



Seasonal distribution of microalgae in relation to hydrographical features of water streams at Punyagiri Hills, Vizianagaram district, Andhra Pradesh, India.

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Abstract

In the present study some Physico chemical and micro algal distribution were made at Punyagiri Hills, Vizianagaram district, Andhra Pradesh. Seasonal changes in the distribution of microalgae along with Physico-chemical parameters were studied for a period of one year from May 2018 to April 2019. Water samples were analyzed for Physical and Chemical parameters. Information on distribution of micro algal flora from water stream of Punyagiri Hills was collected, and data revealed that the dominant members belongs to Chlorophyceae (15 genera) followed by Cyanophyceae (9 genera), Bacillariophyceae (4 genera) and Euglenophyceae (2 genera).

Key words: Physico-chemical parameters, Micro algae, Water streams at Punyagiri Hill, Vizianagaram District, Andhra Pradesh.

Introduction

Microalgae are important group of organisms and primary producers of the food chain which play important role in the aquatic ecosystem. These microbes are capable of generating the oxygen and also indicators of water quality (Agale et al, 2013). Micro algae are influenced by physico chemical and biological parameters and making them valuable tool in monitoring some scientific projects. Studies on seasonal abundance and distribution of phytoplankton were made by (Barinova et al,2006; Das, 2000; Das et al 2009). Studies on micro algae help to find out the trophic status and the organic pollution in the ecosystem (Ramachandra and Solanki 2007). The diversity of these micro algae is influenced by various biotic and abiotic. The stream algae also influence the oxygen budget as well as the nutrient cycling (Munn and Tesoriero,2010; Wetzel,2001. Few investigators have emphasized that micro algae and macro algae served as indicators of pollution (Nandan and Patel, 1986).

Several investigators studied the phytoplankton distribution, abundance in the fresh water ecosystems especially lakes, reservoirs and stagnant water bodies (Narasimha Rao, 2009; Narasimha Rao and Murty,2010; Renuka and Narasimha Rao, 2013; Jyothi and Narasimha Rao, 2013a; Bhanu Prakash et al,2014; Madhava Rao et al,2015; Madhava Rao and Narasimha Rao,2016; Jyothi and Narasimha Rao,2015; Jyostna et al, 2014 and 2016) Studies on hydrographical features in relation to distribution of micro algae communities is a basic tool that contributes in making up of the ecosystem and determine the trophic dynamics of the aquatic ecosystem. Hence the present study was conducted on micro algae of running streams along with physico chemical features at Punyagiri Hills of Vizianagaram district.

Study site

Punyagiri hill is located 4 kms away from the Srungavarapu Kota and 62 kms away from the Visakhapatnam. The latitude and longitude of Punyagiri temple is 18°11' 19"N and 83° 11' 19" E respectively. Sri Umakotilingeswara Swami Temple is a famous Siva Krishna situated in Punyagiri hills. There are several perennial streams in the hill which support the growth and development of micro algal and macro algal communities.

Materials and Methods

Hydrographical features of the study area were studied for a period of one year from May 2018 to April 2019. During this study period, the surface water samples were collected in clean plastic bottles once in a month. Water temperature was recorded on the study area. The samples for dissolved oxygen were fixed immediately on the field itself. The remaining features were analyzed as per the standard methods. Turbidity, Temperature, pH and Conductivity were measured with the help of Nephelometer, Thermometer, pH meter, and Conductometer respectively. D.O and B.O.D. were determined by the modified Winkler's method. Water samples (one liter) were collected from the study sites and were brought to the laboratory then centrifuged at 1500-2000rpm for 10-12 minutes. Micro algae were diluted to a desirable concentration in such a way that they could be easily counted individually under compound binocular microscope 10x and

40x and micro algae were measured and multiplied with the dilution factor, using Sedgwick rafter cell as per method followed by Trivedi and Goel(1986). Micro algae were identified using standard monographs and manuals (Desikachary,1959)



Plate 1: water streams at Punyangiri Hills with macro algal blooms

Results and Discussion

Hydrographical features of the running water stream at Punyangiri Hill were collected for the period of one year from May 2108 to April 2019. Table 1 shows the hydrographical and some chemical parameters conducted during the period of study. Higher water temperature was recorded in the month of May (26.4°C) and lower water temperature was recorded in the month of December (19.5°C). During the period of investigation minimum temperatures were recorded in the months of November to February. pH of the surface waters at the study site ranged from 7.0 to 7.8 with minimum reading in March and maximum in the month of July. Dissolved oxygen of the surface waters at the study site was ranged from 4.0 to 6.8 mg/L. Turbidity of the running water stream at the study area varied from 22.3 to 49.2. Table 1 shows the variations conductivity and BOD of the surface waters at study site.

Table 1. Hydrographical and physico chemical features of water steam at Punyangiri Hills

Month	Water Temperature (0°C)	pH	D.O (mg/L)	Turbidity (NTU)	Conductivity (uMHos)	BOD (mg/L)
May2018	26.4	7.4	6.8	49.2	976	2.3
June	26.1	7.5	5.5	37.3	1014	3.5
July	25.8	7.8	4.5	34.5	802	3.2
August	25.6	7.3	4.9	25.4	905	2.8
September	24.2	7.6	4.0	22.3	698	2.6
October	23.4	7.2	5.1	27.6	642	2.8
November	20.9	7.4	4.9	32.4	626	2.2
December	19.5	7.3	5.1	36.7	543	2.1
January 2019	20.6	7.7	4.2	41.2	826	2.7
February	22.4	7.1	4.6	43.5	874	2.5
March	24.1	7.0	5.2	45.1	928	2.3
April	25.2	7.1	5.4	47.8	965	2.7

Table-2. Seasonal variations of phytoplankton (org L⁻¹) at running streams of Punyagiri during May 2018 – April 2019

Class	Monsoon	Post monsoon	Pre monsoon	Total	%
Chlorophyceae	526	112	248	886	45.3
Bacillariophyceae	278	96	218	592	30.2
Cyanophyceae	174	68	116	358	18.3
Euglenophyceae	62	22	34	118	6.0

Table 2 shows the distribution of Phytoplankton in various seasons of the year 2018-2019. Microscopic examination of phytoplankton revealed that there were 4 groups consisting of 30 genera and 48 species of microalgae belonging to order Chlorophyceae (15 genera, 28 species); Bacillariophyceae (9 genera, 12 species), Cyanophyceae (4 genera, 10 species) and Euglenophyceae (2 genera and 8 species) reported in this a hill stream of Punyagiri. Distribution and abundance of phytoplankton varied seasonally due to the Physico chemical features of water bodies (Raj Kumar et al. 2009). The distribution of phytoplankton depends on the environmental and nutrient conditions (Narasimha Rao and Prayaga, 2010). Among Chlorophyceae *Chlorogonium euchlorum*, *Cosmerium sp.*, *Scenedesmus sps.* *Closterium acerosum*, *Coelanastrum indicum* and *Chlamydomonas sps* are common species in this study period. In the class Cyanophyceae species such as *Oscillatoria limosa* and *Spirulina platensis* are common forms during the period of study. Common species of Bacillariophyceae are , *Aulacoseira ambigua*, *Gyrosigma scalproides*, *Skeletonema costatum* and *Pinnularia viridis* . Maximum abundance of phytoplankton was recorded in monsoon followed by pre monsoon season. Minimum phytoplankton abundance was recorded in post monsoon season. Among the different classes of algae, Chlorophyceae has higher percentage (45.3) while minimum for the class Euglenophyceae (6.3%).

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