Abundance of Heterocystous Blue Green Algae of Rice Field of Mangaldoi Sub Division, Darrang District Assam

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ABSTRACT

An Experiment were conducted from Feb 2017 to Jan. 2019 in *Mangaldoi* sub division, Darrang District Assam for taxonomical study of blue green algae In these studies total 67 numbers of heterocystous blue green algal species were identified belonged to the genus. *Richelia*, *Cylindrospermum*, *Anabaena*, *Nostoc*, *Aulosira*, *Camptyloneopsis*, *Scytonema*, *Tolypothrix*, *Microchaete*, *Fortiea*, *Calothrix*, *Dichothrix*, *Rivularia*, *Gloeotrichia*, *Stigonema*, *Fischerella*, *Westiellops*, *Hapalosiphon*. Out of which the Genus *Nostoc* having highest number of species, and Order *Nostocales* consists 91.04% of species

KEY WORDS: ABUNDANCE, BLUE GREEN ALGAE, HETEROCYSTOUS, RICE FIELD, GENUS NOSTOC.

INTRODUCTION

Blue green algae, constitute a fascinating group of prokaryotic photosynthetic organisms, some of them fix atmospheric nitrogen, mostly heterocystous types by which they can increase fertility in the tropical rice field. Many workers have studied the cyanobacterial flora of rice fields of our country. (Rai and Bergman, 2002; Jaiswal et al., 2008; Karthikeyan et al., 2009, Anamika Singh, Hema Joshi 2018,) cyanobacteria have enormous potential in serving humanity in many ways as bio-fertilizer, protein source, food and fodder etc. It maintain ecological balance and conservation of soil also. Their diazotrophic nature, wide distribution pattern and capability to enter into N₂-fixing symbiosis make them attractive research interest. Cyanobacteria have a long history of usage in agriculture as biofertilizer (Whitton, 2000). They improve the texture of soil and increase the biochemical quality of the soil which forms a rapidly multiplying over of microscopic plants. They have highly colonization with almost all types of soils. (Bold and Wanne, 1978) These strains are having special concern in microbiology as

they are widely used as biofertilizer. Keeping in view in a study were conducted to find out the heterocystous types of blue green algae with special interest.

MATERIAL AND METHODS

Water samples were collected from seven different sites of *Mangaldoi* sub-division of Darrang District, Assam. To perform the proposed taxonomical study in a precise manner, the *Mangaldoi* Sub-division is specified into seven selected sites for the present study. During the field survey, specimens are being collected in wide mouthed bottles, test tubes, polythene bags, plankton net, scalpel, blade, forceps are being used to collect blue green algae from running water. Sampling bottle is filled up with specimen along with water collected from the area to its one third capacities, the remaining parts is for aeration. Species of different levels of water is being collected by using pipes & tubes. Samples will be collected from the same area in each case. The methods and techniques are used on the basis of "Standard Operating Procedures for the Collection and Analysis of Aquatic Algae" June 2016 (Version 2.0) Published by North Carolina department of Environmental Quality. 2016.

RESULTS AND DISCUSSION

Identification of collected species was carried out by consulting keys given by, Fritch (1935) Smith (1950),

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Desikachary,(1959) Randhawa, (1959), and some published literature, monographs of algal taxonomy also

studied. However Desikachary's (1959) classification is followed in arranging the genera and species.

Table 1. List of algal order Nostocales and Stigonematales with family and genus having Heterocystous species

Order Nostocales		
Family	Genus	Species
Nostocaceae	1. <i>Richelia</i>	1. <i>Richelia intracellularis</i>
	2. <i>Cylindrospermum</i>	2. <i>Cylindrospermum indicum</i>
	3. <i>Anabaena</i>	3. <i>A. sphaerica</i>
		4. <i>A. spiroides</i>
		5. <i>A. oryzae</i>
		6. <i>A. fertilissima</i>
		7. <i>A. khannae</i>
		8. <i>A. anomala</i>
		9. <i>A. ambigua</i>
		10. <i>A. vaginicola</i>
		11. <i>A. fuellebornii</i>
		12. <i>A. aphanizomenoides</i>
		13. <i>A. orientalis</i>
		14. <i>A. lyngarii</i>
		15. <i>A. ballyganglii</i>
		16. <i>A. naviculoides</i>
		17. <i>A. doliolum</i>
		18. <i>A. variabilis</i>
		19. <i>A. variabilis</i> var. <i>kashiensis</i>
		20. <i>A. variabilis</i> var. <i>ellipsospora</i>
		21. <i>A. circinalis</i>
		22. <i>A. utermohli</i>
		23. <i>A. oscillarioides</i>
	4. <i>Nostoc</i>	24. <i>N. punctiforme</i>
		25. <i>N. linckia</i>
		26. <i>N. piscinale</i>
		27. <i>N. spongiaeforme</i>
		28. <i>N. ellipsosporum</i>
		29. <i>N. calcicola</i>
		30. <i>N. commune</i>
		31. <i>N. paremitoides</i>
		32. <i>N. verrucosum</i>
		33. <i>N. hatei</i>
	5. <i>Aulosira</i>	34. <i>A. aenigmatica</i>
		35. <i>A. pseudoramosa</i>
		36. <i>A. fritschii</i>
Scytonemataceae	6. <i>Camptylonemopsis</i>	37. <i>Camptylonemopsis pulneyensis</i>
	7. <i>Scytonema</i>	38. <i>S. chiasmum</i>
		39. <i>S. multiramosum</i>
		40. <i>S. burmanicum</i>
		41. <i>S. schmidtii</i>
		42. <i>S. ocellatum</i>
	43. <i>S. guyanense</i>	
Microchaetaceae	8. <i>Tolypothrix</i>	44. <i>Tolypothrix boutellei</i>
	9. <i>Microchaete</i>	45. <i>T. byssoidea</i>
		46. <i>M. uberrima</i>
	10. <i>Fortlea</i>	47. <i>M. elongate</i>
		48. <i>F. incerta</i>
Rivulariaceae		49. <i>F. bossel</i>
	11. <i>Calothrix</i>	50. <i>C. castellii</i>
		51. <i>C. clavarioides</i>
		52. <i>C. scytonemicola</i>
		53. <i>C. wembaerensis</i>
		54. <i>C. breviararticulata</i>
		55. <i>C. dolichomeres</i>
		56. <i>C. membranacea</i>
		57. <i>C. marchica</i>
	12. <i>Dichothrix</i>	58. <i>Dichothrix baueriana</i>
	13. <i>Rivularia</i>	59. <i>Rivularia hansgirgi</i>
	14. <i>Gloeotrichia</i>	60. <i>G. pilgeri</i>
		61. <i>G. longicauda</i>
Order Stigonematales		
Stigonemataceae	15. <i>Stigonema</i>	62. <i>S. hormoides</i>
		63. <i>S. panniforme</i>
		64. <i>S. dendroideum</i>
	16. <i>Fischerella</i>	65. <i>Fischerella ambigua</i>
	17. <i>Westiellops</i>	66. <i>Westiellopsis prolifica</i>
	18. <i>Hapalosiphon</i>	67. <i>Hapalosiphon intricatus</i>

The identified Heterocystous blue green algae are structurally different in shape, size and structure. The identified blue green algal species of rice field are 67 in

numbers within 18 genus of two orders as Nostocales and Stigonematales. Order Nostocales consists 91.04% of species and Order Stigonematales consists 8.95% of

species. Genus *Anabaena* having 31.34% including 21 number of species, followed by genus *Nostoc* having 14.92% including 10 number of species. Other genus *Calothrix* 11.94%, *Scytonema* 8.95% *Aulosira* and *Stigonema* 4.47%, *Tolypothrix*, *Microchaete*, *Fortiea*, *Gloeotrichia* having 2.98%, *Richelia*, *Cylindrospermum*, *Camptylonomopsis* 1.49% among the (heterocystous) species found.

Algal species add readily available nutrition to crop plants in agricultural lands and ensure better crop nutrient management. They improve the texture of soil and increase the biochemical quality of the soil which forms a rapidly multiplying cover of microscopic plants. They have highly colonization with almost all types of soils. (Bold and Wanne, 1978). The study shown that heterocystous Genus *Anabaena* having 31.34% including 21 number of species in rice field of Mangaldai sub division. In another study "Taxonomic Enumeration of blue green algae of tea garden area of Mangaldai sub division Darrang District Assam". Shown that the genus *Anabaena* (of heterocystous type) was the most dominant species throughout the study period. Blue green algae are sensitive to environmental change and nutrient fluctuation has been suggested by Frempong (1981); Tilman et al. (1982); Sudhkar et al. (1991). Herbicides have two fold effects on cropping they reduce the fertilizer need of crop which is the most efficient method for weed control, but such chemicals cause damage to the cyanobacterial photosynthesis either as photosynthetic indicator or as photosynthetic energy deviators (Dodge, 1975; Kapoor and Sarma, 1980); Kapoor et al., 1996a; Kapoor and Arora, 1996, 1998, 2000a, 2000b). According to Chopra (1971) 45.80% pesticidal compounds disappear from the soil within a year.

CONCLUSION

Among the heterocystous blue green algae genus *Anabaena* was the most dominant species throughout the study period. Blue green algae.

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