

INFLUENCE OF GENOTYPES AND ROW SPACINGS ON YIELD ATTRIBUTES, YIELD AND ECONOMICS IN PADDY UNDER DRILLED CONDITION

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ABSTRACT

An experimental trial was conducted during *kharif* season of 2018 at Agricultural college farm, College of Agriculture, Nagpur, Maharashtra to study the effect of genotypes and row spacings on yield attributes, yield and economics in paddy under drilled condition. The design of the experiment was Factorial randomized block design with eight treatments replicated three times. The factors of the trial were varieties (2), seed rates (2) and spacings (2). Varieties tested were Poornima (V_1) and Indira aerobic-1 (V_2), in two different row spacings S_1 -20 cm row spacing and S_2 -30 cm row spacing and two different seed rates. The results revealed that total number of panicles plant⁻¹, length of panicle (cm), number of grains panicle⁻¹, weight of grains panicle⁻¹ (g), test weight (g), grain yield (kg ha⁻¹) were maximum in Indira aerobic -1 paddy variety in row spacing of 20 cm. Similarly maximum GMR, NMR, B:C ratio were maximum with Indira aerobic -1 paddy variety in row spacing of 20 cm.

(Key words: Genotypes, row spacings, yield attributes, yield, economics, paddy under drilled condition)

INTRODUCTION

Paddy is the most important and widely cultivated crop in the world. Asia is the home of rice. More than two billion people are getting 60-70% of their energy requirement from rice and its derived products (Rekha *et al.*, 2015). Paddy belongs to the family poaceae and genus *Oryza*. The genus *Oryza* has 2 cultivated and 22 wild species. The cultivated species are *Oryza sativa* and *Oryza glaberrima*. *Oryza sativa* is grown all over the world while *Oryza glaberrima* has been cultivated in west Africa. India and Burma are the centers of origin of paddy. It is grown in 150 countries with more than 40,000 varieties. Among cereals, rice is an important source of food for more than 60% of world population and more than 90% rice is consumed in Asia (Chauhan *et al.*, 2014). Rice is the staple food of Asia Pacific region, providing 39% of calories. It provides 30-70% of the calories to more than three billion people (Khush, 2004). Among the various agronomic practices, spacing plays an important role in maximizing the crop yield as well as productivity.

Inter row spacing is very important for proper distribution of plants over cultivated area and for better

utilization of available soil and natural resources. Planting distance affects crop yields as it not only determines the optimum crop stand but also ensures the feasibility and effortlessness of using inter tillage devices for sufficient weed control and conservation of soil moisture. In addition, proper row spacing is important for maximizing light interception, penetration, light distribution in crop canopy and average light utilization efficiency of the leaves in the canopy and thus affects yield of a crop (Hossain *et al.*, 2003). Hence, present investigation was planned and carried out to assess the "Influence of genotypes and row spacings on yield attributes, yield and economics in paddy under drilled condition"

MATERIALS AND METHODS

A field experiment was conducted at Agriculture College Farm, Nagpur during *kharif* season of 2018-2019. The experiment was laid out in Factorial randomized block design with three replications and eight treatments. Factors of the experiment were varieties (V_1 -Poornima, V_2 - Indira aerobic -1), spacings (S_1 - 20 cm row spacing, S_2 -30 cm row spacing) and seed rates (SR₁-50 kg ha⁻¹, SR₂-75 kg ha⁻¹).

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Treatments used were $T_1 (V_1+S_1+SR_1)$, $T_2 (V_1+S_1+SR_2)$, $T_3 (V_1+S_2+SR_1)$, $T_4 (V_1+S_2+SR_2)$, $T_5 (V_2+S_1+SR_1)$, $T_6 (V_2+S_1+SR_2)$, $T_7 (V_2+S_2+SR_1)$, $T_8 (V_2+S_2+SR_2)$. The postharvest observations like total number of panicles plant⁻¹, length of panicle (cm), number of grains panicle⁻¹, weight of grains panicle⁻¹(g), test weight(g), grain yield (kg ha⁻¹) were recorded at time of harvest. GMR, NMR, B:C ratio were recorded after harvest. The observed data were analyzed statistically and the appropriate standard error of mean SE ($m \pm$) and the critical difference (C.D.) were calculated at 5% level of significance (Panse and Sukhatme, 1954).

RESULTS AND DISCUSSION

Growth attributes

Total number of panicles plant⁻¹

There was a significant influence on total number of panicles plant⁻¹ due to different varieties. The variety Indira aerobic-1 was found to be superior over the Poornima variety and recorded significantly higher number of panicles plant⁻¹. The results of the experiment were similar to the results obtained by Shridara *et al.* (2011) with paddy variety BI-43. The row spacing of 20 cm was significantly superior than row spacing of 30 cm and recorded higher number of panicles plant⁻¹. The results of the experiment were similar to the results obtained by Negash *et al.* (2017). They observed a greater number of panicles plant⁻¹ with the row spacing of 20 cm.

Length of panicle (cm)

The variety Indira aerobic-1 produced significantly higher length of panicle than Poornima variety. The length of panicle is purely a varietal character which is influenced by the genetic makeup and environment. The results of the experiment were similar to the results obtained by Durgam *et al.* (2016) where they reported higher length of panicle with paddy variety MTU1010.

The row spacing has no significant influence on length of the panicle. The length of panicle is a genotypic character which cannot be influenced by spacing.

Number of grains panicle⁻¹

The maximum number of grains panicle⁻¹ were observed in Indira aerobic-1 variety and was significantly superior to Poornima variety. Basavaraja *et al.* (2011) and Durgam *et al.* (2016) recorded highest number of grains panicle⁻¹ with paddy varieties MTU1010 and KRH-2. The row spacing of 20 cm produced a greater number of grains panicle⁻¹ as compared to 30 cm row spacing, and was significantly superior to 30 cm row spacing. The results were similar with the results obtained by Banerjee and Pal (2011), Mondal *et al.* (2013) and Rasool *et al.* (2013). They recorded maximum number of grains panicle⁻¹ with 20 cm row spacing.

Weight of grains panicle⁻¹(g)

The Indira aerobic-1 variety recorded significantly higher weight of grains panicle⁻¹ and was superior over

Poornima variety. Garba *et al.* (2013) and Yadav *et al.* (2017) observed more weight of grains panicle⁻¹ with paddy varieties PAC837, DRRH-3 and NERICA-1. The row spacing of 20 cm was found to be significantly superior over 30 cm row spacing and produced higher weight of gains panicle⁻¹. The results are in conformity with the findings of Mondal *et al.* (2013), Pandey, (2013) and Ambuj *et al.* (2018). They observed more weight of grains panicle⁻¹ with row spacing of 20 cm.

Test weight (g)

There was no significant influence of different varieties on test weight. The test weight was not significantly influenced by the different row spacings.

Yield

The variety Indira aerobic -1 produced more grain yield ha⁻¹ and was found to be significantly superior in producing grain yield ha⁻¹ over the Poornima variety. The results were in conformity with the results obtained by Suresh *et al.* (2013) and Durgam *et al.* (2016) with the paddy variety MTU1010. The row spacing had a significant effect on grain yield ha⁻¹. The row spacing of 20 cm was more effective than row spacing of 30 cm in producing grain yield ha⁻¹ and was significantly superior over Poornima variety. Similar results were observed by Mondal *et al.* (2013) and Ambuj *et al.* (2018), they reported that the higher grain yield ha⁻¹ was obtained at 20 cm row spacing.

Economics

Gross monetary returns

The variety Indira aerobic -1 showed maximum value of gross monetary returns (Rs 83281 ha⁻¹) as compared to the gross monetary (Rs 63399 ha⁻¹) of Poornima variety and was found significantly superior over the Poornima variety. Shridara *et al.* (2011) reported highest gross monetary returns with variety BI-43 compared to other varieties. Spacing of 20 cm between two rows recorded the higher value of gross monetary returns (Rs 76444 ha⁻¹) and it was significantly superior over the value of gross monetary returns (Rs. 70236 ha⁻¹) of 30 cm row to row spacing. Pandey (2013) reported the maximum gross monetary returns with 20 cm row to row spacing.

Net monetary returns

As regarding the net monetary returns, the maximum value of Rs 58516 ha⁻¹ was obtained with the variety Indira aerobic-1 as compared to Poornima variety. The Indira aerobic -1 variety was found significantly superior over Poornima variety. The results were in conformity with the results obtained by Shuba *et al.* (2018) with paddy variety MTU1010. The row spacing of 20 cm recorded the maximum net monetary value of Rs. 51009 ha⁻¹ which was significantly superior over the 30 cm row to row spacing. Pandey (2013) reported the highest net monetary returns under row spacing of 20 cm.

B:C ratio

Maximum B:C ratio of 3.32 was obtained with Indira aerobic-1 variety than Poornima variety. So, Indira aerobic-1

Table 1. Yield attributes, yield and economics as influenced by genotypes and row spacings

Treatments	Total Number of panicles	Length of panicle (cm)	No. of grains panicle ⁻¹	Weight of grains panicle ⁻¹	Test weight (g)	Grain yield (kg ha ⁻¹)	Gross monetary returns (Rs. ha ⁻¹)	Net monetary returns (Rs. ha ⁻¹)	B.C. Ratio
Genotypes (A)									
V ₁ -Poornima	8.49	24.41	113.67	1.93	16.62	3113	63399	37969	2.48
V ₂ -Indira aerobic-1	9.78	26.03	151.25	2.64	18.26	4138	83281	58516	3.32
SE (m) ±	0.30	0.23	2.60	0.10	0.58	32	680	680	-
CD at 5%	0.70	0.58	6.90	0.27	-	94	2038	2038	-
Spacing(B)									
S ₁ - 50 Kg ha ⁻¹	9.78	25.46	138.50	2.48	17.68	3755	76444	51009	2.99
S ₂ - 75 Kg ha ⁻¹	8.50	24.99	126.42	2.09	17.20	3496	70237	45476	2.80
SE (m) ±	0.30	0.23	2.60	0.10	0.58	32	680	680	-
CD at 5%	0.70	-	7.40	0.20	-	94	2038	2038	-
Interaction (A×B)									
SE (m) ±	0.42	0.33	3.67	0.13	0.82	45	961	961	-
CD at 5%	-	-	-	-	-	-	-	-	-

was found superior to Poornima variety. Shuba *et al.* (2018) reported the highest B: C ratio with paddy variety MTU1010. The highest B:C ratio of 2.99 was observed in 20 cm row to row spacing compared to row spacing of 30 cm. Hence, the 20 cm row to row spacing was considered as superior. Pandey (2013) observed the highest B: C ratio under row spacing of 20 cm.

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