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Madras agric. J.78 (9-12) Sep-Dec-1991

<https://doi.org/10.29321/MAJ.10.A01884>

NURSERY MANURING AND ITS EFFECT ON SEEDLING GROWTH AND YIELD OF RICE

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ABSTRACT

The effect of nursery manuring in rice was studied at Tamil Nadu Rice Research Institute, Aduthurai during 1985-1987. Two forms of fertilizers, diammonium phosphate (DAP) and urea plus super phosphate with different levels and time of application were compared. It was inferred that root and shoot length of rice seedlings were significantly influenced by the application of either DAP or urea plus super phosphate. Shoot length of seedlings was significantly increased by applying the fertilizer 10 days after sowing compared to basal application. Increased shoot length with lesser root length eased the pulling out operation with lesser per cent of seedling damage. Grain yield was not influenced by nursery manuring.

KEYWORDS : Rice varieties, Nursery manuring, Seedling growth yield.

In lowland transplanted rice, nursery management is very important for getting healthy and vigorous seedlings. Phosphorus application to rice nursery influenced rooting and promoted early root strike in the soil. But the crops which show visual phosphorus response in early stages do not give significant grain yield difference at harvest (De Datta *et al.* 1966). Basal application of DAP at 2 kg/40m² was being advocated for getting vigorous seedlings. However, this practice resulted in root snapping and difficulty in pulling out of seedlings in some pockets. In

order to have a detailed investigation on nursery manuring and its effect on seedlings growth and grain yield of rice, an experiment was conducted.

MATERIALS AND METHODS

Field experiments were conducted at Tamil Nadu Rice Research Institute, Aduthurai during *Kuruvai* (1985, 1986) and *Thaladi* (1985-1986, 1986-1987) seasons. The soil of the experimental site was clayey loam with available

Table 1. Effect of nursery manuring on rice seedling growth and grain yield (1985-1986)

Treatment	Kuruval 1985			Thaladi 1985-1986		
	Shoot length (cm)	Root length (cm)	Grain yield (t.ha ⁻¹)	Shoot length (cm)	Root length (cm)	Grain yield (t.ha ⁻¹)
T ₁ Control (no fertilizer)	9.8	10.2	4.6	11.6	11.4	3.6
T ₂ DAP 1 kg.40m ⁻² (Basal)	10.0	10.4	4.6	11.9	11.6	3.5
T ₃ DAP 1 kg.40m ⁻² (10 DAS)	11.5	10.7	4.7	13.4	11.9	3.5
T ₄ DAP 2 kg.40m ⁻² (Basal)	9.1	12.2	4.5	10.9	13.3	3.9
T ₅ DAP 2 kg.40m ⁻² (10 DAS)	11.5	10.4	4.6	13.5	11.5	3.7
T ₆ Urea + Super phosphate equivalent T ₂	9.0	9.9	4.8	11.0	11.1	3.8
T ₇ Urea + Super phosphate equivalent T ₃	10.8	12.1	4.6	12.6	13.2	3.6
T ₈ Urea + Super phosphate equivalent T ₄	9.4	13.0	4.5	11.2	14.1	3.5
T ₉ Urea + Super phosphate equivalent T ₅	12.0	8.9	4.7	13.7	10.0	3.8
T ₁₀ Urea alone @ 0.5 kg.40m ⁻² (10 DBP)	10.1	10.8	4.7	12.0	10.9	3.7
CD (5%)	1.8	2.1	NS	1.4	1.9	NS

DBP = days before pulling the seedlings; DAS = days after sowing NS = Not significant

Table 2. Effect of nursery manuring on rice seedling growth, seedling snapping percent and grain yield (1986-1987)

Treatment	<i>Kuruvai</i> 1986				<i>Thaladi</i> 1986-1987			
	Shoot length (cm)	Root length (cm)	Grain yield (t.ha ⁻¹)	Seedling snapping (%)	Shoot length (cm)	Root length (cm)	Grain yield (t.ha ⁻¹)	Seedling snapping (%)
T ₁ Control (no fertilizer)	10.8	7.1	3.8	12.7	13.2	10.0	3.9	8.1
T ₂ DAP 2 kg.40m ⁻² (Basal)	10.9	9.2	4.4	15.3	12.8	15.0	3.6	8.9
T ₃ DAP 2 kg.40m ⁻² (10 DAS)	12.0	8.3	3.7	14.0	13.3	12.8	3.5	8.0
T ₄ Urea + Super phosphate equivalent T ₂	9.2	8.7	3.3	15.8	12.3	14.8	3.6	8.7
T ₅ Urea + Super phosphate equivalent T ₃	12.2	7.1	3.3	14.2	14.6	13.3	3.6	7.8
T ₆ Urea alone @ 0.5 x 40m ⁻² (10 DBP)	9.8	7.2	4.2	12.2	12.6	13.0	3.6	4.7
CD (5%)	1.10.7	0.7	NS	0.7	1.4	1.3	NS	0.4

DAS = Days after sowing; DBP = Days before pulling the seedlings NS = Not significant

status of low N, medium P₂O₅ and high K₂O. The pH of the soil was 7.8. In 1985-1986, the effect of diammonium phosphate (DAP) at two levels (1 and 2 kg. 40m⁻²) and time of application (basal and 10 days after sowing - DAS) was studied in comparison with urea plus superphosphate on equal nutrient basis. This was also compared with urea application alone at 0.5 kg 40m⁻² at 10 days before pulling out. In 1986-1987, DAP at 2 kg 40m⁻² level alone tried. The experiment was laid out in a randomised block design. The varieties were ADT 36 for *Kuruvai* and ADT 39 during *Thaladi*. Both the varieties had a duration of 115 to 120 days and hence twenty five days

old seedlings were transplanted in the main field applied with recommended dose of N, P and K. At maturity, plots were harvested and yield recorded at 14 per cent moisture.

Biometric observation of rice seedlings were recorded on the day of pulling out of seedlings by randomly fixing ten seedlings in each treatment. The seedling snapping was recorded as detailed below. While assessing the seedlings damage, the seedlings completely snapped at collar region were taken into consideration leaving the minor root damages.

$$\text{Seedling snapping (\%)} = \frac{\text{No. of snapped seedling unit area}^{-1}}{\text{Total No. of seedlings unit area}^{-1}} \times 100$$

RESULTS AND DISCUSSION

The effect of treatment on growth yield and seedling snapping from 1985 to 1986-1987 is present in Table 1 and 2.

Seedling Growth

The root and shoot length of seedlings were influenced by DAP as well as urea plus super phosphate compared to no manuring. This might be due to better nourishment by the application of inorganic manures especially P nutrition to growing seedlings. Application of urea plus super phosphate 10 DAS to rice nursery recorded the highest shoot length of 12.2 cm in *Kuruvai* and 13.3 cm in *Thaladi* season, of 1986-1987 and was on a par with DAP application while the root length was significantly higher in basal DAP or urea plus super phosphate during both the seasons due to better absorption of P by the germinated seedlings. These observations were in line with the findings of Palaniappan (1982). There was no difference between DAP and urea plus super phosphate and as well as between levels.

Seedling Snapping

Basal application of fertilizer (either DAP or urea plus super) significantly increased the

snapping of seedlings compared to later application which might be due to deep penetration of root system in the soil. Basal application of DAP at 2 kg. 40m⁻² recorded significantly higher per cent of seedling snapping viz., 15.3 and 8.9 during *Kuruvai* and *Thaladi* seasons respectively. Besides the seedling damage, pulling out of seedlings also became more laborious operation. The lowest per cent of seedling snapping was recorded by urea application alone at 0.5 kg. 40m⁻² 10 days before pulling out of seedlings possibly due to lesser root growth in the nursery.

Grain Yield

Though the nursery manuring provided healthy seedlings, its effect was not reflected in increasing the grain yield of rice in the main field where several other management factors are involved. The grain yield was not significantly increased due to nursery fertilization irrespective of forms, levels and time of application. This kind of non-interaction between nursery manuring and main field fertilization on grain yield was reported by Rajagopalan and Krishnarajan (1987).

It was inferred that significant increase in shoot length without altering the root system was achieved with top dressing of fertilizer at 10 DAS in the nursery. This increased vegetative growth with lesser root length eased the pulling out operation recording minimum seedling snapping and hence reduced wastage of seedlings and saved time.

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