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EFFECT OF NITROGEN MANAGEMENT AND NURSERY MANURING ON GRAIN AND STRAW YIELD OF RICE

A. MUTHUSANKARA NARAYANAN and G.S. THANGAMUTHU,
Tamil Nadu Agriculture University, Coimbatore - 641003.

ABSTRACT

Experiments conducted at Rice Research Station, Ambasamudram, during *kar* and *Pishanam* seasons of 1984-1985 with rice varieties TKM 9 and IR 20 revealed that placement of USG at 10 cm depth seven days after sowing to supply at 90 kg.ha^{-1} N resulted in highest grain yield. Sprouted seed treatment with three per cent DAP solution resulted in highest straw yield.

KEYWORDS : Rice, Nitrogen, Nursery, Field management.

The hectare^{-1} production of rice in Tamil Nadu is 2.2 tonnes against the world average of 2.4 tonnes. Poor soil fertility and improper water and nutrient management are the major factors which contribute to the poor yield in rice. In rice, nursery manuring has not received adequate attention. Nitrogen (N) plays a major role in increasing the grain yield. In the recent past, application of slow release N fertilizer to rice is gaining ground as it increases the fertilizer use efficiency. Hence, to evaluate various nursery manuring practices and N application to the main field through Urea Super Granule (USG) on grain and straw yield of rice, experiments were conducted at the Rice Research Station, Ambasamudram during *Kar* (June-September) and *Pishanam* (October-March) seasons of 1984-1985.

MATERIALS AND METHODS

The experiments were conducted in split plot design with seven management (main plot) and five nursery manuring treatments (sub-plot) replicated thrice. The main plot treatments were: control (M_1), application of N at 30 (M_2), 60 (M_3), and 90 (M_4) kg.ha^{-1} through USG. The five nursery manuring treatments were: application of DAP at 2 kg cent^{-1} (S_1), N at 360 g cent^{-1} as urea (S_2), P_2O_5 at 920 g cent^{-1} as single super phosphate (S_3) sprouted seed treatment with 3 per cent solution of DAP (S_4) and farmers method (No manuring - S_5). During *kar* and *pishanam* season, TKM 9 and IR20 were raised. Calculated quantities of fertilizers as per the treatment schedule were applied to the nursery by broadcasting before last levelling; For sprouted seed treatment, the sprouted seeds after incubation were dipped in the supernatent solution of 3 per cent DAP for 20 minutes and were sown after shade drying for 10 minutes. During *kar* season TKM9 seedlings were transplanted on the 25 the day after sowing (DAS) and during *pishanam* season IR 20 seedlings were transplanted on 30th DAS . Each plot in the main field received a constant quantity of P_2O_5 and K_2O at 50 kg. ha^{-1} each basally. For those treatments which received N through urea, half the quantity was applied basally while the remaining half was applied in two equal splits, the first at tillering and the second at panicle initiation. The USG as per the dosage of N were placed in alternate rows to a depth of 10 cm with equal intervals on seven days after transplanting. Irrigation was given once in three days to maintain the water level to a height of 2.5 cm commencing from third DAT. Other cultural practices were followed uniformaly through out the crop period. At the time of harvest plotwise grain and straw yields were recorded.

RESULTS AND DISCUSSION

In both the seasons, application of N at 90 kg.ha^{-1} as USG resulted in maximum grain yield while the least was under control treatment (Table 1). Increasing doses of N addition progressively increased the grain yield. For a given dose of N added, the grain yield was higher under USG as compared to commercial urea. In respect of nursery manuring treatments, sprouted seed treatment with 3 per cent DAP solution (S_4) resulted in maximum grain yield in the first season and this was on a par with 2kg DAP application (S_1). In the second season, though application of 920 g P_2O_5 cent^{-1}(S_3) registered the maximum yield it was on a par with the application of 2kg DAP (S_1) and sprouted seed treatment (S_1).

In rice, the grain yield is determined by the number of panicles unit area^{-1}, number of filled grains panicle^{-1}, and also grain test weight. In the present study, the number of panicles, grain number and grain test weight were maximum under N application at 90 kg.ha^{-1} as USG and hence, the maximum grain yield.

De Datta (1981) observed that N absorbed by the crop from tillering to panicle initiation tended to increase the number of panicle, that absorbed during panicle development increased the number of filled spikelets panicle^{-1} and that absorbed after flowering tended to increase the grain test weight. In the present study, since there was higher N availability through out the crop growth phase under 90 kg N addition through USG(M_7) the grain yield was maximum under this treatment. Pyarelal *et al.* (1983) and Singh and Kumar (1983) also observed significant yield increase under USG placement as compared to urea application.

In the case of straw yield also, 90 kg N addition through USG (M_7) recorded the highest straw yield. Among the nursery manuring treatments, sprouted seed treatment with three per cent DAP solution (S_4) resulted in maximum straw yield in both the seasons. Enhanced straw yield under these treatments was due to the fact that the plant height, number of tillers, leaf area index and dry matter production at various crop growth stages were maximum under these treatments. For a given dose of N application, USG resulted in high straw yield compared to commercial urea and this could be due to enhanced fertilizer use efficiency and similar trend of results were obtained by Somasundaram (1982), Tyagi (1982) and Sharma (1983).

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TABLE 1. Grain and straw yield as influenced by the treatments - Mean values (kg.ha^{-1})

Treatment	*Kar.*		*Pisharam*	
	Grain yield	Straw yield	Grain yield	Straw yield
M_1	3372	3659	3960	5080
M_2	4383	4822	4469	6561
M_3	4773	5460	4399	7051
M_4	5622	7283	4836	7885
M_5	4801	5797	4685	7295
M_6	5140	6776	4766	7982
M_7	5685	8718	5245	8694
CD(5%)	234	519	314	278
S_1	4944	5876	4645	7241
S_2	4809	5979	4650	7096
S_3	4755	6101	4733	7259
S_4	4965	6246	4586	7413
S_5	4647	6164	4491	7096
CD (5%)	128	166	150	163