Madras Agric. J. 90 (1-3) : 47-49 January-March 2003

Effect of seedling age, number and spacing on yield and nutrient uptake of traditional Kambanchamba rice

V. RAJESH AND K. THANUNATHAN
Dept. of Agronomy, Faculty of Agriculture, Annamalai Univ., Annamalainagar - 608 002, Tamil Nadu.

Abstract: An experiment was conducted at Annamalai University Experimental Farm, Annamalainagar during Samba season of 2000. Age of seedlings *viz.* 30, 40 and 50 days, number of seedlings *viz.* 2 and 4 seedlings hill^{-1} and spacing *viz.* 20x15, 20x10 and 15x15 cm were tested in split-split plot design replicated thrice. It was found that planting of 40 days old seedlings @ 2 seedlings hill^{-1} with a spacing of 20 x 15 cm was optimum in increasing the yield of Kambanchamba rice for the tract of old Cauvery delta zone. The N, P and K uptake were higher in the same treatment.

Key words: Traditional rice, Age of seedlings, Number of seedlings and Spacing.

Introduction

Rice is the most important and extensively grown food crop of Tamil Nadu. It is cultivated over an area of 2.7 m.ha with a production of 7.2 million tonnes. Though many traditional varieties recorded very low yield, there are traditional varieties with good quality produce with lesser inputs recording higher net income and they have special qualities like pleasant aroma, finer grain size, delicious taste and high nutritive content. Moreover, high yield potentialities of different traditional rice cultivars were also documented by several workers (Singh and Gangwar 1989; Gangwar and Sharma 1997). Optimum age of seedlings, number of seedlings hill^{-1} and plant density are the vital factors that influence the yield of rice. Information on optimum seedling age, number of seedlings hill^{-1} and plant population to get higher productivity in the traditional rice variety Kambanchamba is lacking. Hence it is necessary to ascertain appropriate management technology that would enhance the yield potentiality of traditional cultivars at the maximum extent suitable to old Cauvery delta areas.

Materials and Methods

Field experiment was conducted at Annamalai University Experimental Farm, Annamalainagar during Samba season of 2000 to find out the optimum age of seedlings, number of seedlings hill^{-1} and plant population for a long duration traditional rice *viz.* 'Kambanchamba'. The experiment was conducted with three age of seedlings *viz.* 30, 40 and 50 days old seedlings as main treatment, two different number of seedlings hill^{-1} *viz.* 2 and 4 seedlings hill^{-1} as sub-treatment and three spacing *viz.* 20x15, 20x10 and 15x15 cm as sub-sub treatment. The experiment was laidout in split-split plot design with three replications. The soil of the experimental field was clay loam in texture with low in available nitrogen (238 and 231 kg ha^{-1}), medium in available phosphorus (18.13 and 17.47 kg ha^{-1}) and high in available potassium (312 and 308 kg ha^{-1}) in experiments I and II, respectively. The recommended level of fertilizer (150:50:50 NPK kg ha^{-1}) was applied during the experimentation.

Results and Discussion

Effect of seedling age

Age of seedlings had significant influence on yield and nutrient uptake of traditional rice (Table 1 and 2).

Planting of 40 days old seedlings recorded maximum grain yield of 2.39 and 2.28 t ha^{-1} in experiments I and 11, respectively. The reduction in yield with planting of 50 days old seedlings might be due to the fact that 50 days old seedlings recorded minimum dry matter production and did not remove sufficient nutrients to vegetative growth and reproductive phase. The present study was in conformity with the findings of Banik *et al.* (1997). The higher values of nutrient with 40 days old seedlings might be due to better growth of crop as evidenced by increased dry matter production.

Table 1. Effect of age, number of seedlings and spacing on yield of traditional rice Kambanchamba

Treatments	Grain yield (t ha^{-1})		Straw yield (t ha^{-1})		Harvest index (HI)	
	Exp-I	Exp.-II	Exp.-I	Exp.-II	Exp.-I	Exp.-II
Age of seedlings						
30 days	2.12	2.05	5.09	4.91	0.29	0.29
40 days	2.39	2.28	5.63	5.49	0.30	0.29
50 days	2.08	1.96	4.76	4.60	0.29	0.30
CD (P=0.05)	0.03	0.03	0.06	0.06	0.003	0.003
Number of seedlings hill^{-1}						
2 seedlings	2.34	2.23	5.56	5.39	0.30	0.29
4 seedlings	2.05	1.97	4.76	4.60	0.30	0.29
CD (P=0.05)	0.02	0.02	0.03	0.03	NS	NS
Spacings						
20 x 15 cm	2.40	2.27	5.68	5.53	0.30	0.29
20 x 10 cm	2.08	1.98	4.79	4.64	0.30	0.30
15 x 15 cm	2.11	2.05	5.00	4.83	0.29	0.29
CD (P=0.05)	0.02	0.02	0.05	0.05	0.003	0.003

Table 2. Effect of age, number of seedlings and spacing on nutrient uptake of traditional rice Kambanchamb

Treatments	N uptake (kg ha^{-1})		P uptake (kg ha^{-1})		K uptake (kg ha^{-1})	
	Exp-I	Exp.-II	Exp.-I	Exp.-II	Exp.-I	Exp.-II
Age of seedlings						
30 days	112.39	108.27	17.18	16.18	112.99	109.89
40 days	116.39	111.22	18.41	17.22	117.62	115.21
50 days	109.69	105.36	16.61	15.49	109.74	106.42
CD (P=0.050	1.26	1.22	0.19	0.17	1.26	1.21
Number of seedlings hill^{-1}						
2 seedlings	115.85	108.64	18.26	17.05	116.67	114.09
4 seedlings	109.79	103.29	16.54	15.56	110.23	106.92
CD (P=0.05)	0.90	0.86	0.14	0.12	0.91	0.88
Spacings						
20 x 15 cm	116.00	114.93	18.49	17.26	117.12	114.90
20 x 10 cm	110.10	108.65	16.68	15.65	110.55	106.79
15 x 15 cm	112.36	111.31	17.03	16.00	112.68	109.83
CD (P=0.05)	1.24	1.19	0.16	0.16	1.23	1.20

Effect of seedling number

Seedling number had significant influence on yield and nutrient uptake of traditional rice (Table 1 & 2).

Planting of 2 seedlings hill^{-1} recorded higher yield and nutrient uptake than that of 4 seedlings hill^{-1}. Planting of 2 seedlings hill^{-1} enabled the plant to produce more new tillers which had undergone normal physiological growth and field duration resulting in more healthy panicles with more filled spikelets might be the reason for higher yield. This is in concordance with the finding of Ramasamy and Babu (1997). Higher nutrient uptake observed with 2 seedlings hill^{-1} might be due to maintenance of optimum number of seedlings which helped the crop in increasing the growth especially dry matter production thereby contributing to greater nutrient uptake.

Effect of spacing

Spacing had significant influence on yield and nutrient uptake of traditional rice (Table 1 & 2).

Wider spacing of 20 x 15 cm produced maximum yield and registered higher nutrient uptake than other spacings. This might be due to the fact that, under individual hill wider spacing showed superior growth and yield contributing characters than closer spacings. Further, closer spacings resulted in higher inter plant competition for the resources thus resulting in lesser development of yield characters. The result of present study was in conformity with the findings of Gupta and Sharma (1991). With respect to different spacings maintenance of optimum plant population might have eliminated competitions between plants for nutrients, sunlight leading to better growth of crop resulting in higher nutrient uptake.

Based on the above findings, it can be concluded that planting of 40 days old seedlings @ 2 seedlings hill^{-1} at a spacing of 20x15cm is essential to maximise the yield and nutrient uptake of traditional Kambanchamba rice.

References

Banik, P., Sarkar, B., Sasmal, T., Ghosal, P.K and Bagohi, D.K. (1997). Effect of different numbers and age of seedlings on rice *(Oryza sativa)* cultivars in low land plateau region of Bihar. *Indian J. Agron.* **42**: 265-268.

Gangwar, K.S. and Sharma, S.K. (1997). Influence of planting dates and productivity of traditional scented rice varieties. *IRRN*, **23**: 42.

Gupta, A.K. and Sharma, R.S. (1991). Effect of plant spacing and fertility level on grain yield of early medium indica rice *(Oryza sativa). Indian J. Agron.* **36**: 223

Ramasamy, S. and Babu, R. (1997). Effect of plant density, number of seedlings and nitrogen on the productivity of aged rice seedlings. *Oryza*, **34**: 310-313.

Singh, S. and Gangwar, B. (1989). Comparative studies on production potentials in traditional tall and improved rice cultivars. *J. Andaman Sci. Association.* **5**: 81-82.

(Received : October 2001; Revised : June 2002)