Population density and diversity study of algal sp in different season from Dravyavati River

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Abstract

The ecosystem received any pollutant, changes occur in its physico-chemical nature and that causes a change in the biota of that region. Some biota which is sensitive to the pollutant will disappear from the place and those capable of being tolerant to that type of pollution are able to withstand. In the identification of the organisms of different/similar type of ecosystem, we can predict the degree of pollution. To evaluate the water quality of Dravyavati River (Amanishah Nala) is the great advantages for showing the amount of pollutant present in the water and its impact on the physico-chemical and biological components of the water and it can to use to assess what the organisms are likely to be exposed to as well as for calculation of the amount of pollutant transported in and out of the system. This work represents an attempt to compile and evaluate the present status of affairs with regard to population Density and Diversity study of Algal sp. in different Season from Dravyavati, along with its nutrient status and phytoplankton.

Keywords: ecosystem, algae, population density, diversity

Introduction

Algal community was used to monitor the water quality. Water pollution indices are based on the community, which is used commonly to detect and evaluate the water pollution (Boateng and Aboagye 2013) [3]. Phytoplankton constitutes the very basis of nutritional cycle of an aquatic ecosystem. In any water source, the seasonal changes in algal diversity and productivity are due to differential reactions changing levels of light, temperature, nutrients and grazing pressure in various algal species with seasonal changes (Agrawal, 1999) [1] over the course of a year. Seasonal algae cycles are more pronounced in temperate or temperate environments. Unlike those in tropical areas, polar lakes and rivers (Reynolds, 1988) [8]. A fairly recognizable Phytoplankton fits a fairly recognizable the annual growth period, but often the synchronicity of its regular annual cycle is broken by the exponential growth of rapid inflation (Vaulot, 2001) [10]. Some animals. The most significant occurrence of nature is primary development, on which the whole It relies, directly or indirectly, on a broad variety of lives. It is the guiding force of all metabolic operations in the biosphere (Balogun, et al, 2014) [2]. It also illustrates an area's ability to sustain biological population growth (Prasad, 1990) [7]. The Algal, In the food chain, flora is a critical link and its effectiveness depends on the quality of water at a given time (Meshramm and Dhande, 2000) [5]. In the water, too much nitrogen and phosphorus allows algae to expand more rapidly than organisms can manage.

These algae occurrence and abundance differ seasonally and their analysis offers an analysis the related research focus is on the eutrophication of bodies of water and its harmful effects on marine life.

The relationship between the growth of algae and nitrogen to phosphorus atomic ratios (N: P) evaluated in the experiment revealed that N: P was the major factor influencing the growth of algae and the limiting factor was phosphorus (Zhou et al, 2011) [11].

Methodology

The water samples were collected at monthly intervals from three selected Industrial sites of Dravyavati River (Amanishah Nala), one meter away from both the banks for each sampling station. The samples were collected from a depth of 10 to 15 cm from surface. The time of the sampling ranged between 8 to 11 a.m. throughout the study period.

Water samples from Dravyavati River (Amanishah Nala) were collected in different seasons (summer, winter and rainy) and stored in sterilized glass bottles. Before sampling, the risk of external contamination was minimized by rinsing these bottles three times with source water. Random samples for the investigation of phytoplankton were collected onsite. The chemical analysis of samples was performed soon after their transport to the laboratory. Algae were identified and counted microscopically (Ewebiyi et al, 2015) [4].

1 liter water sample was collected at each of the selected locations. 15-ml portion was selected and centrifuged at 3000 rpm at room temperature. The visible content on the concentrated ~20 μl sample was deposited on a glass slide, counted and enumerated under a 40X light microscope. Representative images were taken at 100X magnification. Morphological features – cell character, motility, Color, physical and reproductive structures were used to identify algal species. Bellinger and Sige 2015, key were followed for the Identification of algal species (Siangbood and Ramanujam 2014) [9].

Results

The water Samples were collected in all three seasons (summer, winter and rainy) from Dravyavati River

(Amanishah Nala) Industrial sites (Site 1= Sitapura industrial area, Site 2= Sanganer industrial area, Site 3= Mansarovar industrial area). Many algae are excellent indicators of water quality and the dominant phytoplankton group can be used to characterize and identify the status of

ecosystem of many lakes and river. Many industries discharge their wastes in the Nala. There was a correlation in the population density and diversity of algal sp.with respect to the physicochemical condition of water samples collected at different time interval.

Table 1: Population Density and Diversity study of Algal sp. in Summer Season from Dravyavati River

S. No	Physicochemical Parameters	Site1	Site 2	Site3
1.	Nitrogen	*Oscillatoria*	*Oscillatoria*	*Oscillatoria*
		Navicula	*Navicula*	*Navicula.*
		Nostoc	*Chlorella*	*Chlorella*
		Anabaena	*Nostoc*	*Nostoc*
			Anabaena	*Anabaena*
2.	Phosphorus			*Oscillatoria*
				Polytoma
		Oscillatoria	*Oscillatoria*	*Navicula*
		Navicula	*Chlorella*	*Chlorella*
		Chlorella		*Spirogyra*
				Spirulina
				Pandorina

*Site 1= Sitapura industrial area, Site 2= Sanganer industrial area, Site 3= Mansarovar industrial area

The highest concentration of the Nitrogen in summer season inhanced the growth and showed the presence of *Oscillatoria sp.*, *Navicula sp. Chlorella sp.*, *Nostoc sp. and Anabaena sp.* (Table 1). Similarly high concentration of Phosphorus also inhance the growth of *Oscillatoria sp.*, *Navicula sp.*, and *Chlorella sp.*

Along with above reported sp. *Oscillatoria sp.*, *Polytoma sp.*, *Navicula sp.*, *Chlorella sp.*, *Spirogyra sp.*, *Spirulina sp. and Pandorina sp.* were the additional member reported only from Site3 (Mansarovar industrial area) in the summer season when there was an inhanced Concentration of Phosphorus in the water.

Table 2: Population Density and Diversity study of Algal sp. in Rainy Season from Dravyavati River

S. No	Physicochemical Parameters	Site1	Site 2	Site3
1.	Nitrogen	*Oscillatoria*	*Oscillatoria*	*Oscillatoria*
		Navicula	*Navicula*	*Polytoma*
		Chlorella	*Chlorella*	*Navicula*
		Spirogyra	*Spirogyra*	*Chlorella*
		Spirulina	*Nostoc*	*Spirogyra*
		Nostoc	*Anabaena*	*Spirulina*
		Anabaena		*Synedra*
				Anabaena
				Nostoc
				Pandorina
				Chlamdomonas
				Oscillatoria
2.	Phosphorus	*Oscillatoria*	*Oscillatoria*	*Polytoma*
		Polytoma	*Navicula.*	*Navicula*
		Navicula	*Chlorella*	*Chlorella*
		Chlorella	*Spirogyra*	*Spirogyra*
		Spirogyra		*Spirulina*
		Spirulina		*Synedra*
				Nostoc
				Anabaena
				Pandorina

*Site 1= Sitapura in Site 1= Sitapura industrial area, Site 2= Sanganer industrial area, Site 3= Mansarovar industrial area

The highest concentration of the Nitrogen in rainy season inhanced the growth and showed the presence of *Oscillatoria sp.*, *Navicula sp. Chlorella sp.*, *Spirogyra sp.*, *Spirulina sp.*, *Nostoc sp.and Anabaena sp.* (Table 2). Similarly *Oscillatoria sp.*, *Polytoma sp.*, *Navicula sp.*, *Chlorella sp.*, *Spirogyra sp.*, *Spirulina sp.*, *Synedra sp.*, *Anabaena sp.*, *Nostoc sp.*, *Pandorina sp.*, and *Chlamdomonas sp.*,were reported with the presence of Nitrogen from Site3 (Mansarovar industrial area). High

concentration of Phosphorus also enhance the growth of *Oscillatoria sp.*, *Polytoma sp.*, *Navicula sp.*, *Chlorella sp. Spirogyra sp. and Spirulina sp.* Along with above reported sp. *Polytoma sp.*, *Navicula sp.*, *Chlorella sp.*, *Spirogyra sp.*, *Spirulina sp.*, *Synedra sp.*, *Anabaena sp.*, *Nostoc sp.*and *Pandorina sp.* were the addinitonal member reported only from Site3 (Mansarovar industrial area) in the rainy season when there was an enhanced Concentration of Phosphorus in the water.

Table 3: Population Density and Diversity study of Algal sp. in Winter Season from Dravyavati River

S. No	Physicochemical Parameters	Site1	Site 2	Site3
1.	Nitrogen	Oscillatoria	Oscillatoria	Oscillatoria
				Polytoma
				Navicula
				Chlorella
				Spirogyra
		Navicula	Navicula	Spirulina
		Chlorella	Chlorella	Nostoc
		Nostoc	Nostoc	Anabaena
		Anabaena	Anabaena	
2.	Phosphorus	Oscillatoria	Oscillatoria	Oscillatoria
		Navicula	Chlorella	Navicula sp
		Chlorella		Chlorella sp

*Site 1= Sitapura industrial area, Site 2= Sanganer industrial area, Site 3= Mansarovar industrial area

The highest concentration of the Nitrogen in winter season inhanced the growth and showed the presence of *Oscillatoria sp*.,*Navicula sp*., *Chlorella sp. Polytoma sp*., *Spirogyra sp*., *Spirulina sp*., *Nostoc sp*., *and Anabaena sp*. (Table 3). Similarly high concentration of Phosphorus also enhance the growth of *Oscillatoria sp*., *Navicula sp*., and *Chlorella sp*. Along with above reported sp. *Oscillatoria sp*., *Navicula sp*., and *Chlorella sp*. were reported only from Site2 (Sanganer industrial area) in the winter season when there was an enhanced Concentration of Phosphorus in the water.

Conclusion
Algal community was used to monitor the water quality. Water pollution indices are based on the community, which is used commonly to detect and evaluate the water pollution. To, fulfill the objectives and aims of the study; collection was done from different sites during the period of 3 years. Site 1= Sitapura industrial area, Site 2= Sanganer industrial area, Site 3 = Mansarovar industrial area. This work represents an attempt to compile and evaluate the present status of affairs with regard to population Density and Diversity study of Algal sp. in different Season from Dravyavati, along with its nutrient status and phytoplankton. Special attention has been given to evaluate the Bioindicator species with special reference to phytoplankton which give valuable response against the physico-chemical parameters of Amanishah Nala. After observation of results in summer season algal *sps* reported only with high concentration of Phosphorus at Site3 (Mansarovar industrial area). In Rainy season algal *sps* reported only with high concentration of Nitrogen and Phosphorus at Site3 (Mansarovar industrial area) and in winter season algal *sps* reported only with high concentration of Phosphorus at Site2 (Sanganer industrial area).

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