

STUDIES ON THE EFFECT OF BIOFERTILIZERS IN RICE

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Field experiments conducted at Agricultural College and Research Institute, Madurai during 1980 and 1981 to study the effect of biofertilizers alone and in combination with urea in rice, revealed that application of either Blue green algae or Azolla coupled with 75 kg N/ha gave equal yield as that at 100 kg N/ha, indicating a saving of nitrogen to a tune of 25 kg/ha.

The grain production in the tropics largely looms round an efficient and economic supply of nitrogen, an element required in the largest quantity in comparison with other indispensable ones. Nitrogen being the costlier input, small and marginal farmers who can not afford, have to think of the alternative resources which can reduce the requirement of chemical nitrogen. The biological nitrogen fixation is considered to be a potential system for rice fields in economising nitrogen need. Tran and Dao (1973) suggested fifty per cent to nitrogen supply to rice crop through Azolla. Latchumanan (1977) reported that the grain yield, obtainable with 120 kg N/ha with Blue green algae, could be obtained at the lower level viz., 90 kg/ha.

The present study was undertaken to examine the usefulness of biofertilizers viz., Blue green algae, Azolla and Azotobactor in rice cultivation.

MATERIALS AND METHODS

Field experiments were conducted in the single cropped wetland at Agricultural College and Research Institute

Madurai during August-December 1980 and 1981 in a randomised block design replicated thrice. The variety tested was IR 20. The soils of the experimental fields are of sandy loam with a pH of 6.5 and classified as low in available nitrogen, medium in available phosphorus and potash. The treatments are.

- T₁ - Azolla alone inoculated @ one t/ha, a day after planting and incorporated after 25 days.
- T₂ - Application of 100 kg N/ha, alone
- T₃ - Azolla + 75 kg N/ha
- T₄ - Azolla + 50 kg N/ha
- T₅ - Blue green algae alone @ 10 kg/ha
- T₆ - Blue green algae + 75 kg N/ha
- T₇ - Blue green algae + 50 kg N/ha
- T₈ - Azotobactor alone applied @ 200 g, 400 g, and 800 g as seed dressing, seedling dip and soil application respectively.
- T₉ - Azotobactor + 75 kg N/ha
- T₁₀ - Azotobactor + 50 kg N/ha.

A basal dose of 50 kg/ha in each of P₂O₅ and K₂O was applied at the time of

Table 1: Effect of treatments on the growth, yield components and yield of IR. 20

Treatments	Plant height (cm)		No. of productive tillers/hill		No. of grains per panicle		1000 grain weight (g)		Grain yield (kg/ha)	
	1980	1981	1980	1981	1980	1981	1980	1981	1980	1981
T ₁ — 'A' alone	89.7	87.1	9.5	8.2	129	102	18.25	17.33	3178	3680
T ₂ — 100 kg N/ha	100.5	99.1	12.4	11.8	157	128	21.43	20.41	5439	6208
T ₃ — 'A' + 75 kg N/ha	98.2	98.2	12.3	11.4	154	126	21.30	20.29	5284	4998
T ₄ — 'A' + 50 kg N/ha	95.9	94.6	10.9	9.1	134	105	19.20	18.26	4495	4200
T ₅ — BGA alone	88.9	87.5	10.0	7.8	126	96	18.35	17.25	3241	3680
T ₆ — BGA + 75 kg N/ha	100.4	97.0	11.5	10.8	156	123	21.30	20.35	5347	4907
T ₇ — BGA + 50 kg N/ha	96.6	93.8	11.0	8.9	136	104	19.10	18.10	4420	4175
T ₈ — 'Az' alone	88.2	84.2	9.3	7.3	133	93	18.00	17.05	3010	3160
T ₉ — 'Az' + 75 kg N/ha	97.6	96.1	12.9	10.0	144	114	20.50	19.51	4836	4287
T ₁₀ — 'Az' + 50 kg N/ha	94.4	92.4	10.1	8.1	132	102	19.00	18.02	4105	3965
CD P=0.05	6.1	4.8	2.5	2.1	3.8	6.5	0.17	1.14	244	582

A — Azolla ; BGA — Blue Green Algae ; Az — Azotobacter

planting. Half the quantity of nitrogen was applied as basal and the other half in equal split doses at tillering and panicle initiation stages. Fresh Azolla was weighed @ one t/ha and uniformly applied as per schedule of treatments, a day after planting and allowed for multiplication. The multiplied azolla was incorporated into the field twenty five days after planting. Dehydrated Blue green algae was weighed and applied as per schedule seven days after planting @ 10 kg/ha, Azotobactor at 200 g, 400 g, and 800 g was applied as seed dressing, seedling dip and soil application, respectively. Biometric observations were recorded

RESULTS AND DISCUSSION

The data on the growth, yield and yield components are presented in Table 1.

In both the seasons, nitrogen at 100 kg N/ha recorded maximum number of productive tillers number of grains per panicle and 1000 grain weight. The trend of increase in number of tillers per hill due to increase in nitrogen level is in accordance with the findings of Iruthayaraj (1975) and Mahendran (1980). In both the seasons 100 kg N/ha recorded highest grain number per panicle and 1000 grain weight and were on par with the application of either Blue green algae or Azolla coupled with 75 kg of applied nitrogen per hectare.

With regard to grain yield, application of either Blue green algae or Azolla along with 75 kg N/ha recorded

as much yield as that at 100 kg N/ha in both the seasons. The increased yield in these treatments could be attributed to the increase in number of production tillers, number of grains per panicle and 1000 grain weight. Natarajan *et al.* (1980) indicated that the use of Azolla along with graded levels of nitrogen could save 25 per cent of fertilizer nitrogen without affecting the grain yield. Latchumanan (1977) observed that the grain yield obtainable with 120 kg N/a could be obtained at lower level of 90 kg/ha when Blue green algae inoculant was added.

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