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Algal Diversity in Paddy fields of Subbavaram Mandal, Visakhapatnam District, Andhra Pradesh

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Abstract **Original Research Article**

Data on algal diversity and composition was collected for one season in the paddy fields of Subbavaram Mandal during the year 2019. In Subbavaram Mandal paddy was cultivated for one time in a year only due to unavailability of water. Water samples were collected randomly from different villages of this Mandal. A total of 28 species were reported from the paddy fields of the study sites and belongs to Chlorophyceae (16), Bacillariophyceae (5), Cyanophyceae (3).
Keywords: Algal Composition, Paddy fields, Subbavaram Mandal, Visakhapatnam district.

INTRODUCTION

Paddy cultivation in Visakhapatnam district is mainly depend on rains and some areas with water support from lakes and tanks. In these stated conditions cultivation of paddy for one time in year only not for two times like Godavari districts (Narasimha Rao el al.2019). Due to the nature of semi submerged crop, either wet soil of water bodies offers growth of variety algal blooms (Narasimha Rao *et al.*, 2019 and Padmaja Rani and Narasimha Rao, 2021). Members of the Cyanophyceae plays important role in enhancing the productivity of Paddy crops across the country (Chowdhary *et al.*, 2011 and Singh *et al.*, 2014). Information on algae present in paddy fields was studied by few authors (Rout and Dey, 1999; Rao *et al.*, 2008; Prasanna *et al.*, 2009; Dey *et al.*, 2010; Chowdhary 2011; Bharawaj and Baruah, 2013; Borah *et al.*, 2014; Das Gupta and Ahmed, 2013; Narasimha Rao *et al.*, 2019; Padmaja Rani and Narasimha Rao, 2021) in different geographical regions of India. In the present investigation an attempt was made to study the identification and composition of micro algae occurs in the paddy fields of Subbavaram mandal, Visakhapatnam district, Andhra Pradesh.

MATERIAL AND METHODS

Subbavaram located nearly 26 KM away from the centre of Visakhapatnam city. It lies between longitudes 83° 07' E and latitudes 17°47' N. Paddy fields of five areas in this Mandal were selected for collection of data. In these study sites paddy was cultivated for one time in a year only. Height of the water column in study sites was in between 10-15cm only. Water samples (surface) were collected from study sites for three months such as August, September and October only as water presence was observed in these months. The water samples were collected in plastic bottles and fixed with 4% formalin and these materials were transferred to the Botany Department, Andhra University for further analysis. These water samples were centrifuged at 1500 RPM for 5 to 8 minutes. After centrifuge 0.5ml water sample was taken in Sedgwick Rafter Cell and identified the algae with standard reference of (Fritsch (1935), Prescott (1951) and Desikahary (1959).

RESULTS AND DISCUSSION

Information collected on composition of algae present in different study sites of Subbavaram Mandal was presented in Table 1. There is no significant difference in presence of algae in different stations of Subbavaram Mandal. So data of all study sites was merged and presented in single table. A total of 24 micro algal species were identified (Table 1), out of these 16 species belongs to Chlorophyceae, 3 belongs to Cyanophyceae and 5 species belongs to Bacillariophyceae. Several investigators from India and outside the India (Chowdhary *et al.*, 2011; Rout and Dey 1999; Rao *et al.*, 2008; Prasanna *et al.*, 2009; Dey *et al.*, 2010; Bharawaj and Baruah, 2013; Das Gupta and Ahmed, 2013; Okuda and Yamaguchi, 1955; Roger and Reynaud, 1982 Zancarini *et al.*, 2013; Narasimha Rao *et al.*, 2019 and Padmaja Rani and Narasimha Rao, 2021) studied the composition and distribution of algal forms

in Paddy fields. Even though abundant nitrogen is available in atmosphere but plant populations (except few members of Cyanobacteria) in the nature unable to utilize for the growth and development of plants. So crop productivity depends on the synthetic nitrogenous compounds which are costly for poor farmers. So application of blue green algal forms like *Nonstoc* and *Anabaena* will certainly enhance the productivity Paddy crops. Algal bio-fertilizers are eco-friendly however unlike the chemical fertilizer they do not bring about spectacular visual changes in crop growth and production. The growth of algae in the paddy field effects the later in several ways. Two main strategies are either by nitrogen fixation or secretion of growth promoting substances or both.

Table 1: List of Algae present in paddy fields of Subbavaram Mandal during 2019

S. No	Name of the alga	Class
1	Ankistrodsmus convolutes	Chlorophyceae
2	*Chalmydomonas globosa*	Chlorophyceae
3	*Chlorella vulgaris*	Chlorophyceae
4	*Closterium ehrenbergii*	Chlorophyceae
5	*Closerium moniliferum*	Chlorophyceae
6	*Cosmarium contractum*	Chlorophyceae
7	*Cladophora glomerata*	Chlorophyceae
8	*Chaetophora elegans*	Chlorophyceae
9	*Eudorina pectnalis*	Chlorophyceae
10	*Hydrodictyon reticulam*	Chlorophyceae
11	*Oedogonium globosum*	Chlorophyceae
12	*Pediastrum simplex*	Chlorophyceae
13	*Scenedesmus dimophus*	Chlorophyceae
14	*Scenedesmus denticulatus*	Chlorophyceae
15	*Spirogyra communis*	Chlorophyceae
16	*Zygnema pectinatum*	Chlorophyceae
17	*Cymbella austriaca,*	Bacillariophyceae
18	*Navicula bacilloides*	Bacillariophyceae
19	*Navicula major,*	Bacillariophyceae
20	*Melosira varians*	Bacillariophyceae
21	*Synedra affinis*	Bacillariophyceae
22	*Anabaena constricta*	Cyanophyceae
23	*Anabaena gelatinicola*	Cyanophyceae
24	*Anabaena orientalis*	Cyanophyceae

REFERENCES

- Bharadwaj, N., & Baruah, P. P. (2013). Diversity and abundance of N2-fixing cyanobacterial population in rice field soil crusts of Lower Brahmaputra Valley agro-climatic zone. *Journal Algal Biomass*, 4, 23-33.
- Borah, D., Rout, J., & Thajuddin, N. (2014). Polyphasic characterization of Nostoc commune (Cyanobacteria, Nostocaceae) isolated from rice growing agro-ecosystems of Dima Hasao district of Assam, North-East India. *Phytotaxa*, 161(2), 111-120.
- Choudhary, K. K. (2011). Occurrence of nitrogen-fixing cyanobacteria during different stages of paddy cultivation. *Bangladesh Journal of Plant Taxonomy*, 18(1), 73-76.
- Dasgupta, M., & Ahmed, S. U. (2013). Some potential rice field BGA isolates from Sonitpur district Assam, North east India. *J Nat Prod Plant Resour*, 3(4), 17-23.
- Desikachary, T. V. (1959). A monograph on cyanophata. I.C.A.R, New Delhi, 686 pp.
- Dey, H. S., Tayung, K., & Bastia, A. K. (2010). Occurrence of nitrogen-fixing cyanobacteria in local rice fields of Orissa, India. Ecoprint: *An International Journal of Ecology*, 17, 77-85.
- Fritsch, F. E. (1935). The structure and reproduction of algae. Vol.1. Univ. Press, Cambridge, 791 pp.
- Okuda, A., & Yamaguchi, M. (1955). Nitrogen-fixing microorganisms in paddy soils (Part 1) characteristics of the nitrogen fixation in paddy soils. *Soil Science and Plant Nutrition*, 1(1), 102-104.
- Prasanna, R., Jaiswal, P., Nayak, S., Sood, A., & Kaushik, B. D. (2009). Cyanobacterial diversity in the rhizosphere of rice and its ecological significance. *Indian Journal of Microbiology*, 49, 89-97.
- P. Padmaja Rani and G.M.Narasimha Rao.2021. Micro Algal Composition in Paddy Fields of Boddam and Veeranrayanam Villages of Vizianagaram District, Andhra Pradesh. *International Journal of Research and Review*. Vol.8; Issue: 3 pp.297-301.

- Digambar Rao, B., Srinivas, D., Padmaja, O., & Rani, K. (2008). Blue-green algae of rice fields of South Telangana region, Andhra Pradesh. *Indian Hydrobiology*, 11(1), 79-83.
- G. M. Narasimha Rao, Reshmi Chetterjee and N.V.Jayanth Babu. 2019. Composition and diversity of algae in Paddy fields of Razole Mandal, East Godavari district, Andhra Pradesh. *The Bio brio* Vol. 6. (3&4) : 411-419, 2019.