Seasonal Phytoplankton Diversity of Semara Taal, A Wetland of Siddharth Nagar District of U.P.

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Abstract- ***In the present study only few species are present throughout the year, while other species were distributed in different seasons mainly in winter and summer seasons. Duiring winter, Chlorophyceae was dominant group followed by Bacillariophyceae. On the other hand, Cyanophyceae and Euglenophyceae were dominant during Summer. Pandoria. Pediastrum, Gonium, Chlorella, Scendesmus, Oedogonium, Oscillatrria and Euglena were recorded throughout the year. Presence of Pandoria, Chlorella, Oscillatoria, Anacystis, Cymbella and Nitzschia incidence the polluted condition of taal water.***

Indexed Terms- ***Phytoplankton, Semara taal, wetland.***

I. INTRODUCTION

Phytoplankton forms the vital source of energy in the aquatic environment and these are the base of aquatic food chain and food web and is the most important factor for production of organic matter in aquatic ecosystem. Phytoplankton diversity also help to determine the trophic status and water quality of waterbodies. The interplay of physical, chemical and biological properties of water most often lead to the production of phytoplankton, while their assemblage (composition, distribution, diversity and abundance) is also structured by these factors. Most of wetlands will require significant amount of phytoplankton to have productive and sustainable development of fisheries. Some of phytoplankton species gives a reliable information about pollution status of aquatic bodies. So, these are called good indicator of water quality. These studies and monitoring are useful for control of the physico-chemical and biological conditions of the water. Wetlands are very productive ecosystems, which help in the regulation of biological cycles, maintenance of water quality, nutrient movement and support for food chains.

Water quality parameters provide the various physico-chemical characteristics of waterbodies. These components vary with space and time (Mane et al, 2005). Wetlands are areas where water is the primary factor controlling the environment and the associated plants and animal life (Prakash, 2016). The interplay of physical, chemical and biological properties of water most often lead to the production of phytoplankton, while their assemblage (composition, distribution, diversity and abundance) is also structured by these factors. The importance of phytoplankton in tropical aquatic ecosystems includes its use in estimating potential fish yield. The scale of socio-economic activities, urbanization, industrialization and hydropower generation have a major impact on wetlands. The impact of these activities affected water quality and aquatic biodiversity.

The Semara taal, a wetland is situated near the Shohratgarh of Siddharthnagar district of Uttar Pradesh. The total area of this taal is 466.66 acre. The maximum depth of water in the pond is 15 feet during monsoon and minimum in summer. It has good biodiversity as it is rich both in flora and fauna and the occurrence of good bio-diversity is an index of healthy, growing, dynamic and economically efficient water body. Due to urbanization and anthropogenic pressure most of the wetlands are succumbed to greater degree of biologically active nutrient accumulation. The present paper deals with the seasonal variation of physico-chemical condition of water and phytoplankton of the Semara Taal, a wetland of tarai region of eastern Uttar Pradesh.

II. MATERIALS AND METHODS

The physico-chemical conditions of taal water were analyzed according to APHA (1998). The phytoplankton were collected in different seasons periodically by using plankton collecting net made of

bolting cloth with 25 meshes/ cm and were preserved I 100 ml bottle by fixing them 5% Lugol's solution. The sample were brought to the laboratory and observation were taken under compound microscope. The procedure was repeated four times to get an average for qualitative analysis. Plankton were identified with the help of a book entitled "A guide to the study of fresh water biology" written by Needham and Needham (1962) and other standard literature.

III. RESULTS AND DISCUSSION

The data on the physico- chemical parameters and phytoplankton diversity were presented in Table1 and 2, respectively. Physico-chemical parameters concentration of water showed that water of samara taal was under good quality condition *i.e*., good for phytoplankton growth and growth and survival of fish.

Table1. Seasonal changes of Physico-chemical parameters of Semara Taal

Parameters	Summer	Rainy	Winter
pH	7.6-7.8	7.0 -7.4	7.2 - 07.7
Dissolved Oxygen (ppm)	2.0 -3.9	3.2 -5.8	3.1 -5.1
Free Carbondioxide (ppm)	41.2 55.7	38.4 – 40.2	35.2 – 36.7
Total Alkalinity (ppm)	130 - 410	145 - 450	168 - 470
Total Hardness (ppm)	60 -120	90 -110	105 - 125
Chloride (ppm)	65-125	55 -150	60 -120
Sulphate (ppm)	15 -23	22- 35	25 -35
Phosphate (ppm)	2.5 -4.0	1.5 -2.5	1.6 -2.7
Nitrate (ppm)	1.5 -3.0	1.7 – 2.6	2.0 -3,7

Phytoplankton is usually at the base of aquatic food web and is the most important factor for production of organic matter in aquatic ecosystem. In the present investigation total 22 genera of phytoplankton was observed throught the year. Out of 22 genera, 10 genera belong to Chlorophyceae, 5 to Bacillariophyceae, 4 to Cyanophyceae and 2 to Euglenophyceae (table2).

Table 2. Seasonal alteration in Phytoplankton Diversity of Semara Taal

Phytoplanktons	Summer	Rainy	Winter
Chlorophyceae			
Chlamydomonas sp.	-	-	+
Pandoria sp.	+	+	+
Gonium sp.	+	+	+
Volvox sp.	+	+	+
Oedogonium sp.	+	+	+
Chlorococcum sp.	-	+	-
Spirogyra sp.	-	-	+
Closterium sp.	+	+	+
Chara sp.	+	-	+
Nitella sp.	+	-	+
Cyanophyceae			
Micocystic sp.	+	+	-
Scytonems sp.	+	+	+
Oscillatoria sp.	+	+	+
Anacystis sp.	+	+	-
Euglenophyceae			
Euglena sp.	+	-	+
Phacus sp.	+	-	+
Bacillariophyceae			
Diatom asp.	+	+	-
Cymbella sp.	-	-	+
Frustulia sp.	-	-	+
Navicula sp.	-	-	+
Nitzschia sp.	+	-	+
Fragilaria sp.	-	-	+

During the study period, the phytoplankton population showed two peaks, winter (Nov.-Feb,) and summer (March-June). The maximum population of Chlorophyceae was recorded in winter season. During the present study, presence of *Pandoria, Chlorella, Oscillatoria, Anacystis, Cymbella* and *Nitzschia* is considered as indicator of organic pollution because all these genera were collected from highly polluted water. The table 2 clearly indicated that winter season was most favourable season for growth of phytoplankton specially Chlorophyceae. Singh (1988) stated that conjugation members prefer to grow luxuriantly during winter months and species *Chara* and *Nitella* flourished well in this season. Imam and Khan (2014) have observed that high turbidity, pH,

bicarbonate, orthophosphate, alkalinity, chloride may be responsible for Cyanophycean growth and algal bloom. Thus, from the above observations it is clear that winter are more favourable for the Chlorophyceae and Bacillariophyceae. On the other hand, there is abundance of Cyanophyceae during summer. Certain species e.g. *Chlorella, Scendesmus, Chlorococcum, Pediastrum, Oscillatoria, Anacystis, Nitzschia* and *Fragilaria* are good indicator of water pollution. Presence of these species was reported in fresh water bodies of eastern Uttar Pradesh (Prakash, 2001a, Prakash *et al*., 2002 and Sinha *et al*., 2002).

CONCLUSION

This study revealed that seasonally variation in physico-chemical and biological parameters recorded in Semara Taal. Phytoplankton diversity was also recorded in Semar taal. Phytoplankton species was recorded highest in winter season. 22 genera of four different groups were recorded in this wetland. Physico-chemical parameters concentration of water showed that River water was under good quality condition i.e. good for phytoplankton growth and survival of aquatic animals like fishes.

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