e-ISSN: 2248-9126
Vol 4|Issue 3| 2014 |162-164. Print ISSN: 2248-9118

Indian Journal of Pharmaceutical Science & Research

www.ijpsrjournal.com

DISTRIBUTION OF BLUE-GREEN ALGAE IN RICE FIELDS OF WARANGAL DISTRICT OF ANDHRA PRADESH, INDIA

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ABSTRACT

Occurrences of blue-green algae in rice field soils of Warangal, Andhra Pradesh have been studied. In the present study rich diversity of heterocystous cyanobacteria was recorded from rice fields of Warangal District. 12 species, represented with 4 genera came under single order and 3 families have been reported from this area which includes *Anabaena aequalis Borge, Anabaena constricta (szafer) Geitler, Anabaena fertilissima Rao C.B., Anabaena oryzae Fritsch, Anabaena variabilis Kutzing ex Born et Flah, Anabaena doliolum Bhardwaj, Nostoc muscorum Ag.ex Born.et Flah., Microchaete calothrichoides Hansing, Microcoleus acutissimus Gardner,. Oscillatoria princeps Vaucher ex Gomont, Oscillatoria proboscidea Gomont* and *Oscillatoria obscura Bruhl* et Biswas.

Keywords: BGA, Distribution, Nitrogen fixation, Algae.

INTRODUCTION

Blue Green Algae (BGA) are an ancient group of unique prokaryotic organisms with the ability to perform mutually compatible functions like nitrogen fixation and photosynthesis. The Key enzyme nitrogenase is involved closely to fix atmospheric nitrogen. The capacity of several Blue Green Algae to fix the atmospheric nitrogen is a significant biological process of economic importance. [1] Blue-green algae are present abundantly in paddy fields and are important in maintaining fertility of rice fields through nitrogen fixation. The utilization of blue green algae in the rice fields has a great significance, in increasing the fertility of rice fields. Several reports are found on edaphic algae of rice fields of different states of India [2-6]. The rice field ecosystem consists of diverse habitats for blue green algae. Various workers have studied the blue green algal flora of rice fields of our country. Though rice is enormously cultivated in the Warangal District of Andhra Pradesh, no concerned attempt has so far been made to record the occurrence and distribution of blue green algae in paddy fields of the Warangal District.Therefore a systematic study on the distributional pattern of blue green algae in the rice fields was undertaken to prepare a detailed account of blue green algae of the rice fields in Warangal District of Andhra Pradesh.

MATERIALS AND METHODS

The study area encompassed at total of 20 sites viz.(1) Ghanpur, (2) Govindaraopeta, (3) Jangaon, (4) Kesamudram, (5) Thorur, (6) Sangem, (7) Hanamkonda, (8) Hasanparthy, (9) Kodakandla, (10) Maripeda, (11) Mulug, (12) Kothagudem, (13) Dharmasagar, (14) Narsampet And (15) Nekkonda covering the major rice growing areas of the Nellikudur of Warangal district, situated between, 17.030’ to 18.000’ N latitude and 78.6903’ to 79.5800’ E longitude, in the rice growing region of Warangal District, Andhra Pradesh, India. Temperature of the water and soil samples were recorded between 20°C and 36°C during the growing season (July-October 2013) and pH ranged from 6.5-8.0.

Collection, Preservation, and Identification of Samples

Samples were collected from seventeen different sites of Warangal District. The samplings were done

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randomly from both soil and water of the rice fields, representing the terrestrial as well as free-floating masses. The taxonomic enumeration was performed with fresh materials in the laboratory. The algal samples were preserved in 4 % formalin and slides were prepared by staining with methylene blue and mounted in glycerine. Detail studies were made by examining specimens under a compound microscope with Nikon E200 photo micrographic attachment. The strains were identified based on their morphological features and cell structure following the monograph of Desikachary and Prescot. [7,8].

Sl.No	BGA Organism	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	*Anabaena aequalis*	+	-	-	-	+	-	-	+	-	-	+	+	+	+	+
2	*Anabaena Constricta*	+	+	-	-	-	+	+	+	-	-	-	+	-	-	-
3	*Anabaena Fertilissima*	-	-	-	+	+	-	-	-	+	+	+	+	-	-	+
4	*Anabaena oryzae*	+	+	+	+	+	+	+	-	-	-	+	+	+	+	+
5	*Anabaena Variabilis*	-	-	-	+	-	-	-	+	-	-	+	+	-	-	-
6	*Anabaena doliolum*	-	-	-	+	-	-	-	+	-	-	+	+	+	+	+
7	*Nostoc muscorum*	+	+	+	+	+	+	+	+	+	-	-	+	+	+	+
8	*Microchaete Calothrichoides*	+	-	-	+	-	+	-	-	-	-	+	+	+	-	-
9	*Microcoleus Acutissimus*	+	-	-	-	+		+	+	+	+	+	+	+	+	+
10	*Oscillatoria Princeps*	+	-	+	+	-	+	+	-	-	-	-	-	-	+	+
11	*Oscillatoria Proboscidea*	+	-	-	-	-	-	+	+	+	+	-	+	-	-	-
12	*Oscillatoria Obscura*	-	-	+	+	-	+	+	-	-	+	+	-	+	-	-
Total algal flora		8	3	4	8	5	5	6	5	4	4	8	9	6	5	7

RESULTS AND DISCUSSION

An extensive study was made to find out the occurrence and abundance of heterocystous blue green algae population in different study sites (twenty) of Warangal District, Andhra Pradesh, India. Totally 12 species of blue green algae belonging to 5 genera under 3 families viz., Nostocaceae, Microchaetaceae and Oscillatoriaceae were recorded during the study period as shown in Table:1. The distribution of these blue green algal forms might be indicating the lower nitrogen status in rice fields. Prasanna and Nayak [9] recorded more heterocystous forms while studying abundance of blue green algae and their diversity in rice field soils of India. Choudhary [10] observed that the enumeration of blue green algae revealed the maximum diversity during the mid cultivation cycle of the rice fields. In conclusion, the present study documented a remarkable biodiversity of blue green algae. Anabaena was the dominant genus of soil microflora in the rice fields of studied area. The favourable balance of soil nitrogen of rice fields wherein rice can be grown in the same rice field without any addition of fertilizers and without any reduction in yield, confirms the significance of nitrogen fixation by blue green algae. [11-14] Blue green algae are one of the major components of the nitrogen fixing biomass in the rice fields. Finally, it might be concluded that the documentation on cyanobacteria may enhance the understanding of the nutrient status of the field and might be applied for sustainable agricultural practices by reducing the application of chemical fertilizer to avoid the appearance of non-nitrogen fixers in the soil that might compete with nitrogen fixers for nutrients [15,16].

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