

Micro Algal Composition in Paddy Fields of Boddam and Veeranrayanam Villages of Vizianagaram District, Andhra Pradesh

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ABSTRACT

Present study was undertaken in the rice fields of Boddam and Veeranarayanam villages of Vizianagaram district to examine the algal assemblages of the paddy fields. Distribution of microalgae in various seasons in a year was such as Rabi season (December 2019 to March 2020) and kharif season (June 2020 to November 2020) was collected. Micro algal assemblages of the study area revealed that there were 3 groups consisting of 24 genera and 34 species of microalgae belonging to the Classes, Cyanophyceae, Chlorophyceae and Bacillariophyceae reported. More number of algae present in the season of Kharif due to availability of water in Kharif season. *Spirogyra* species were dominated in the paddy fields of Boddam. Members of Cyanophyceae group were abundant in the paddy field of Veeranarayanam. Nostoc and Anabeana were found to be dominant genera from paddy water of Veeranarayanam.

Key words: Micro algae, Paddy fields, Boddam and Veeranarayanam villages, Andhra Pradesh, India.

INTRODUCTION

India is one of the world's largest producers of rice, including white rice and brown rice grown mostly in the eastern and southern part of the country. Rice is mainly grown in rain fed areas that receive heavy rain fall. That is why it is fundamentally a kharif crop in India. It demands temperature of around 25 degree Celsius and above and rainfall of more than 100 cm. Rice is also grown through irrigation in those areas that

receives comparatively less rainfall. Rice is the staple food of eastern and southern parts of India.

The paddy field ecosystem provides an environment favourable for the growth of BGA with respect to their requirements for light, water, high temperature and nutrient availability. This may account for the higher abundance of BGA in paddy soils than in other cultivated soils as reported under widely different climatic conditions of India (G. Odell 2015). Fritsch and John (1942) found a correlation between the composition of the algal flora and soil characteristics. Lund (1947), observed that the number of algae in these soil varied with the weather conditions. The maintenance of a healthy aquatic ecosystem depends on the abiotic properties of water and the biological diversity of the ecosystem (Hari Krishna et al., 1999). In addition to the economic benefits, paddy field system help in maintenance of nutrient recycling, trophic structures balance, water recharge and most, importantly harbours diverse floral communities (Dhyani et al., 2007).

The green algae play the impotent acting as primary producer and also increase the fertility of the soil in paddy field (Amith Kumar et al., 2012). Yield trends from long terms continues cropping experiments conducted in the Philippines, India, Indonesia, Thailand and Bangladesh indicated that, even with the best available cultivars and scientific management, rice yield, has declined over time since the early

1980's (Flinn and De Datta, 1984; Cassman and Pingali 1995; Nambiar and Ghosh 1984 (as cited in Pingali et al., 1997).

Vizianagaram located very near to Visakhapatnam experiences subtropical climate, which is characterized by hot summer from March to May and well distributed rain fall during South-west monsoon from June to October. Winter season is marked by dry and cold weather during the month of November to February. In the present study, field studies were undertaken in the rice fields of Boddam and Veeranarayanam villages of Vizianagarm district to examine the algal assemblages of the paddy fields.

STUDY AREA

Boddam and Veeranrayanam are the villages in Vizianagaram District of Andhra Pradesh. Paddy crop is cultivated mainly during Kharif season with 80% of its area under tank fed conditions which in turn depend on the local rainfall. Vizianagaram District Latitude 18°07'12.00" N, Longitude 83°25'12.00"E.

MATERIALS AND METHODS

Water samples were collected from four local Paddy fields of Vizianagaram District of Andhra Pradesh namely Veeranarayanam, Maheshkallalu, Ramaswamipeta, and Boddam. The study area were studied in a period of Rabi (December 2019 to March 2020) and Kharif (June 2020 to November 2020). During this study period algae were picked up with the help of forceps and spatula and collected in clean plastic bottles in a month. WATER temperature was recorded on the study area. Temperature and rainfall were measured with help of thermometer and rain gauge. Water samples (one litter) were collected from the study sites and were brought to the laboratory then centrifuged at 1500-2000 pm 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 diluted factor, using Sedgwick rather cell as per method followed Trivedi and Goel (1986). Micro algae were identified using standard Monographs and Manuals (Desikachary 1959)



PADDY FIELD AT VEERANARAYANAM

RESULTS AND DISCUSSION

Hydrographical features of the paddy field water at Veeranarayanam were collected for the period of Rabi (December

2019 to March 2020) and Kharif (June 2020 to November 2020) season. Table 1 shows the hydrographical features and rain fall during the period of study. High water

temperature was recorded in the month of March (32.5° C) and lower water temperature was recorded in the month of December (22.5 ° C). During the period of investigation minimum temperatures were recorded in the months of January 2020 and November 2020. The importance of weather temperature in tropical agriculture was recognized only after World War-2(Best 1962). High weather temperature was recorded in the month of May (35° C) and lower weather temperature in the month of January (26° C). The extreme Latitudes in which rice is grown are in temperature regions. As reported by Moomaw and Vergara (1965). Based on experiments in Texas, Stansel et al (1965) and Stansel (1975) suggest that the rice plants most critical period of solar energy requirement is from panicle initiation until about 10 days before maturity. Sterility caused by cool night temperatures (below 15 0c) 10-14 days before heading (Rutger and Peterson 1979). The Climate of the of Veeranarayanam is characterized as High humidity almost through of the year with extreme summer and adequate seasonal rain fall in the summer is normally from the month of March to June during the period from December to February where district experiences good weather with cool temperatures. The Northern Hilly parts are very cool than plains as they receive higher rain fall and also due to higher elevations. The evolution of rice as a food crop was influenced primarily by amount and distribution of rain fall. Where the mean annual rain fall totals are marginal for rice. The onset, amount and distribution of rain fall are highly variable. Here, an excellent rice crop can be produced wherever water is provided by irrigation Huke (1976). The annual average rainfall of the Veeranarayanam is 1311.4 mm. Higher rainfall recorded in the month of August 2020 (242.4mm) and lower rainfall recorded in the month of December 2019 (24.2 mm). Rabi Session (December 2019 to March 2020) and Kharif Session (June 2020 to November 2020) of Paddy field at

Veeranarayanam. Climate directly influences the physiological processes that affect the rice plants growth, development, and grain formation. Indirectly, climate influences the incidence of insects and diseases and hence, grain yield (Yoshida and Paprao 1976).

Rabi and Kharif Season December 2019 to November 2020 of Paddy field at Boddam and Veeranarayanam:-

MONTH	Water Temperature (0° C)	Weather Temperature (0° C)	Rainfall (mm)
December 2019	22.5	26.5	24.2
January 2020	24	26	62.5
February 2020	26.5	28	82.4
March	29.5	29	135
April	27	32	147.5
May	32.5	35	116.9
June	30	34	81.3
July	28.5	32	75.8
August	27.5	30.5	242.4
September	27.5	31	152.5
October	24.5	30.5	144.8
November	23.5	30	45.6

Algal Species observed in Paddy field at Boddam:-

S.No	Name of the Algae	Rabi	Kharif	Class
1.	Chroococcus species	+	+	Cyanophyceae
2.	Aphanothece species	-	+	Cyanophyceae
3.	Oscillatoria species	-	+	Cyanophyceae
4.	Nostoc species	+	-	Cyanophyceae
5.	Anabaena species	+	-	Cyanophyceae
6.	Gloecapsa species	-	+	Cyanophyceae
7.	Phormidiu species	-	+	Cyanophyceae
7	Scytonema species	+	+	Cyanophyceae
8.	Gloeotrichia species	+	+	Cyanophyceae
9.	Calothrix Species	-	+	Cyanophyceae
10.	Oedogoniun species	-	+	Chlorophyceae
11.	Spirogyra species	+	+	Chlorophyceae
12.	Zygnima species	+	+	Chlorophyceae
13.	Ulothrix species	+	+	Chlorophyceae
14.	Scenedesmis species	-	+	Chlorophyceae
15.	Chlorella species	-	+	Chlorophyceae
16.	Synedra species	+	+	Bacillariophyceae
17.	Navicula species	+	+	Bacillariophyceae
18.	Pinnularia species	-	+	Bacillariophyceae
19.	Cymbella species	-	+	Bacillariophyceae

Algal Species observed in Paddy field at Veeranarayanam

S.No	Name of the Algae	Rabi	Kharif	Class
1.	Chroococcus species	+	+	Cyanophyceae
2.	Aphanothece species	-	+	Cyanophyceae
3.	Oscillatoria species	-	+	Cyanophyceae
4.	Nostoc species	+	-	Cyanophyceae
5.	Anabaena species	+	+	Cyanophyceae
6.	Gloecapsa species	-	+	Cyanophyceae
7.	Phormidium species	-	+	Cyanophyceae
8.	Scytonema species	+	+	Cyanophyceae
9.	Gloeotrichia species	+	+	Cyanophyceae
10.	Calothrix Species	-	+	Cyanophyceae
11.	Lyngbya species	-	+	Cyanophyceae
12.	Ankistrodermus species	-	+	Chlorophyceae
13.	Chlorococcum species	+	+	Chlorophyceae
14.	Rhizodinium species	-	+	Chlorophyceae
15.	Scenedesmus species	+	-	Chlorophyceae
16.	Navicula species	+	-	Bacillariophyceae
17.	Pinnularia species	+	-	Bacillariophyceae
18.	Cymbella species	+	+	Bacillariophyceae

PRESENT (+) ABSENT (-)

Tables 2 and 3 shows the distribution of microalgae in various area in a period of Rabi season (December 2019 to March 2020) and kharif season (June 2020 to November 2020). Microscopic examination of microalgae revealed that there were 3 groups consisting of 24 genera and 34 species of microalgae belonging to order Cyanophyceae, Chlorophyceae and Bacillariophyceae reported in this paddy field of Boddam and Veeranarayanam. Seasonal fluctuations on population of algae were seen in most of the seasons in present investigation. Algae population were drastically reduced in advent of monsoon due to the ploughing and field preparation activity where field flooded with suspended soil particles (G. Odelu, 2015). A qualitative study of algae began to grow one month after the first monsoon rain; the algal community was low in both quality and quantity.

More number of algae observation in the season of Kharif. Because availability of

water in Kharif season was high when compared to Rabi season. Spirogyra species were dominated in the paddy field of Boddam. Cyanophyceae group algae abundant in the paddy field of Veeranarayanam. Nostoc and Anabaena were found to be dominant genera from paddy water of Veeranarayanam. Similar type of results were concluded in the studies conducted by (Selvi and shiva kumar 2012 ; Basavaraju ,and Naik.,2019; Ghadga and Karande,2019; S.D Petkar et.al,2020; Thajamanbi et.al.,2016). Less number of Bacillariophyceae present in the field of both Boddam and Veeranarayanam.

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