https://doi.org/10.29321/MAJ.10.A03405

Madras agric. J. 61 (8) : 324–328, August, 1974

Effects of Seed Rate and Weed Control Methods on Yield Components of Rice Varieties

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ABSTRACT

The effects of seed rates viz. 40, 60 and 80 kg/ha and chemical weed control with Stam-F.34 on the yield components of four rice varieties (*Kanchi*, *Kannaki*, *Karuna* and *Cauveri*) were studied. The panicle weight, 1000-grain weight and number of grains per panicle decreased with increasing seed rate while the number of empty spikelets increased with increasing seed rate. Chemical weed control in combination with lower seed rate resulted in better expression of yield components. The optimum seed rate was 40 kg / ha under chemical weed control and 60 kg under manual weeding.

INTRODUCTION

New rice varieties of medium duration as *Kanchi*, *Kannaki*, *Karuna* and *Cauvery* have been released for wider cultivation in Tamil Nadu. Direct seeding combined with chemical weed control has aroused interest in recent times in India and yet there is little information on this aspect to make worthwhile recommendations. Hence a study was undertaken on this line with the above mentioned high yielding medium duration rice varieties to evaluate their efficacy under direct seeding and to fix optimum seed rates, in relation to chemical weed control.

MATERIALS AND METHODS

The experiment was conducted at Agricultural College Farm, Coimbatore during *Kharif*, 1972. Factorial Randomised Block design was adopted for for the study combining factorially the varieties viz. *Cauveri* (V_1), *Kanchi* (V_2), *Kannaki* (V_3) and *Karuna* (V_4), the seed rates viz. 40 (S_1) 60 (S_2) and 80 (S_3) kg/ha and the two weed control methods viz. manual weeding (H_0) and chemical weed control (H_1) with Stam F. 34 There were 24 treatments and 3 replications The gross and net size of the plots were 5 2 × 2.2 m and 5 × 2 m respectively. The crop was sown (direct seeding) on 18 - 6 - 72. Stam F. 34 at 10 l/ha was sprayed as post-emergence on the 8th day of sowing. Manual weeding was done on 45th day. A fertilizer dosage of 120 : 60 : 60 kg of NPK/ha was adopted for the study. Data on yield

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TABLE 1. Influence of seed rate on yield components

Seed rate	Mean values				
	Length of panicle	Weight of panicle	Number of filled grains per panicle	Number of empty spikelets	1000-grain weight
S_1	15.40	1.71	42.65	4.02	21.55
S_2	16.69	1.68	42.89	4.95	20 85
S_3	15.85	1.64	39.91	5.46	19 98
S. E.	0.241	0.05	0·17	0.25	0.04
C. D. [P = 0 05]	0.84	0.10	0.35	0.51	0.17

components as length of panicle, weight of panicle, number of filled grains and empty spikelets and the 1000-grain weight were recorded.

RESULTS AND DISCUSSION

It was observed that seed rate influenced the panicle length significantly (Table 1). The panicle length was maximum at the seed rate of 60 kg/ha. Earlier workers (Vachani *et al.*, 1961 and Sheik Dawood *et al.*, 1971 have reported similar results. The panicle weight was more at lower seed rate (40 kg/ha) In all the varieties at lower seed rates viz. 40 and 60 kg ha, the panicle weight was higher and at 80 kg/ha seed rate, the panicle weight was minimum. The relatively wider spacing at lower seed rate resulted in increased panicle weight was higher and at 80 Kg/ha seed rate, the panicle weight was minimum. This observation is in agreement with the findings of Chang and Yang (1965). Also the chemical weeding increased the panicle weight compared to manual weeding and this is in agreement with the observation of Sahu and Lanka (1969).

The number of filled grains decreased towards increased seed rates from 40 to 80 kg/ha (Table 2). This may be probably due to the increased sterility occurring at higher seed rates and thicker population of plants per unit area. The methods of weed control (manual and chemical) influenced the mean panicle weight differentially in different paddy varieties (Table 3). In the varieties *Kanchi* and *Cauveri*, the manual weeding increased the number of filled grains significantly while in the varieties *Karuna* and *Kanmaki* the chemical weed control (Stam F. 34 application) gave increased number of

TABLE 2. The variety, seed rate interaction on yield components

Varieties	Mean length and panicle (cm)			Mean weight and panicle (g)			Mean No. of grain/panicle			No. of empty spikelets			1000 - grain wt.		
	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3	S_1	S_2	S_3
V_1	15.56	16.20	15.77	1.56	1.56	1 50	45 68	42.73	40.17	3 57	4.38	4.69	21.30	20.50	20.6(
V_2	15.99	18.07	16.57	1.82	1.79	1.75	52 13	48.07	44.93	3.33	5 67	6.00	23.40	23.00	21.8(
V_3	15.47	16 97	15 87	1.75	1.75	1.70	49.00	46.43	41.53	5.0)	5 23	6 50	21.30	21.00	20.3(
V_4	14.80	15.53	15.27	1.70	1.60	1.60	35.77	83 53	33.00	4.17	4.50	4.67	20 20	18.80	17.3(
S E		0 88			0.03			0 35			0 53			0.20	
C D (P=0.05)		1.77			0 06			0.70			1 07			0.50	

filled grains. Such varietal differences have been observed earlier by Verma and Mani (1967).

The number of empty spikelets were found to increase with the increased seed rate. Obviously, under lower seed rate, the grain filling would be more, in the absence of competition between plants for nutrition and similar view has been expressed bo Sahu and Jenna (1968). At higher seed rates, the number of filled grains was more with manual weeding compared to chemical weeding. On the other hand, the number of filled grains was more at lower seed rate with chemica weeding (Table 3). This is in confirmity with the earlier findings of Godel (1935) and Sahu and Jenna (1968) Thus for adopting chemical weed control, 40 kg/ha seed rate is better in the rice varieties tried under the system of direct seeding. Neither the method of weed control nor the seed rate had any significant influence on the mean thousand-seed weight. The study undertaken revealed that 60 kg/ha seed rate under manual weeding and 40 kg ha seed rate under chemical weeding were good for all the four varieies in favourable expression of yield components.

TABLE 3. The effect of weed control methods on yield components

	Varieties							
	V_1		V_2		V_3		V_4	
	H_0	H_1	H_0	H_1	H_0	H_1	H_0	H_1
1.	15.65	15.97	16.92	16.68	15.91	16.29	15.17	15.23
2.	43.23	42.39	48.26	48.50	45.51	45.80	34.14	34.06
3.	4.25	4.17	5.01	4.99	5.44	5.61	4.49	4 40
4.	20.95	20.58	22.62	22.85	20.85	21.08	18.62	18.88

Table 3 [Continued]

	Seed rate							
	S_1		S_2		S_3			
	H_0	H_1	H_0	H_1	H_0	H_1	SED	CD
1.	15.03	15.77	16.60	16.78	16.11	15.57	0.62	1.25
2.	43.95	47.34	42.79	42.59	41.61	38.13	0.28	0.56
3.	4.42	3.62	4.92	4.98	5.14	5.78	0.25	0.51
4.	21.48	21.67	20.85	20 91	19 96	19.97	0.04	0.07

Characters : 1. Panicle length
2. Number of filled grains
3. Number of empty spikelets
4. 1000 - grain weight

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