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Research Notes

Influence of water management and cultural practices on the yield attributes and yield of rice

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Rice is the most important food crop of the world population. In Tamil Nadu, rice production is 3.22 million tonnes from an area of 1.40 million hectares with the productivity of 2,308 kg ha⁻¹ (GOTN, 2006). The productivity is low when compared to the world average rice productivity. The major constraints in rice production are lack of integrated management practices involving land, water, crop and inputs. In the present investigation, efforts were made to find out the suitable method of water management and cultural practices to increase the rice productivity.

An experiment was conducted during the *kharif* 2004 and 2005 at the Tamil Nadu

Rice Research Institute, Aduthurai. The experiment was laid with three water management practices (continuous submergence (5±2 cm) (M₁), cyclic submergence (M₂) and saturation throughout crop growth (M₃) as main plot treatments and four cultural practices (transplanting + herbicide weed control + recommended fertilizer dose (T1), direct sowing of sprouted seeds on the same day + herbicide weed control + 1 spot weeding on 30DAS + recommended fertilizer dose (T2), direct sowing of sprouted seeds on same day + herbicide weed control + 1 conoweeding on 30 DAS + recommended fertilizer dose (T3) and direct sowing of sprouted seeds on second day + herbicide weed control + 1 conoweeding on 30 DAS + recommended fertilizer dose (T4) as sub

Table 1. Yield attributes of rice under water management and cultural practices (Kharif 2004 and 2005 Mean)

Treatments	No.of tillers/m ²	No.of panicle / m ²	Panicle weight(g)	Grain yield (t ha ⁻¹)
<i>Cultural practices</i>				
T1 - transplanting herbicide weed control + recommended fertilizer dose	369	358	2.43	5.10
T2 - Direct sowing on same day + herbicide weed control + 1 spot weeding + recommended fertilizer dose	393	380	2.48	5.06
T3 - Direct sowing on same day + herbicide weed control + 1 conoweeding + recommended fertilizer dose	443	427	2.98	5.10
T4 - Direct sowing on second day + herbicide weed control + 1 conoweeding + recommended fertilizer dose	395	384	2.49	5.13
SEd	2.64	2.49	0.18	0.05
CD (5 %)	6.47	6.10	0.45	0.12
<i>Water management practices</i>				
M1 - Continuous submergences (5+2 cm)	404	394	2.61	5.36
M2 - Cyclic submergences	391	381	2.57	5.15
M3 - Saturation throughout crop growth	392	391	2.61	5.17
SEd	1.8	1.0	0.01	0.06
CD (5 %)	4.0	2.21	0.030	0.13

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plot treatments and replicated thrice under the design split plot. The soil of experimental site was clay loam (clay 54%, salt 17% and sand 28%) with pH, EC, CEC and organic carbon content of 7.22, 0.63 dSm⁻¹, 30 m.eq/100g of soil and 0.75% respectively. The soil was low in nitrogen (190 kg ha⁻¹), high in phosphorous (27 kg ha⁻¹) and medium in potassium (280 kg ha⁻¹). The short duration rice variety (ADT 43) was raised as test crop.

The sowing of direct seeded rice was done by seed drilling the sprouted seeds. In direct sowing, seed rate of 100 kg ha⁻¹ was used while for transplanting 20 kg ha⁻¹ seed was used for raising nursery. Transplanting of seedlings was done 25 days after sowing. Transplanting and direct sowing were done on the same day. For herbicidal weed control, 2.5 l ha⁻¹ was mixed with 50 kg of sand and broadcasted uniformly on 3rd day after transplanting/sowing. Spot weeding was carried out by removing the weeds by hand weeding. Conoweeding was worked on 30 DAS.

The fertilizer was applied @ 125, 50 and 50 kg N, P O₅ and K O ha⁻¹ through urea, single superphosphate and muriate of potash. The 50 per cent of nitrogen and whole amount of P₂O₅, and 50 per cent of K₂O were applied basally at last ploughing. The remaining N was applied in 2 equal splits during active tillering and panicle initiation / stage. The remaining K₂O was applied along with nitrogen during panicle initiation stage. A common dose of 25 kg ZnSO₄ ha⁻¹ was applied as basal.

The results revealed that water management practices significantly influenced the yield components and yield of rice. The highest number of tillers m⁻² (404), panicles m⁻² (394) and panicle weight (2.61g) and grain yield of 5.36 t ha⁻¹ was obtained from continuous submergence (M₁). This may be attributed to higher DMP and increased nutrient uptake under continuous submergence condition (Muthukrishnan and Purushothaman 1992). Patel and Gildhyal (1983) also reported increased growth, yield attributes and yield with increased soil moisture regime due to higher DMP and nutrient uptake by rice as a result of frequent irrigation.

Cultural practices had significant influence on yield determinants and yield of rice. Direct sowing of sprouted seeds on same day + herbicide weed control + 1 conoweeding on 30 DAS + recommended fertilizer dose (S3) showed its superiority and registered more number of tillers m⁻² (443), panicles m⁻² (427), panicle weight (2.98 g) and grain yield (5.70 t ha⁻¹).

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