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Response of IR 8 Rice to Direct Seeding and Transplanting at Three Levels of Nitrogen

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ABSTRACT

A field experiment was conducted during *kharif* 1970 to compare the efficiency between transplanting and direct seeding of IR. 8 rice under three levels of nitrogen (125 175 and 225 kg/ha). The findings indicated that direct seeding was better than transplanting because of early maturity and higher yield. There was response upto the maximum dose of nitrogen adopted. The cost of cultivation between methods did not vary significantly.

INTRODUCTION

The relative merits between direct seeding and transplanting rice have been reported by several workers. Balakrishnan and Tambad (1967) and Rao and Vachhani (1969) have reported that the grain yields were higher in transplanted rice than broadcasted crop. Chowdhury *et al.* (1970) stated that the direct sowing have higher yield per hectare in dwarf indica varieties as compared to all indica varieties. De Datta *et al.* (1968) reported that dwarf variety IR. 8 gave increased yields with increase in the levels of nitrogen. Tanaka *et al.* (1958) observed decrease in the percentage of productive tillers as the nitrogen doses were increased. Chandler (1965) stated that with higher nitrogen applications heavy tillering varieties responded more to nitrogen under low plant density. This paper presents the results of a trial of direct seeding and transplanting of IR. 8 rice under different levels of nitrogen.

MATERIALS AND METHODS

The experiment was carried out in the wet land of the Agricultural College Coimbatore during main season, 1970. The soil is of deep black clay and is classified as medium in available nitrogen and potassium and very low in phosphoric acid content in fertility status. The high yielding fertilizer responsive and non-lodging IR 8 rice variety was selected for the study. This variety was subjected to two methods

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TABLE 1. Effect of method of sowing and levels of nitrogen on growth and yield attributes

Details	Plant height (cm)	Tillers per hill	Tillers per sq. m.	Productive tillers per hill	Productive tillers per sq. m	Panicle length (cm.)	No. of spikelets per panicle	No. of filled grains per panicle	Grain yield (kg/ha.)	Straw yield (kg/ha.)
Transplanting	93.04	14.00	620	10 67	489	25.50	148	126	7023	8119
Direct seeding	94.14	13.51	767	8.60	635	25.94	147	119	7473	8538
S. E.	0.92	0 76	43.7	0.43	41.3	0.176	8.98	7.7	0.100	0.38
C. D. 5%	...	...	133	1.30	125	...	...	...	0.30	..
F test	NS	Ns	S	S	S	NS	NS	NS	S	Ns
Sub plot										
N1	92.23	13.43	663	9.22	545	25 6	134	113	7023	7953
N2	92 93	13.53	729	9.55	574	25.9	144	123	7353	8343
N3	95.62	14.30	689	10.13	566	25 9	163	133	7375	8693
S. E.	0.58	0.25	13.6	0.24	16.6	0.054	2.9	2.5	0 105	0 113
C. D. 5%	...	...	...	...	...	...	...	...	0.30	..
F test	NS	NS	NS	NS	NS	NS	NS	NS	S	NS

of sowing namely direct seeding and transplanting and three levels of nitrogen namely 125, 175 and 225 kg per ha. No organic manure was applied as basal dressing. Superphosphate and muriate of potash to supply 90 kg P_2O_5 and K_{20} per ha each were applied before planting or seeding as the case may be. The experiment was conducted in split plot design and replicated thrice. Broadcasting was done on 6th July, 1970 and on the same day, the seeds were sown in the seed bed for transplanting A seed rate of 60 kg per ha was adopted for the direct seeding and a spacing of 20 × 10 cm with two seedlings per hill was adopted for transplanting. Other routine cultural operations were the same for all treatments.

RESULTS AND DISCUSSION

The plant height under direct seeding was slightly higher than the trans-

planted crop though the results were not significant (Table 1). IR. 8 variety recorded more number of total and productive tillers per sq. m. under direct seeding inspite of slight fall in mean productive tillers per plant in direct seeded crop. With regard to the length of the panicle, number of grains per panicle and number of filled grains per panicle, there was no significant difference between methods. There was no significant increase in plant height, tillers and other yield attributes with every successive increment of nitrogen.

Yield of grain and straw: Direct seeded plot gave significantly higher grain yield over transplanting. A careful perusal of the yield component discussed already would reveal that the method of sowing had no influence on the panicle length, filled grains and number of grains per panicle. The high yield obtained under direct seeding could then be mainly due to increase in productive tillers per unit area. Though there was a slight increase in straw yield due to more number of plant population per unit area in direct seeding, the difference was not significant. The positive increase in grain yield due to the higher doses of nitrogen indicated the high response of the variety. However, the increase was not significant between the higher levels of nitrogen namely 175 kg and 225 kg per ha.

The direct seeded crop recorded 450 kg additional grain yield per ha over transplanted crop. A perusal of the uptake figures obtained in the study would reveal that there was no significant difference in uptake of nitrogen and potassium under both the methods of sowing. However, the direct seeded crop removed significantly higher P_2O_5 than the transplanted rice (Table 2). The direct seeded crop attained early maturity. Mahaptra and

TABLE 2. Influence of methods of sowing on duration and uptake of nutrients.

Method of sowing	Duration in days	Uptake of nutrients kg/ha		
		N	P	K
Transplanting	147	107	20.49	39.29
Direct seeding	137	103.92	22.06	35.49
S. E.		3.78	0.54	1.49
C. D.		...	1.64	...
F test		NS	S	NS

TABLE 3. Cost of cultivation per ha. for direct seeding and transplanting.

Details of nitrogen dose	Methods of sowing.	
	Direct seeding	Trans-planting
N1 (125 kg/ha)	1,623–04	1,637–78
N2 (175 kg/ha)	1,762–55	1,777–28
N3 (225 kg/ha)	1,900 - 93	1,915–63
Mean	1,762 - 16	1,776–91

Sharma (1967) and Pradhan (1970) reported similar trend in maturity of direct seeded rice. Bersamin and Mabbayard (1967) opend that the early maturity in direct seeded rice was possibly due to suppression of tillering. The reduction may also be due to the longer growing period required for transplanted crop than direct seeded crop to compensate for the retardation in growth caused transplanting.

Cost of cultivation: The cost of cultivation of the crop is presented in Table 3. The total cost of cultivation per ha. did not vary much between transplanting and direct seeding methods. Eventhough the cost of raising nursery and transplanting was higher in the former, the expenditure involved in additional weeding under the latter compensated each other raising the total cost in each method to the same level.

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