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RICE RATOONING AS INFLUENCED BY VARIETIES, NITROGEN AND CUTTING HEIGHT

R. BALASUBRAMANIAN and S. KRISHNASAMY

Department of Agronomy
 Agricultural College and Research Institute
 Tamil Nadu Agricultural University
 Madurai 625 104

ABSTRACT

Field experiments were conducted during *Kharif* and *rabi* seasons of 1990-91 at the Agricultural College and Research Institute, Tamil Nadu Agricultural University, Killikulam to study the performance of rice ratooning as influenced by varieties, nitrogen and cutting height. Four varieties viz., ADT 36, ASD 16, CO 37 and PMK 1, three nitrogen levels (75, 100 and 125 kg/ha) and cutting heights of 20 and 30 cm were tested in a split plot design. In the main crop, ADT 36 recorded maximum grain yield, wherein the ratoon crop, CO 37 registered the highest grain yield (2.56 and 2.61 t/ha in *kharif* and *rabi* respectively) followed by PMK 1. Growth and yield attributes like plant height, productive tillers, grains per panicle, panicle length and days to maturity were influenced by varieties and nitrogen. Per day productivity was the highest (32.5 and 30.0 kg/ha in *kharif* and *rabi* respectively) for rice variety CO 37. Nitrogen applied at 125 kg/ha recorded higher yield attributes and grain yield in ratoon rice. Cutting height had no significant influence on ratoon rice. The cost benefit ratio was maximum for variety CO 37.

KEY WORDS : Rice, ratoon, variety, nitrogen, cutting height, yield, economics

Rice ratooning is practiced in countries like U.S.A., China, Japan and India. But it has not been practiced for large scale commercial farming because of lack of good ratooning varieties and better management techniques. In Tamil Nadu, rice ratooning is normally not practiced except in parts of Chengalpat district. The most ideal condition for ratooning is the single crop lowland areas under canal and tankfed systems. In single crop wetlands, water is unutilised towards the end of season for about one and half to two months. The surplus water can be economically utilised for a ratoon crop after the harvest of single crop instead of leaving it as fallow. Ratoon rice has the advantages of shorter duration, low production cost and higher per day productivity. Hence, the present study was conducted to evaluate the suitability of varieties, N and cutting height for ratoon rice.

MATERIALS AND METHODS

Field experiments were conducted at the Agricultural College and Research Institute, Tamil Nadu Agricultural University, Killikulam during *kharif* and *rabi* seasons of 1990-91 to find out the performance of rice ratooning as influenced by varieties, N and cutting height in a split plot design replicated thrice. Varieties (ADT 36, ASD 16, CO 37 and PMK 1) and cutting height (20 and 30 cm) formed the main plot and N levels (75, 100 and 125 kg/ha) formed the subplot. Soil type was typical haplustalf having low available N, medium in available P and K. The main crop was raised by following recommended agronomic practices with a spacing 15 x 10 cm. The main crop was harvested leaving stubbles at 20 and 30 cm height from the ground level. Three levels of N (75, 100 and 125 kg/ha) were applied in three splits viz., immediately

Rice Ratooning, Varieties, Nitrogen and Plant Height

Table 1. Ratooning on yield attributes of rice

	Plant height (cm)		Productive tillers per hill		Panicle length (cm)		1000 seed weight (g)		Grains per panicle	
	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi
MAIN PLOT										
Variety										
ADT 36	49.9	50.5	4.9	4.0	14.4	11.1	20.4	20.2	97.8	94.7
ASD 16	50.8	49.1	4.0	3.8	14.6	10.3	24.1	24.1	95.9	91.8
CO 37	60.9	55.6	5.7	5.9	14.9	15.8	22.3	22.2	140.2	128.5
PMK 1	72.8	70.5	6.0	6.0	18.2	16.1	24.4	24.1	125.6	117.9
SEd	0.5	0.6	0.07	0.01	0.20	0.01	0.1	0.02	0.7	0.14
CD (P=0.05)	1.0	1.3	0.14	0.03	0.41	0.02	0.2	0.04	1.4	0.27
Cutting height (cm)										
20	58.9	56.4	5.1	4.9	15.6	13.33	22.7	22.7	114.8	108.2
30	58.3	56.5	5.2	5.0	15.5	13.36	22.7	22.6	115.0	108.3
SEd	0.4	0.4	0.04	0.01	0.01	0.01	0.02	0.02	0.4	0.5
CD (P=0.05)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SUB PLOT										
Nitrogen (kg/ha)										
75	57.5	55.5	4.8	4.7	14.9	12.93	22.7	22.6	107.2	105.6
100	57.8	56.4	5.0	5.0	15.1	13.25	22.7	22.7	115.4	108.2
125	60.6	57.2	5.6	5.3	16.6	13.86	22.8	22.7	122.0	110.8
SEd	0.4	0.3	0.06	0.01	0.18	0.01	0.01	0.02	0.6	0.12
CD (P=0.05)	0.9	0.7	0.12	0.02	0.36	0.02	NS	0.04	1.2	0.23

after cutting, maximum tillering and panicle initiation stages. P and K were applied at 50 kg each per ha on the day of cutting as basal along with first dose of N. Labourers were engaged for manual weeding and trampling in between rice stubbles immediately after the harvest of main crop. Data on growth, yield attributes, grain yield and

days to maturity were recorded and statistically analysed. Per day productivity and economics were worked out.

RESULTS AND DISCUSSION

Among four short duration varieties, CO 37 and PMK 1 ratooned very well. Growth and yield

Table 2. Ratooning on yield and maturity of rice

	Straw yield (t/ha)		Grain yield (t/ha)		Days to maturity		Per day productivity (kg)	
	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi
MAIN PLOT								
Variety								
ADT 36	1.63	1.52	1.49	1.40	80.3	79.1	18.6	17.7
ASD 16	1.71	1.35	1.46	1.22	80.8	80.2	17.6	15.2
CO 37	3.21	3.00	2.56	2.61	78.7	78.2	32.5	32.1
PMK 1	3.03	2.95	2.33	2.28	83.1	81.0	28.0	28.1
SEd	0.01	0.01	0.01	0.01	0.4	0.20	-	-
CD (P=0.05)	0.02	0.02	0.01	0.03	0.7	0.41	-	-
Cutting height (cm)								
20	2.37	2.21	1.96	1.85	76.6	79.5	25.6	23.3
30	2.36	2.20	1.96	1.85	76.4	79.7	25.7	23.2
SEd	0.01	0.01	0.01	0.01	0.4	0.2	-	-
CD (P=0.05)	NS	NS	NS	NS	NS	NS	-	-
SUB PLOT								
Nitrogen (kg/ha)								
75	2.30	2.10	1.91	1.70	73.5	77.9	26.0	21.8
100	2.39	2.22	1.97	1.87	76.5	79.8	25.8	23.1
125	2.42	2.29	2.01	2.02	79.5	81.2	25.3	24.9
SEd	0.01	0.01	0.01	0.01	0.3	0.17	-	-
CD (P=0.05)	0.01	0.02	0.01	0.02	0.6	0.36	-	-

Table 3. Economics of main crop and ratoon crop (Mean of two seasons)

Variety	Main crop					Ratoon crop				
	Grain yield (t/ha)	Cost of cultivation (Rs/ha)	Value of produce (Rs/ha)	Net profit (Rs/ha)	Cost benefit ratio	Grain yield (t/ha)	Cost of cultivation (Rs/ha)	Value of produce (Rs/ha)	Net profit (Rs/ha)	Cost benefit ratio
ADT 36	5.8	4191.75	12470.00	8278.25	2.97	1.45	2411.50	3118.00	763.50	1.29
ASD 16	5.1	4191.75	10200.00	6008.25	2.43	1.34	2411.50	2680.00	268.50	1.11
CO 37	5.1	4191.75	13110.00	8918.25	3.13	2.59	2411.50	5957.00	3545.50	2.47
PMK 1	4.8	4191.75	9200.00	5008.25	2.19	2.31	2411.50	5313.00	2901.50	2.20

Cost of seed : ADT 36 Rs 2.15/kg ; ASD 16 Rs. 2.00/kg ; CO 37 Rs. 2.30/kg ; PMK 1 Rs. 2.30/kg

attributes like plant height, productive tillers, panicle length, 1000 seed weight, grains per panicle and days to maturity were significantly different between varieties. Variety CO 37 recorded the highest grain yield when it is grown as ratoon (2.56 and 2.61 t/ha in *kharif* and *rabi* respectively) (Tables 1, 2). Ratooning reduced the rice crop duration considerably. CO 37 matured earlier than other varieties and the per day productivity was also maximum (32.5 and 31.1 kg/day in *kharif* and *rabi*). The better ratooning ability of CO 37 was attributed to its faster regeneration, high tillering, more grains/panicle and early maturing characters. N levels (75, 100 and 125 kg/ha) positively influenced the yield attributes. However, application of N delayed the maturity of crop. N at 125 kg/ha increased the ratoon rice grain yield significantly (2.01 and 2.02 t/ha) which was due to the more productive tillers, panicle length and grains per panicle. This was in conformity with the results of Bahar and De Datta (1977) and Chatterjee *et al.* (1982). Cutting of main crop at 20 and 30 cm stubble height did not significantly influence the ratooning ability, yield attributes and yield. It is in

conformity with the findings of Bardhan Roy and Mondal (1982). But Bahar and De Datta (1977) found the optimum cutting height as 15 to 20 cm.

In the main crop the net profit and the cost benefit ratio were maximum in CO 37 (Table 3). The cost of cultivation was comparatively low in ratoon crop than main crop. This was due to the no cost involvement for field preparation, seeds and nursery. As ratoon crop, only two varieties viz. CO 37 and PMK 1 performed well. The net profit and cost benefit ratio were the highest (Rs.3545.50 and 2.47 respectively) in CO 37 followed by PMK 1 (Rs.2901.50 and 2.20 respectively).

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