (MDDL) 346.030 M Ayacut 5100 Acres, Height above river bed 15.85m, Width: 3.00m, MWL +258.068 m, FRL+357.460m, MDDL +346.030m, Sill level of Ragi Sluice +349.080. Irrigation potential is about 5100 acres. Mandalwise ayacut for Bejjanki -1950 acres, and Koheda -3150.

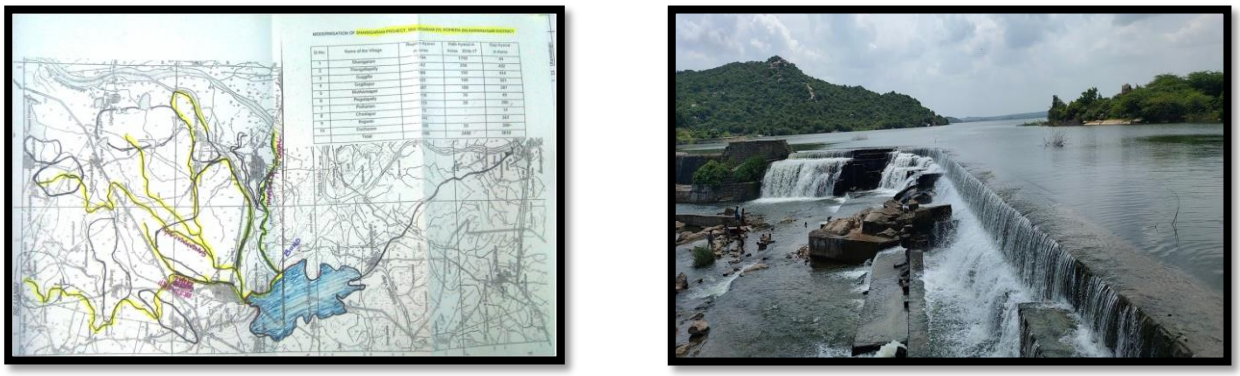

Fig 1. Shanigaram Lake mapping and over view

Fig 2. Showing Petroglyph and algal collection from shanigaram project

From the lake view 1 km distance goddess saraswathi temple located at ananthasagar.

III. RESULTS AND DISCUSSION

The present investigation showed different algal members represented by four classes namely Euglenophyceae, Chlorophyceae, Bacillariophyceae and Cyanophyceae. Chlorophyceae is the dominant class in all observations Cyanophyceae occupied second rank third dominant group is Bacillariophyceae and least is the Euglenophyceae are recorded with few algal members.

Table -1: Occurrence of common and Dominant species of Phytoplankton of Shanigaram Project

Name of algal group	Number of species recorded	Name of species
CHLOROPHYCEAE	32	*Actinastrum hantzschii*,
		Ankistrodesmus falcatus (Corda) Ralfos,
		Botryococcus braunii Kuetz,
		Chlamydomonas globsa Snow,
		Chlorella vulgaris Beyernick,
		Cladophora glomorata ,
		Closterium lanceolatum Reinsch,
		Closterium moniliferum nitzsch ex Ralfs.,
		Cosmarium botrytis Menegh,,
		Coliochaete orbicularis,
		Cylindrocapsa geminella Var.minor Hansg,
		Draparnaldiopsis indica (Vauch) Ag,
		Dictyospharium pulchellum,
		Eudorina elegans Ehr,
		Hydrodictyon rerticulatum (L) Larger heim,
		Microspora indica,
		Oedogonium intemedium,
		Oedogonium indicum Kuetz,
		Pandorina morum Bory,
		Pediastrum boryanum (Turp.) Menegh,
		Pediastrum duplex Meyen,
		Pediastrum simplex Meyen,
		Pediastrum tetras (Ehr.) Ralfs,
		Pithophora oedogonia,
		Rhizoclonium hieroglyphicum,
		Scenedesmus acuminatus (Turp.) de Breg,

		Scenedesmus granulates (Turp) Kurtz,
		Spirigyra crassa Jao,
		Stigeoclonium aestivale (Engl. Bot) Kuetz.
		Ulothrix zonata (Weber & Mohr) Kuetz,
		Volvox aureus Ehrenb,
		Zygnema pectinatum (Vauch) C.A Agardh,
CYANOPHYCEAE	11	*Anabaena viridis* Borge,
		Anabaena circularis var.Lemm,
		Aphanocapsa grevillei (Hass.) Rab.
		Calothrix indica,
		Chroococcus minutes,
		Gloeotrichia natans,
		Lyngbya dendrobia Lemm,
		Microcystis aeruginosa Kuetz.emen Elenkin.,
		Nostoc pruniforme Ag.,
		Raphidiopsis mediterenea,
		Oscillatoria curuiceps Ag. Ex Gomont.
BACILLARIOPHYCEAE	5	*Cymbella meneghiniana* Kuetzing,
		Navicula rectangularis Kuetz,
		Navicula subrhyncocephala,
		Pinnularia acrosepholeria Kuetz,
		Synedra ulua (Nitz).
EUGLENOPHYCEAE	3	*Euglena viridis* Her.
		Euglena acus,
		Phacus accuminatus stokes.

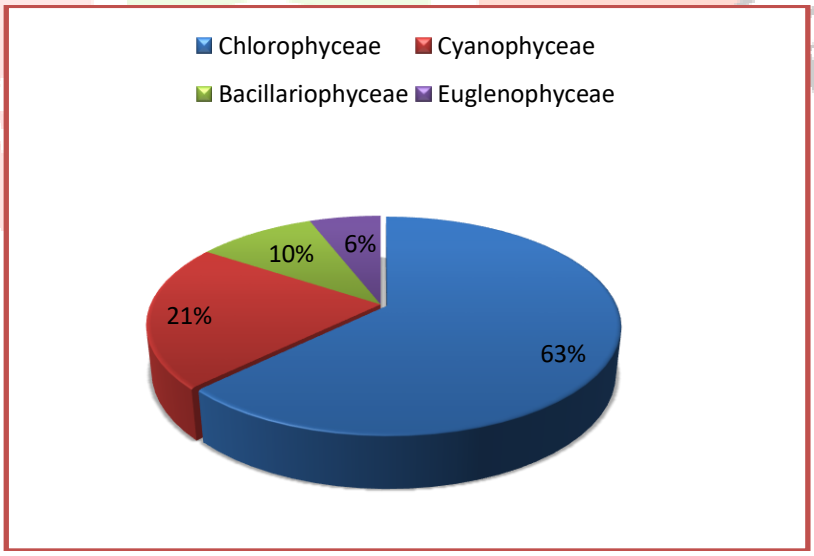

Fig .3: Showing phytoplankton species composition in Shanigaram Lake

From the above graphical representation it has been concluded that the water of Shanigaram Lake shows 63% (highest) of Chlorophyceae with 32 genera, which were dominant among all groups, 21% of Cyanophyceae with 11 genera, 10% of Bacillariophyceae with 5 genera, and 6% (lowest) Euglenophyceae members with 3 genera. (Fig **3).** The species composition was found identical at three sampling stations.

IV.CONCLUSION

It would be obvious from present investigation that, the Chlorophyceae in the dominant members, Cyanophyceae and Bacillariophyceae are predominant members and few of Euglenophyceae in the Shanigaram Project. The present study reveals all the algal species observed in the lake belongs to unpolluted water organisms. It indicate that the shanigaram lake at present free from pollution. Hence it can be safely used for different purposes such as drinking, agriculture, and for fisheries.

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