



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 10, Issue, 11(F), pp. 36131-36135, November, 2019



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International Journal of
Recent Scientific
Research

DOI: 10.24327/IJRSR

Research Article

EFFECT OF WATER QUALITY ON THE SUSTAINABILITY OF PHYTOPLANKTON DIVERSITY IN THE LAKE ECOSYSTEM OF NAVALGUND IN DHARWAD DISTRICT, KARNATAKA - INDIA

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DOI: <http://dx.doi.org/10.24327/ijrsr.2019.1011.4844>

ARTICLE INFO

Article History:

Received 15th August, 2019
Received in revised form 7th September, 2019
Accepted 13th October, 2019
Published online 28th November, 2019

Key Words:

Seasonal, Ecosystem, Diversity, Phytoplankton, Arekurahatti Lake, Water quality index, Cyanophyceae.

ABSTRACT

Phytoplankton inhabit widely in different environments. Due to their undemanding nutritional habits, simple structure, fast growth and reproduction these algae have a great capacity of adapting to extreme ecological conditions. The present paper deals mainly with, ecologically significant Phytoplankton belonging to five different classes of algae related to physicochemical characteristics of Arekurahatti Lake in Navalgund. Nineteen physicochemical parameters were analyzed seasonally from May 2012 to April 2013. The climate change and variation in physicochemical parameters played an important role in the diversity of Phytoplankton and favoured the maximum blooming of Chlorophyceae, Cyanophyceae, Bacillariophyceae and Euglenophyceae members especially during Monsoon. But during winter and summer season much fluctuation was observed in the density of these members. Surprisingly, the species of Dinophyceae members were appeared during summer season when phosphate levels were found least in the lentic water body. On an average, the per cent occurrence of Cyanophyceae members was found maximum followed by Chlorophyceae, Bacillariophyceae, Euglenophyceae and Dinophyceae. A total of One hundred and nineteen species were recorded throughout the year belonging to Bacillariophyceae (41), Chlorophyceae (35), Cyanophyceae (27), Euglenophyceae (13) and Dinophyceae (3). The results of physicochemical parameters revealed that the load of nutrients in Arekurahatti Lake has influenced abundance of Phytoplankton species. Based upon the recorded physicochemical parameters the status of the lentic water body in the present study indicated its oligotrophic nature. The water quality index recorded was ranged from 45.52 to 58.06 on hundred point scale. The water quality was rated as medium during the months of May, June, July, October, January, February, March and April and during the remaining months it was rated as poor. Therefore, the investigation may suggest that water of Arekurahatti Lake can be used for domestic purposes but not for drinking according to drinking water quality standards (WHO, 1990).

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INTRODUCTION

Water is the elixir of life. It is very essential to all living organisms since it is the key that supports life. It shapes the earth's surface and moderates climate. The earth's ecosystems are linked and maintained by water. Clean fresh water is a crucial resource used for drinking, irrigation, industry, recreation and agriculture (Stephen *et al.*, 1998). Today, the water is polluted with hundreds of toxins and impurities due to anthropogenic activities. Biological assessment is a useful alternative for assessing the ecological quality of aquatic ecosystems since biological communities integrate the

environmental effects of water chemistry, in addition to the physical and geomorphologic characteristics of rivers and lakes (Steven *et al.*, 1999). Chemical analysis of water provides good indication of the chemical quality of the aquatic ecosystem, but does not integrate ecological factors such as altered riparian vegetation or altered flow regime and therefore does not necessarily reflect the ecological state of system (Karr *et al.*, 2000). But phytoplankton abundance in water body reflects the average ecological condition and therefore, they may be considered as an indicator of water quality (Bhatt *et al.*, 1999; Sha *et al.*, 2000). Water quality index is one of the most

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51