

A Preliminary Study on the Diversity of Planktonic Algae of Kaanam River, Kannur, Kerala, India.

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Abstract

A study was conducted to analyze the diversity of Algal components of Kaanam river of Kannur district, Kerala.. The study showed that there were 40 algal species from four classes such as Chlorophyceae, Bacillariophyceae, Cyanophyceae and Eugleninae. The nature of species observed indicated that the pollution level was high in the experimental locations.

Key words: Algae, Diversity, Kaanam, Kannur, Planktons

Introduction

Algae play the major role in carbon sequestration by forming the largest producer of biotic system of universe. With their varied habits and habitats, they have sprawled every niche of the ecosystem with typical modifications to adapt with the changing environmental conditions. These adaptations are necessitated for their perpetuation and survival in conditions like fresh water, marine, terrestrial, epiphytic etc..and the root cause of changed morphology and speciation process. Fresh water algae form one of the major components on these diverse groups and rivers, ponds, lakes, streams etc. are the main repositories of them. Physico-chemical parameters and quantity of nutrients in water play significant role in the distributional pattern and species comparison (Anand 1989). The planktonic algae occupy a special position among the group because of their suspended nature and immediate response towards changing hydrological parameters

Algae of temperate rivers have been studied extensively than their counterparts at Tropics (Rojo *et al.* 1994, Yolanda 2002). Their distribution in riverine habitat is influenced by changing water quality parameters, velocity of water flow, depth of the location, availability of sun light, presence of riparian flora and of course, the type of zooplanktons inhabiting the area. Freshwater bodies are the main abode of planktonic algae and they drift in water at varying depths based on their affinity towards solar radiations.

A review of the literature concerned showed that study on planktonic algae of rivers is scanty in this part of the world. To mention one of the earliest works, Butcher (1947) has studied algae of organically enriched waters. Blum (1957) has studied algae of saline river, Michigan. Venkateswarlu (1969) has made a detailed account of ecology of Algae of Moosi river of Hydrerabad. Jafari *et al.*(2006) have studied algae of urban fresh water river, Mutha, of Pune in India. The algae of Pennar river of Kottayam, Kerala, have been surveyed by Joseph *et al.*(2010) and they described 61 fresh water species. Mohamed Nasser and Sureshkumar (2015) have described 241 species of algae based on variation in altitude of Chalakkudi river of Western Ghats, Kerala, India. Diversity of fresh water algae in Trivenisangamam has been carried out by Ramesh and Aruna (2015) where 40 algal species were described. Chopra *et al.* (2017) have explored the algal components of Yamuna River with 74 species.

Kaanam River, which is a rivulet that originates from the hillocks near Chelora village, is located towards the southern side of Kannur district, Kerala, with geographical location of 11° 87'45'' N & 75° 37'04'' E. Its length is approximately 32 km and the flow line includes laterite soils which further leads to paddy fields; gradually widens and crosses NH 17 and finally pours out to Arabian Sea. The river water shows variations in quality and quantity according to the varying climatic conditions and the shore of the river supports profuse growth of many plants. During summer the colour of the water changes due to the algal blooming and this richness of algal components that led to a detailed study on the algal components of the river. The important kadavus of this river are Chelora, Thazhechova, Avera, Kuruva and Aadhikadalayi which are taken as the experimental sites.

Materials and methods

The collections were taken from selected stations of more or less equidistant in three seasons, viz., pre-monsoon, monsoon and post-monsoon. Sampling was done using specific filter cloth (mesh size 25 µm). 30 samples of 1 litre volume were taken from each site. The water was drained out and the debris containing algal samples were transferred to sterilized plastic vials using the river water as medium. Collected samples were brought to laboratory and kept in refrigerator. On the following day samples were taken, centrifuged in a sterilized centrifuge tube for 15 minutes at 800 rpm. Supernatant was discarded and the debris was collected with the help of micropipette and capillary tube and kept on a clean glass slide with cover glass in watery medium under the high power of a compound microscope. The algae were observed and diagrams were recorded in the note book along with measurements using micrometer. The size, length, shape and colour of the chloroplast, etc.; were noted and the algal members were identified with the help of standard algal flora keys like Deshikachary(1959), Presscott (1982), Anand (1989), Bellinger (2010), etc.

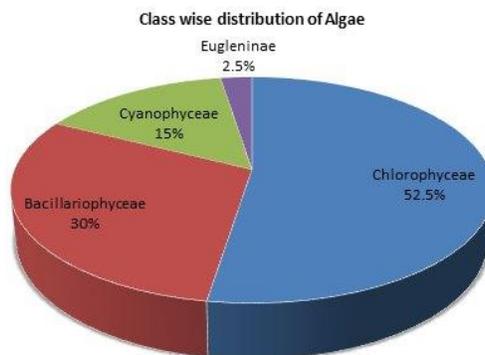
Results and Discussion

The study showed the presence of 40 algal species in the KaanamRiver. Of these, 21 were Chlorophyceae, 12 were Bacillariophyceae and 6 were Cyanophyceae. Eugleninae was represented by a single species. List of algae identified along with their class and the location is given in Table-1. The first experimental site, Chelora, showed high diversity of Algae with 20 species and fourth site, Kuruva, showed least diversity with only 6 species. Second site; Thazhechovva, third site; Avera and fifth site; Aadhikadalayi showed 14, 17 and 11 species respectively. The diversity was high during pre-monsoon and post-monsoon seasons, while, the monsoon season showed less diversity. *Closterium* genus was represented by 5 species, followed by *Oscillatoria* and *Gyrosigma* with 3 species each. *Achnanthes* and *Docidium* were represented by 2 species. *Spirogyra communis* was present in all the five locations. Four algal species were represented in a minimum of 3 locations. They are *Gomphonema parvulum*, *Euglena elastica*, *Oedogonium fragile* and *Oscillatoria limosa*.The percentage wise distribution of various algal groups showed that Chlorophyceae was the most dominant with 52.5%, followed by Bacillariophyceae with 30% and Cyanophyceae with 15 % distribution (Figure-1). Eugleninae had a modest representation of only 2.5%. This result endorsed the findings by Taset *al.*(2007) who identified 104 species of planktonic algae from a shallow lake at Turkey, with 46% of Chlorophyceae, 23% Bacillariophyceae, 16% Cyanophyceae and 11% Eugleninae.Presence of the genus *Euglena* in 3 locations indicated the abundance of decaying organic materials in these locations. Presence of filamentous green algae like *Oedogonium*, *Microspora*, etc., in some locations was an indication of environments stressed by eutrophication, acidification and metal contamination. Among the Green algae, Desmids were more common in the study sites which were in accordance with Gerrath (1993) who reported their presence in oligotrophic lakes, ponds and rivers. Many diatoms present in the river were indicators of contemporary ecological conditions represented by their presence in abundance and richness.

Table: 1: Distribution of Algae in different stations of Kaanam river.

Serial	Scientific name of the Algae with respective classes	Locations #				
		Chelora	Thazhehoova	Avera	Kuruva	Adhikadatalayi
	<i>Achnanthes exigua</i> (Bacillariophyceae)	**_	***	---	---	---
	<i>Achnanthes hungarica</i> (Bacillariophyceae)	---	---	---	---	***
	<i>Amphora acutiuscula</i> (Bacillariophyceae)	---	---	***	---	---
	<i>Arthrospira jenneri</i> (Cyanophyceae)	_**	---	---	---	---
	<i>Bacillaria paradoxa</i> (Bacillariophyceae)	***	---	---	---	_**
	<i>Closterium arcuatum</i> (Chlorophyceae)	_*_	**_	---	---	---
	<i>Closterium kuetzingii</i> (Chlorophyceae)	***	---	---	---	---
	<i>Closterium subcosticum</i> (Chlorophyceae)	***	---	---	---	***
	<i>Closterium truncatum</i> (Chlorophyceae)	_**	***	*_*	---	---
	<i>Closterium wittrockianum</i> (Chlorophyceae)	---	***	---	---	---
	<i>Crucigenia quadrata</i> (Chlorophyceae)	---	---	***	***	---
	<i>Cyclotella meneghiniana</i> (Bacillariophyceae)	---	---	***	---	---
	<i>Cylindrospermum majus</i> (Cyanophyceae)	---	---	---	---	***
	<i>Dictyosphaerium pulchellum</i> (Chlorophyceae)	---	---	***	---	---
	<i>Docidium sub-coronulatum</i> (Chlorophyceae)	---	***	---	---	---
	<i>Docidium undulatum</i> (Chlorophyceae)	*_*	---	---	---	---
	<i>Eudorina charkowiensis</i> (Chlorophyceae)	***	---	_*_	---	---
	<i>Euglena elastica</i> (Euglenophyceae)	***	***	---	---	***
	<i>Gloeocapsa kuetzingiana</i> (Cyanophyceae)	---	---	---	***	---
	<i>Gomphonema parvulum</i> (Bacillariophyceae)	---	_**	***	**_	---
	<i>Gonatozygon leioderium</i> (Chlorophyceae)	***	_**	---	---	---
	<i>Gyrosigma attenuatum</i> (Bacillariophyceae)	---	---	*_*	---	***
	<i>Gyrosigma kuetzingii</i> (Bacillariophyceae)	---	---	***	---	---
	<i>Gyrosigma spencerii</i> (Bacillariophyceae)	---	---	***	---	---
	<i>Hydrodictyon reticulatum</i> (Chlorophyceae)	***	---	---	---	---
	<i>Kirchneriella lunaris</i> (Chlorophyceae)	---	---	***	---	---
	<i>Microspora floccosa</i> (Chlorophyceae)	---	---	*_*	---	---
	<i>Mougeotia viridis</i> (Chlorophyceae)	***	---	---	---	---
	<i>Navicula cuspidata</i> (Bacillariophyceae)	***	***	---	---	---
	<i>Nitzschia frustulum</i> (Bacillariophyceae)	---	---	---	---	***
	<i>Oedogonium fragile</i> (Chlorophyceae)	***	*_*	***	---	---
	<i>Oscillatoria amphibian</i> (Cyanophyceae)	---	---	***	*_*	---
	<i>Oscillatoria limosa</i> (Cyanophyceae)	***	---	*_*	---	***
	<i>Oscillatoria princeps</i> (Cyanophyceae)	---	***	---	---	---
	<i>Penium navigium</i> (Chlorophyceae)	***	---	---	---	---
	<i>Pinnularia acrosphaeria</i> (Bacillariophyceae)	---	*_*	---	---	---
	<i>Scenedesmus bijugatus</i> (Chlorophyceae)	---	---	---	---	***
	<i>Spirogyra communis</i> (Chlorophyceae)	*_*	***	***	***	***
	<i>Spirogyra paradoxa</i> (Chlorophyceae)	***	*_*	---	---	---
	<i>Ulothrix zonata</i> (Chlorophyceae)	***	---	---	---	---

The '**' represents the presence and '-' represents the absence of Algae and their location in each column is represented in the order of pre-monsoon, monsoon and post-monsoon seasons.



Acknowledgment

Authors are thankful to Head of the Department of Botany and the Principal of Mahatma Gandhi Govt. Arts College, Mahe, Union Territory of Puducherry, for providing facilities for conducting the research.

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