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Study on Distribution of Phytoplankton Collected from Palair Lake, Khammam, Telangana, India

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ABSTRACT:

Limnological studies have been conducted on three stations of Palair Lake over a period of two years starting from 2013 to 2015. A monthly variation in quality of the water has been studied. Rapid population growth, growing living standards, a wide range of human activities, industrialization, and greater food production stress have all contributed to the contamination of aquatic ecosystems. In the vast majority of situations, pollutants induce observable changes in abiotic and biotic communities. The number of phytoplankton is used as an indicator of water quality because they rely on it for survival and dominance. Diatoms are widely distributed and have a remarkable ability to ingest and exhibit water quality variations. The result indicates that all the three stations are good and can be used for domestic and irrigation purpose.
KEYWORDS: Limnological studies,Quality ofPalair Lake, Permissible limits,Domestic and Irrigation purpose.

INTRODUCTION: Water covers more than two-thirds of our world, and marine waters account for nearly all of the liquid water (Charette and Smith, 2010). Tardent, 2005; Gruber et al., 2009; Häder et al., 2011) estimate that marine ecosystems produce half of all biomass on Earth, despite their standing crop accounting for only 1% of total terrestrial biomass. While prokaryotic and eukaryotic phytoplankton account for more than 90% of photosynthetic carbon fixation in the oceans, macroalgae and seagrasses account for less than 1% of marine ecosystems yet play critical roles in carbon cycles in coastal areas. These organisms provide the foundation of complex food webs that feed successive layers of the food chain, eventually providing food for the rising human population. Falkowski et al., 2000; Zepp et al., 2007) estimate that marine ecosystems absorb around 26 million tonnes of anthropogenically produced CO2 each day, which is equal to all terrestrial ecosystems combined (Gao et al., 2012b). As a result, they serve a critical role in regulating CO2 levels in the atmosphere and reducing the severity of extreme weather and temperature events (Chester and Jickells, 2012).

STUDY AREA : Khammam, also known as Khammamett, is the city in Khammam district of the Indian state of Telangana. It is the fourth largest city in the state.

In our investigation we have taken lake which are as follows….

PalairLake-station I:
PalairLake- station II:
PalairLake- stationIII:

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MATERIALS AND METHODS:

Water samples for phytoplankton estimation was taken. Sedimentation was performed after adding 15 mL of 4 percent formaldehyde and 10 mL of lugol's iodine to a 1000mL composite sample. Sedimentation in glass columns was used to identify the samples. Finally, the sediment was reduced to 20 mL and placed in a vial for storage. Each vial had one drop carefully placed on a slide, which was then covered with a cover slip. The sedimented material was inspected using an electronic microscope. Five high-power field (15x X 45x) observations, one in each corner of the cover slip and one in the centre, were used to estimate the algal populations.

Phytoplankton has been identified to species level using monographs and research papers. The algae in lake has been identified and classified. The physicochemical and biological data from three stations, as well as the trophic state of the lake, were used for ecological considerations of the waters. Phytoplankton was counted using Lackey's drop method (Lackey, 1938; Vollenweider, 1969), as described in APHA (1995), plus Saxena's adjustments (1987). Phytoplanktons were counted using organisms per litre (Org/L).

Formula used for the calculation of phytoplankton as Org/L is

Phytoplankton Org/L=n x v / V * 100

n= No of phytoplankton counted in 0.1ml concentrate.

v = Total volume of concentrate in ml.

V = Total volume of water filtered through net.

RESULTS: The results are represented in tabular format

TABLE-1 AVERAGE VALUES OF PHYTOPLANKTON IN PALAIR LAKE -STATION-I (2013-2015)

Cyanophyceae	118.956
Chlorophyceae	100.261
Bacillariophyceae	79
Euglenophycae	0.78261

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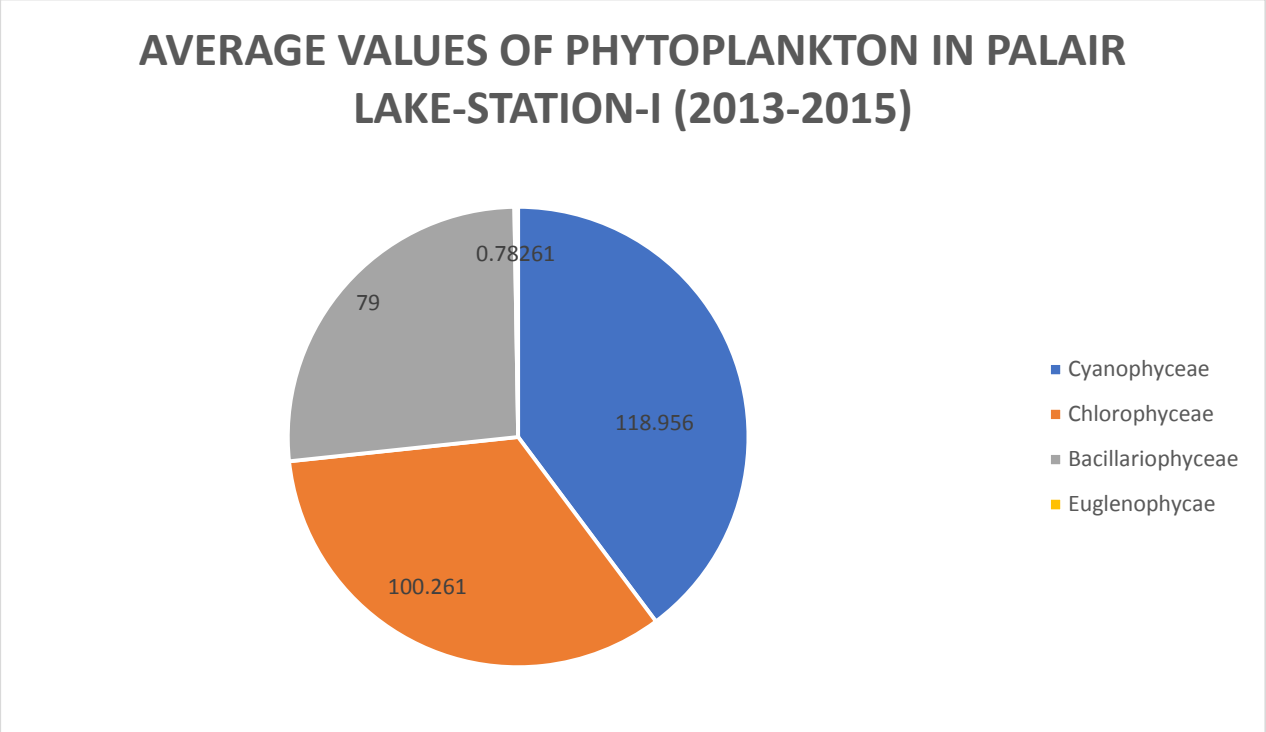

Fig.1

TABLE-2 AVERAGE VALUES OF PHYTOPLANKTON IN PALAIR LAKE -STATION-II (2013-2015)

Cyanophyceae	91.333
Chlorophyceae	83
Bacillariophyceae	69.25
Euglenophycae	0.708

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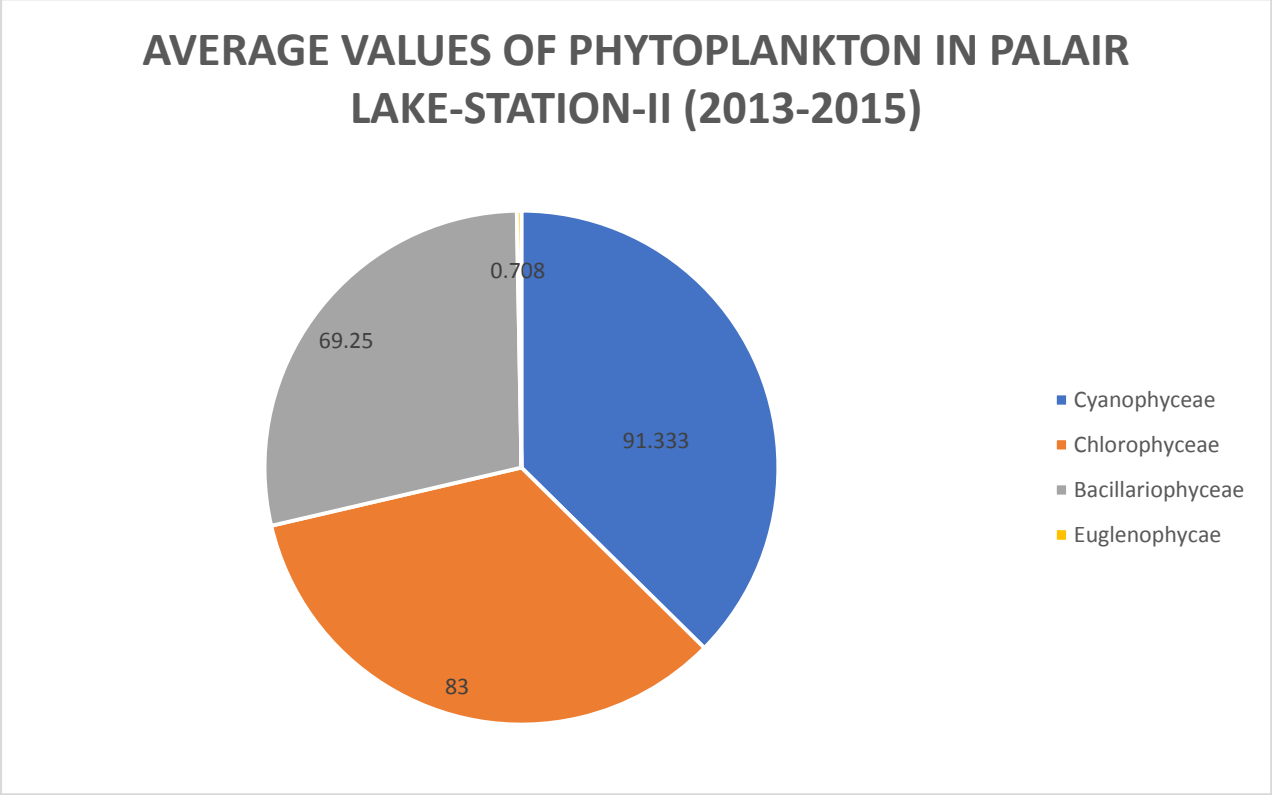

Fig.2

TABLE-3 AVERAGE VALUES OF PHYTOPLANKTON IN PALAIR LAKE -STATION-III (2013-2015)

Cyanophyceae	93.25
Chlorophyceae	82.70
Bacillariophyceae	69.45
Euglenophycae	0.79

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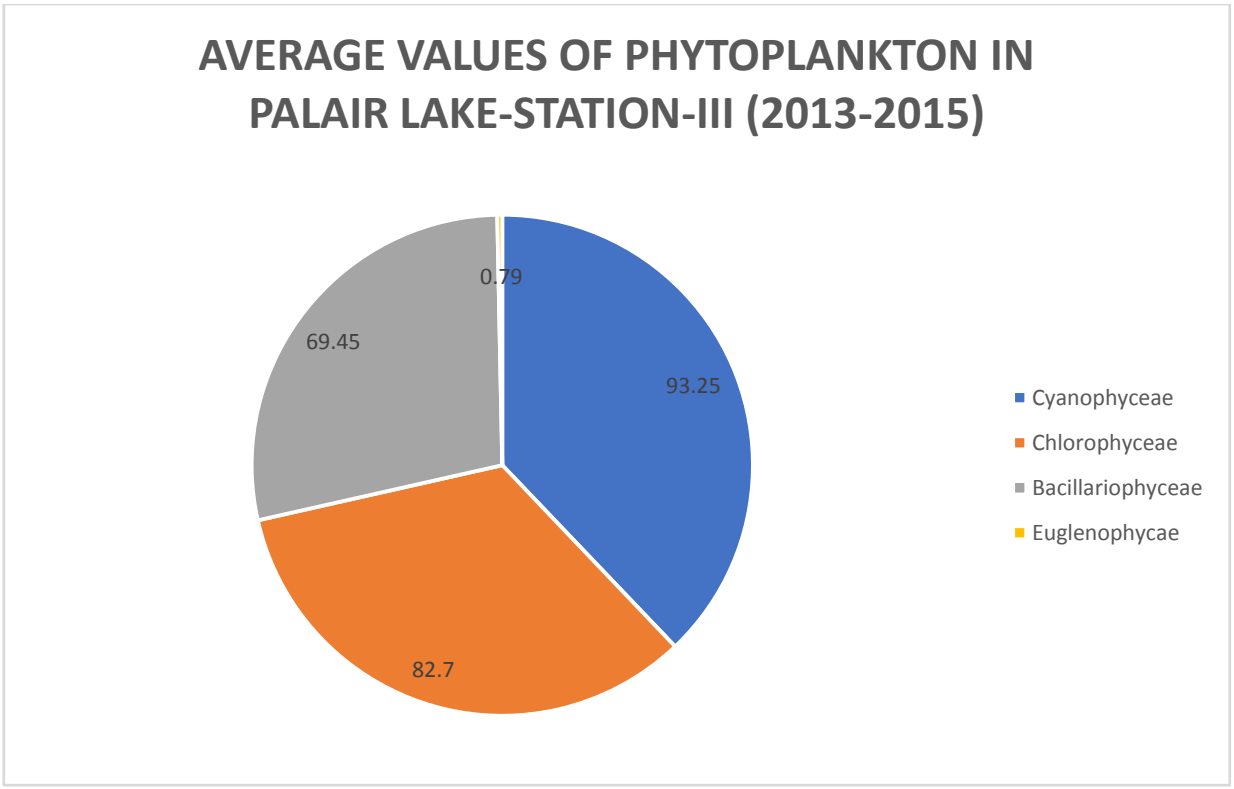

Fig.3

DISCUSSION ON TABLES: Members of the Cyanophyceae family are the most numerous in Station I. The majority of the amount was made up of phytoplankton. Stations I,II and III have an average population of 118.956,91.333 and 93.25 respectively. At three sites, Chlorophyceae came in second, with 100.261 at Station I,83 at Station II and 82.70 Station III. Members of the Bacillariophyceae ranked third, with about 79 at Station I,69.25 at Station II and 69.45 at Station III . 0.78,0.708 and 0.79 of Euglenophyceae members were in fourth place at stations I II and III, respectively.

Cyanophyceae > Chlorophyceae> Bacillariophyceae>Euglenophyceae

CONCLUSION: Phytoplankton productivity is impacted by a wide range of environmental factors, many of which are influenced by human activity, resulting in massive fluctuations as a result of global climate change, ozone depletion, and pollution (Behrenfeld et al., 2006). One of the most critical factors affecting phytoplankton primary productivity is temperature (Lewandowska and Sommer, 2010; Thyssen et al., 2011). Only a few organisms show a positive net photosynthetic activity below freezing (Staehr and Sand-Jensen, 2006; Boyd et al., 2013). Increasing temperatures improve production until active carbon sequestration declines or ends, or organisms die, i.e., species are adapted to a thermal window for photosynthetic output (Huertas et al., 2011). During the preceding 135 years, mean global temperatures have risen as long as systematic measurements exist (Lawrimore et al., 2011). Over the preceding 112 years, manmade climate change has caused global water temperatures to rise by roughly 1°C (Fischetti, 2013). Deoxygenation can be induced by rising

temperatures, especially in coastal and estuarine ecosystems, which can become dead zones for most marine species in extreme cases (Howarth et al., 2011; Carstensen et al., 2014).

The result of this analysis, point out the fact that all the stations are under permissible limits of phytoplankton. The result indicates that the lake is good and can be used for domestic and irrigation purpose.

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