

Study of seasonal Algal diversity from Jawahar tank Nipani (Karnataka) India**Varsha Sanjay Khude**

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ABSTRACT

The present paper deals with the study of seasonal diversity of algae from the Jawahar water tank. During the study period of one year, 31 species of algae were identified belonging to five major classes such as Cyanophyceae, Chlorophyceae, Bacillariophyceae, Euglenophyceae and Dinophyceae. The maximum algal diversity was found in the Summer season and maximum members were of Bacillariophyceae while minimum of Dinophyceae. Some pollution indicating algal species were noticed as, *Oscillatoria*, *Pandorina*, *Euglena*, *Phacus*, *Synedra* and *Melosira*. Therefore it is concluded that, the Jawaharlal water tank was slightly polluted in nature. The maximum algal diversity was found in early spring and summer season. The diversity indices show that there is an urgent need of monitoring of the studied tank to check water quality and its maintenance.

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KEY WORDS : Algal diversity, Jawahar water tank Karnatak

Introduction

Nipani city is located on Poona- Bangalore Highway (NH-4) and placed north west side in Belgaum district of Karnataka. Geographically Nipani city is at 15° 51' N latitude and 74° 31' E longitude at an altitude of nearly 710 meter above mean sea level in the northern slope of Bellary nallah. Nipani is closer to the branches of western ghats, with good rainy season. Temperature ranges from 16° c to 40° c. Nipani city is known for Commercial activities and trading centre for Tobacco, Sugarcane, Groundnut and Chillies. It is the largest urban centre with Population 66,600 in 2011 and 90,900 is to be expected in 2021.

Due to increasing population year by year and lack of technological systems, Nipani CMC have resulted in Environmental pollution, poor sanitation and public health problems such as water born diseases and associated health risks. The CMC Nipani provides drinking water facilities to the communities of Nipani Municipality from Surface water sources Jawahar reservoir and vedganga river. Quantity of water supply is 2.27 MLD from Jawahar reservoir, 6.81 from Vedganga river and 0.27 from local ground source. Jawahar reservoir receives water from Shirguppi nallah catchment area with capacity 0.70 TMC. The water from vedganga river is transported through pipes and stored in this tank. This Jawahar tank has its own water treatment plant of total capacity 6.82 MLD.

Water quality, algal composition and abundance provide important information about the health as well as

human risk assessment. The seasonal composition and algae diversity, has been done from different aquatic bodies of Maharashtra^{1,2-4,9}. These workers concentrated their studies towards understanding ecology of Phytoplankton's, importance of fish food, indicator of pollution and tropic status of water bodies. The phytoplankton study is a very useful tool for the assessment of water quality in any type of water body and also contributes to understanding of the basic nature and general economy of the aquatic system. Changes in season, temperature, wind, precipitation patterns and nutrient cycles influence the dominance of algae. Mostly algae were abundant in early spring and summer seasons. Rapid increase or accumulation in the population of algae in a water system is referred as algal blooms which are harmful in nature. Excess algae can be controlled by chemical, physical and biological methods¹⁰. Keeping all these views in mind, an attempt has been made to study the seasonal composition and algal diversity of Jawahar tank.

Materials and Methods

STUDY AREA: Jawahar Tank Located in Nipani city at 16.39N Latitude and 74.36 E Longitude.

The water samples from the tank were collected during January to December once in every month from four different sites of the tank for assessment of algal diversity. These were the four different sites of the tank selected for study purpose. Site A: It was on East Side

TABLE-1: Occurrence of algal diversity during study period (Jan.2018 to Dec.2018) of Jawahar tank, Nipani.

Sr. No.	Name of The Species	Jan-April2018	May-August2018	Sept.-Dec.2018
I	Class: Cyanophyceae			
1	<i>Anabaena variabilis</i>	+++	+	++
2	<i>Gleocapsa punctata</i>	+++	-	+
3	<i>Merismopedia elegans</i>	+++	-	+
4	<i>Merismopedia punctuate</i>	+++	-	
5	<i>Microcystis wesenbergii</i>	+++	-	
6	<i>Nostoc punctatum</i>	+++	+	+
7	<i>Oscillatoria brevis</i>			
II	Class: Chlorophyceae			
1	<i>Chaetophora spe.</i>	+++	-	+
2	<i>Closterium parvulum</i>	+++	-	+
3	<i>Cosmarium impressulum</i>	+++	+	+
4	<i>Gloeococcus spe</i>	+++	+	++
5	<i>Pandorina morum</i>	+++	-	+
6	<i>Pediastrum ovatum</i>	+++	-	+
7	<i>Scenedesmus quadricauda</i>	+++	+	+
8	<i>Spirogyra condensate</i>	+++	+	++
9	<i>Zygnema micropunctatum</i>	+++	+	+
III	Class: Euglenophyceae			
1	<i>Euglena acus</i>	+++	+	++
2	<i>Euglena gracilis</i>	+++	+	++
3	<i>Phacus acutus</i>	+++	+	++

Sr. No.	Name of The Species	Jan-April2018	May-August2018	Sept.-Dec.2018
4	<i>Trachelomonas volvocina</i>	+++	-	+
IV	Class: Bacillariophyceae			
1	<i>Cymbella cistula</i>	+++	+	+
2	<i>Cymbella lanceolata</i>	+++	+	++
3	<i>Diploneis puella</i>	+++	-	+
4	<i>Nitzschia closterium</i>	+++	-	++
5	<i>Nitzschia pumila</i>	+++	+	++
6	<i>Melosira varians</i>	+++	-	++
7	<i>Pinnularia microstauron</i>	+++	-	+
8	<i>Pinnularia nobilis</i>	+++	+	+
9	<i>Synedra berolinensis</i>	+++	+	++
10	<i>Synedra ulna</i>	+++	+	++
V	Class: Dinophyceae			
1	<i>Ceratium hirundinella</i>	+++	+	+

+++ Abundent, ++ Moderate, + Few – Absent

of the reservoir which is slightly polluted due to cloth washing and bathing of domestic animals, So more polluted. Site B: It is on West side of the reservoir which has stone wall fencing so less polluted. Site C: It is on South side of the reservoir where the tank receives the water from Shirguppi nallah which is less polluted. Site D: It is on North side of the reservoir which has stone wall fencing so less polluted.

The samples were collected with the help of 125 micron bolting silk net. Initially about 20 liters of water sample was filtered and concentrated to 50ml and were preserved by adding 0.4% formalin and then subsequent samples were observed under light microscope and their microphotographs were also taken. The algal taxa were identified with the help of standard books and monographs.^{6,7,13-15,17} Bioindices of species diversity derived from species counts, which are species richness¹², a combination of richness and dominance¹⁶.

Berger-Parker dominance index is the number of individuals in the dominant taxon. The algal abundance used to determine the trophic status of an aquatic ecosystem.

Results and Discussion

The algal species observed in the Fresh water reservoir (Jawahar tank) of Nipani were listed in Table-1. From the Table it is observed that, during the study period of one year 31 species of algae were identified belonging to five major classes such as Cyanophyceae, Chlorophyceae, Bacillariophyceae, Euglenophyceae and Dinophyceae. The maximum algal diversity was found in the Summer season. And maximum members were of Bacillariophyceae while minimum were of Dinophyceae. Similar type of work was done afterwards.¹¹ They found 18 different phytoplankton's from the same tank during 2009-2010.

TABLE 2: Seasonal Algal Diversity Indices of Jawahar tank, Nipani.

Sr. No.	Algal Diversity Index	Jan-April2018	May-August2018	Sept.-Dec.2018
1	Alpha diversity index	523586.63	372649.7	436869.65
2	Shannon index	1.68	1.32	1.47
3	Margalef index	53.12	33.65	40.19
4	Mackintosh index	1.15	1.18	1.17
5	Hill index	0.018	0.008	0.011
6	Berger and Parker index	0.029	0.017	0.022

Alpha Diversity index is high in summer season and it become lower in monsoon season.

It is represented by the entropy of the lake.¹⁶ The value of index is greater than 3 indicates clean water. The value in between 1 to 3 characterised by moderate pollution and less than 1 value indicates heavy pollution. The indices of study area reveal that the values are in between 1 to 3 hence, it clearly indicates that in all seasons the water is moderately polluted

It shows the richness of species in an ecosystem.¹² The richness of species depend upon the diversity indices. Hence the diversity index is more or less species richest. While the diversity index becomes low that time species become more rich.

Mackintosh index is lower in summer season and it become, higher in monsoon season. Hill index is high in summer season and it becomes lower in monsoon season.⁸

It is the number of individuals in dominant taxon divided by number of individuals.² The index is most

strongly influenced by evenness of the indices. From the present study it indicates that individuals of the community in all seasons are not completely evenly distributed. The values are higher in summer season and low in monsoon season.

Conclusion

During the study period of one year 31 species of algae were identified belonging to five major classes such as Cyanophyceae, Chlorophyceae, Bacillariophyceae, Euglenophyceae and Dinophyceae .The maximum algal diversity is found in the Summer season and maximum members are of Bacillariophyceae while minimum are of Dinophyceae. Some pollution indicating algal species were noticed as, *Oscillatoria*, *Pandorina*, *Euglena*, *Phacus*, *Synedra* and *Melosira*. Therefore it is concluded that, the Jawaharlal water tank is slightly polluted in nature. The maximum algal diversity is found in early spring and summer season. The diversity indices show that there is an urgent need of monitoring of the studied tank to check water quality and its maintenance.

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