

Studies on Plankton Diversity of Ashok Sagar Lake in Telangana

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ABSTRACT

The present study was undertaken to study the diversity of Phytoplankton of freshwater bodies in Nizamabad District and after survey Ashok Sagar lake was selected. The present work was carried out during October, 2013 to September, 2014. Ashok Sagar lake is main source of drinking water for Nizamabad and surrounding villages, It also used for agriculture and support fish culture. All the collected water samples were preserved in 4% formalin and were observed under binocular microscope for identification. Mainly four groups of planktonic algae were recorded in Ashok Sagar lake. They were Chlorophyceae, Cyanophyceae, Euglenophyceae and Bacillariophyceae. The species diversity pattern was more or less uniform throughout the study period in lake, indicating the oligotrophic nature and it is useful for human consumption.

Keywords : Phytoplankton, Ashok Sagar Lake, Diversity , Oligotrophic, Nizamabad.

I. INTRODUCTION

Fresh water is the most important natural renewable resource and has often regarded as 'Pillar of our Civilization'. Algae constitute the major part of the food chain in the aquatic environment and any change in its growth and composition will alter the other living sources including the fishes (Palmer, 1980). Algae occur in wide range of aquatic environments like lentic as well as lotic habitat. In India studies on reverie ecosystem have attracted the attention of quite a few investigations in last few decades, e.g. Roy (1955), Chacko and Srinivasan (1955), Kudesia and Sharma (1981) and Mathur (1990) Raghuvanshi et.al (2011). Algae plays an important role in purify the water by photosynthesis. In other words it helps in the process of rejuvenation of rivers (Sharma.2005), (Pandey, 1973; Kumar et.al 1974).

Phytoplanktons are microscopic, unattached plants found homogenously mixed throughout the water column. Being dependent on light and Nutrients, they populate the euphotic zone of fresh water lakes, ponds etc. The phytoplanktonic species are present in all the standing water bodies as well as in the middle and lower reaches of rivers. The primary productivity and the day time biogenic oxygenation in the fresh water zones are dependent on these organisms of the various aquatic groups, the phytoplanktonic communities respond very quickly to the changes in the environment because of their short life cycle and thus act as bio-indicators of pollution.

Phytoplankton Serve as important biological indicators of an aquatic Ecosystems, as they both effect and are affected by many characteristics of a fresh water Ecosystem. Phytoplanktons are often considered powerful biological indicators of fresh

water ecosystems (Bellinger and Sigeo 2011). Biological indicators act as important measures of the state of an Ecosystem more so when combined with chemical data (Dixit et al. 1992). Planktonic algae are an integral part of lake food chains, nutrient cycles and oxygen production. Phytoplankton take part in nutrient cycling via fixation, assimilation, and transfer through the food web, (Barsanthi and Gualtieri 2006), Srinivas and Aruna 2018.

Species diversity accounts for the existence of life in the biosphere. It is one of the basic attributes of Ecological communities and is used to describe both the distribution and abundance of organisms. It is related to the latitude, climate, and nature of habitat, Environmental stresses, attitude, and age of substrate. Algae are the primitive, simple, photosynthetic, aquatic prokaryotic or eukaryotic unicellular or multicellular, primary producers leading mostly a free living mode of life in either fresh water, marine or terrestrial habitats. Acquiring portable water is a day to struggle for most of the people in Nizamabad District. The knowledge bio - diversity of lakes along with its present conservation status will help in the wise use of these Ashok sagar Lake, enabling in their sustainable utilization for the benefit of human mankind by maintain of its natural properties. The most important step is to prevent degradation of lakes ecosystem is to maintain its ecological integrity and health.

II. MATERIALS AND METHODS

During present study, surface and ground water samples were collected from different station of lake at monthly intervals in polythene cans and transported to laboratory. Benthic and planktonic algae were collected separately and simultaneously along with water samples every month. Samples was preserved in formaldehyde and reduced to 50ml by sedimentation this concentrated material was used for species identification. 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).



Fig 1. Ashok Sagar Lake - Sateliite View

STUDY AREA:-

Nizamabad is situated at 18.41 N and 78.6E Latitudes and longitudes. Nizamabad is bounded on the north by Adilabad District, East Karimnagar, South by Medak District and west by Nanded District of Maharashtra State. The Geographical area of district is 7,956 Sq.Km. Average Annual Temp. 27.0 Degrees of Celsius , Summer Temperature 46.0 Degrees of Celsius and Winter Temperature 18.0 Degrees of Celsius.

Ashok Sagar:-

Ashok Sagar is a major irrigation lake situated about 7 km from Nizamabad (Fig-1 & 2). It is situated in the route of famous Saraswathi temple at Basar from Hyderabad. The 15 feet marble statue of Goddess Saraswathi is located in the middle of the lake.



Fig 2. Ashok Sagar Lake - Over View

III. RESULTS AND DISCUSSION

The Density and diversity of Phytoplankton are influenced by the quality of water diversity indicates the degree of complexity of community structure .The present investigation showed different algal members belonging to different classes namely Chlorophyceae, Cyanophyceae, Bacillariophyceae and Euglenophyceae. Chlorophyceae ranks first in all observations and next to Cyanophyceae, Bacillariophyceae was the third dominating group and Euglenophyceae are recorded few. Dominant species of phytoplankton observed in the lake is enlisted in Table-1

Table-1 : Occurrence of common and Dominant species of Phytoplankton of Ashok Sagar Lake

CLASS	GENERA
CHLOROPHYCEAE	<i>Ankistrodesmus falcatus</i> (Corda)
	Ralfos
	<i>Closterium calosporum</i>
	<i>Cosmarium botrytis</i> Menegh
	<i>Chlamydomonas globosa</i> Snow
	<i>Chlorella vulgaris</i> Beyernick
	<i>Pediastrum simplex</i> Meyen
	<i>Pediastrum duplex</i> Meyen
	<i>Volvox aureus</i> Ehrenb
	<i>Scenedesmus dimorphous</i> (Turp.) Kuetz.

CYANOPHYCEAE	<i>Anabaena spiroides</i> Klebehn <i>Aulosira festilisima</i> S.L. Ghose <i>Lyngbya major</i> <i>Microcystis flos-aquae</i> (Wittr.) Kirchner <i>Nostoc carueum</i> <i>Oscillatoria curuiceps</i> Ag. Ex Gomont <i>Spirulina major</i> (Kutz) Gomont.
BACILLARIOPHYCEAE	<i>Cymbella meneghiniana</i> Kuetzing <i>Navicula rectangularis</i> Kuetz. <i>Pinnularia acrosepholeria</i> Kuetz <i>Synedra ulua</i> (Nitz).
EUGLENOPHYCEAE	<i>Euglena viridis</i> Ehr. <i>Phacus acumminatus</i> Stokes

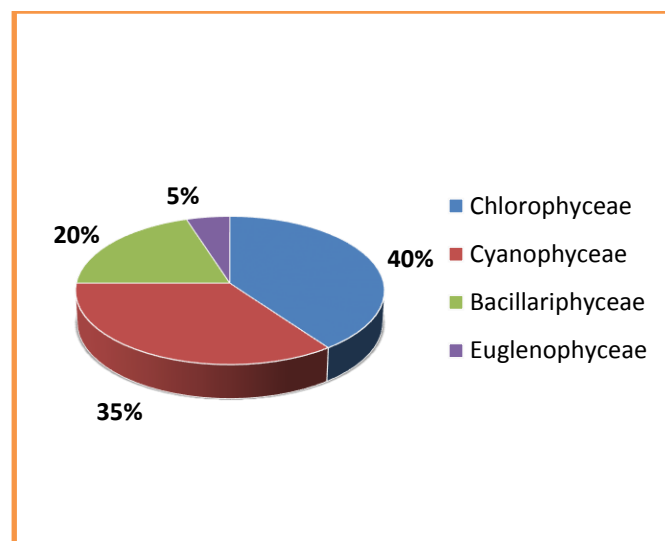


Fig-3 : Algal diversity of Ashok Sagar lake

From the above graphical representation it has been concluded that the water of Ashok Sagar Lake shows 40% (highest) of Chlorophyceae members which were dominant among all groups, 35% of Cyanophyceae members, 20% of Bacillariophyceae members and 5% (lowest) Euglenophyceae members (Fig.- 3).

IV. CONCLUSION

The present study reveals phytoplankton in the lake assessing the quality of water. The algal data has been used as an important tool in lake study. All the species observed in lake belongs to unpolluted water organisms. It indicates lake at present free from Pollution. Hence it can be safely used for different purposes such as drinking, agriculture, and for fisheries.

In the days to come algae will become the highly explored resource for energy remediation tools for a clean environment and nutrient rich food and food supplements for maintaining health. Therefore fundamental researches like the present work can be considered as a pre requisite for advanced researches on applying algae for human welfare.

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