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BLUE-GREEN ALGAE UTILIZATION IN RICE FIELD

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Rice is the major crop of Jharkhand state including Hazaribagh. Because of socioeconomic reasons, farmers are not in a position to use urea in required dose. Environmental problems related to the use of chemical fertilizer is also well known. In present paper, three blue green algae - *Nostoc, Anabaena* and *Aphanotheca* were tested in rice field and the results obtained were encouraging.

Keywords - *Anabaena; Aphanotheca;* Blue green algae; *Nostoc;* Rice.

Rice is major food crop of nearly 55% of the world's population[1]. So far the state Jharkhand is concerned, nearly 76% of the total grain production comprises various varieties of rice only. Increasing population and fast changing land use pattern has resulted significant change in agriculture system and use of chemicalfertilizer has got its own implications. Environmental problems like eutrophication and leaching to water pollution has drawn concern of every section of society. In addition to that poor and marginal farmer fail to fertilize their crop which lead to socio economic problems. Blue-green algae on the other hand are highly suitable substitute of fertilizer and its use in paddy field of tropical countries including India is not new[2,3]. *Nostoc, Anabaena, Cylindrospermum, Gloeotrichia* and *Aphanotheca* are some common genera of blue green algae prevalent in paddy fields of India. Experimentally, it has been found that application of blue-green algae can enhance rice productivity from 15% to 38% over control condition. Present study was undertaken to evaluate efficacy of some blue- green algal strains to enchance productivity of vandana variety of rice.

The experiment was carried out in test plots of 6m x 3m each.Adjacent plots were separated from each other by soil dykes. Rice variety Vandana was used for this experiment. All experimental studies were carried out at Hazaribagh district of Jharkhand. *Nostoc, Anabaena and Aphanotheca* genera of blue-green algae were utilized to study their effect on rice productivity. One test plot was used as control and not given any type of fertilizer. Another test plot was provided 30 kgh^{-1} of urea in two splits at tillering and panicle initiation stage. BGA of three genera mentioned above were given in other test plots and the dose was 10 kgh^{-1} each. Three replica of each treatment was maintained for average data collection. Morphological parameters of rice plant were noted down before harvest. Three square meters of harvest were cut in each plot. The grains were thrashed, air dried and weighed. One square meter of straw was also harvested and over dried. Each experiment were run in triplicate and harvest was done on direct seeding method.

Results obtained during the experiment is presented in table -1. Rice plant grown under control condition was 106 c.m. where as plants in urea treated condition grew up to 110.8 c.m. In *Nostoc, Anabaena* and *Aphanotheca* treated test plots, height of plant was recorded as 108.5 cm, 108.8 c.m. and 106.9 c.m. respectively. Length of root of plant in control set up was 84.5 cm where as plants grown with urea treatment had 89.9 cm long roots. Three blue green algae treated plants i.e. *Nostoc, Anabaena* and *Aphanotheca* had roots 88.4 cm, 89.3 cm and 86.6 cm long length of leaf in control conditions was 42.5 cm where as the corresponding value in urea treated plot was 44.8. Three blue green algae treated plots, with above mentioned order, had 43.2 cm, 44.8 cm and 43.cm long leaves respectively. So far length of panicle is concerned, the value recorded in control conditions was 20.8 cm which increased to 24.9 cm in urea treated plots. Plots having treatment of three genera of blue green algae had 23.6 cm, 24.6 cm and 23.5 cm long panicles. 152 grains were found in each panicle in control condition. Number of grains per panicle increased to 189 in urea treated condition. In blue green treated experimental plots 180, 187 and 174 grains per panicle were found. So far grain yield is concerned, 2010 $kgha^{-1}$ was the recorded result in control condition whereas yield increased to 2444 $kgha^{-1}$ after Urea application. In blue green algae treated conditions, grain yield was 2298 $kgha^{-1}$, 2448 $kgha^{-1}$ and

Table 1. Impact of application of some blue green algal genera on growth and productivity of rice.

SI.	Parameters	Control	Urea	Nostoc	Anabaena	Aphanotheca
1	Height of plant (cm.)	106.00	110.8	108.5	108.8	106.9
2	Length of Root (cm.)	84.5	89.9	88.4	89.3	86.6
3	Length of leaf (cm)	42.5	44.8	43.2	44.8	43.00
4	Length of Panicle (cm.)	20.8	24.9	23.6	24.6	23.5
5	No. of grains per Panicle	152	189	180	187	174
6	Grain yield kgha^{-1}	2010	2444	2298	2448	2362
7	Husk yield kgha^{-1}	2630	2880	2800	2889	2770

Level of significance for various parameters-
1=P<0.05, 2 =P< 0.01, 3=P<0.01, 4=P<0.001, 5 and 6=P<0.01

2362 kgha^{-1} respectively. Data regarding husk yield was also obtained during the experiment. In control condition, yield was 2630 kgha^{-1} which increased to 2880 kgha^{-1} after application of Urea. In blue green algae treated cases, husk yield was 2800 kgha^{-1}, 2889 kgha^{-1} and 2770 kgha^{-1} respectively.

Results clearly indicate positive impact of blue green algae application on the growth and yield of paddy. All morphological parameters studied exhibited marked increase because of application of blue green algae and the enhancement was almost equal to the condition where urea was applied. So far grain yield is concerned, increase of 14.3% to 21.8% was recorded because of treatment of various genera of blue green algae. Maximum, increase was recorded earlier reports with respect to other varieties of rice[4,5].

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