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PHYTOPLANKTON DIVERSITY AND PHYSICO-CHEMICAL ANALYSIS OF SHERSHAH SURI POND, SASARAM WITHIN ROHTAS DISTRICT, BIHAR

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ABSTRACT

The present study has been focused on the phytoplankton diversity and physico – chemical parameters of Shershah Suri pond water from March 2018 to February 2019. The physico- chemical parameters like pH, conductivity, alkalinity, hardness, calcium, magnesium, chloride were analysed in the laboratory. The qualitative evaluation of plankton with seasonal variation and water quality of Shershah Suri pond were analysed. Phytoplankton population was mainly represented by Bacillariophyceace, Chlorophyceace and Cyanophyceae.

KEYWORD: Phytoplankton, Physico- Chemical, Seasonal Variation, Water Quality.

INTRODUCTION

Phytoplanktons, which are the microscopic free floating autotroph and a key factor of aquatic ecosystems. Phytoplankton forms a highly diverse group of microorganism and plays a vital role in transfer of energy in aquatic ecosystem. Phytoplankton is a biological indicator of water pollution and their use in removal of toxicants from wastewater. The moderate phytoplankton contributes to the atmospheric oxygen (80-90‰) by means of their autotrophic activity, their small size may be attributed for their fast metabolic activity, compared to macrophytes [M. Shamsul Islam: 2008, Roach, John: 2004]. Different species of plankton vary in different seasons due to the changes in physico – chemical nature of water [Asha, et. al. 2015, Ameetha, et. al. 2014, Good Frey, 2017].

MATERIALS AND METHODS

The water samples was collected at an interval of 15 days and analysed for the physico-chemical parameters. The samples were collected in triplicate in plastic container during morning hours and analysed in the laboratory.

The water of Shershah Suri pond of Sasaram has been polluted through vigorous contaminant and the growth of phytoplanktons at Sasaram (Rohtas) has been selected for the analysis of planktons on the pond diversities. Further analysis was carried out different sampling stations of pond. The collected water samples for the examination of physical chemical parameters and biological parameters were collected separately APHA [1989] Adoni [1985], Trivedi & Goel [1986], Das [1989] and Sinha and Naik [1997].

RESULTS AND DISCUSSION

A total number of 43 genera and 75 species of phytoplankton were reported during the course of study. The occurrence of phytoplankton genera and species has been given in the (Table1). sampling stations has been given in the (Table-1). Cyanophyceae contributed 13 genera with 31 species, Chlorophyceae contributed 16 genera with 22 species, 13 genera with 9 species belonged to Bacillariophyceae, 3 genera with 7 species belonged to Euglenophyceae, Dinophyceae and Xanthophyceae genera were observed minimum as 1.

Kaul *et.al* [1978] reported that the water bodies rich in Ca and Mg ions have good growth of algae especially Cyanophyceae. Sewage and industrial wastes have been regarded as important sources of calcium and magnesium concentration [Dakshini and Soni, 1979; Mishra and Saxena, 1989]. Dominance of Cyanophyceae during the present investigation indicates the eutrophic nature of pond as also reported by [Prescott; 1939]. Diverse phytoplanktonic biota was dominated by Chlorophycean genera. Other researchers showed similar results.

Important physico - chemical parameters of water like Temperature, pH, conductivity, TDS, Hardness, Turbidity, Alkalinity, Chloride, DO and Silica at selected sampling stations (S- Ⅰ, S-Ⅱ, S- Ⅲ) are presented in (Table-2). The water temperature was recorded as (32^0C, 32.3^0C, and 31^0C) at Site - Ⅰ, Site-Ⅱ and Site-Ⅲ. The maximum value of Turbidity was observed as 111 at Site-Ⅰ and minimum value was recorded as 103 at Site-Ⅱ.

The effect of pH is not very significant with reference to other physico – chemical as well as biological features, rather it is limited and variable. The value of pH was recorded as 9.5, 8.95, and 9.2. The Hardness of water is governed by the content of Calcium and Magnesium salts largely combined with bicarbonates and carbonates and with sulphates, chlorides and other anions of mineral acids. In the present investigation the maximum value of Hardness was observed as 178. The property of alkalinity is usually imparted by the presence of bicarbonates, carbonates and hydroxides and less frequency in inland waters by borate, silicate and phosphates. In the present study, maximum value of Alkalinity was observed as 240 at site Ⅱ and minimum value was recorded as 225 at site- Ⅰ.

Chloride, one of the major inorganic anions increased by discharge of domestic sewage and human as well as other animals excretes. In our observation the maximum concentration of Chlorides was recorded as 89.20 at site- Ⅱ and the minimum concentration was recorded 87.7 at site- Ⅰ. Dissolved oxygen is essential to the metabolism of all aerobic organisms, oxygen distribution is important for the direct needs of many organisms, and affects the solubility and availability of aquatic ecosystem. In the present study, the value of DO in the Shershah Suri pond water was observed maximum as 7.5ppm at site- Ⅱ and minimum was recorded as 7.0ppm at site- Ⅰ. High pH value account for higher content of dissolved oxygen in lentic waters.

CONCLUSION

In the present investigation the input of calcium, magnesium and solids are either related to human activities or additions from municipal waste water. The suggested measure to improve the pond water quality includes washing of clothes, bathing activity and sewage canal entering the pond should be diverted from the pond. Dumping of wastes should be avoided.

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Table 1: No. of Genera and Species Reported From The Shershah Suri Pond.

Class	Genus	Species
Chlorophyceae	16	22
Cyanophyceae	13	31
Bacillariophyceae	9	13
Euglenophyceae	3	7
Xanthophyceae	1	1
Dinophyceae	1	1
Total	**43**	**75**

Table 2: Physico-Chemical Parameters of Water In Shershah Suri Pond During The Year 2018.

PARAMETERS	SITE- I	SITE - II	SITE- III
Water temperature (^{0}C)	32^{0}C	32.3^{0}C	31^{0}C
pH	9.5	8.95	9.2
Conductivity (µS)	985	925	935
TDS (ppm)	640.25	601.25	620
Total Hardness (mg/l)	178	178	176
Calcium Hardness (mg/l)	98	74	96
Magnesium Hardness (mg/l)	80	104	82
Methyl Orange Alkalinity (mg/l)	226	240	228
Phenolphthalein Alkalinity (mg/l)	34	24	36
Chloride (mg/l)	87.7	89.20	88.1
DO (mg/l)	6.95	7.05	7.2
Turbidity (NTU)	111	103	98
Silica (ppm)	13	13	13

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