



E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2019; 8(1): 1194-1195
Received: 28-11-2018
Accepted: 30-12-2018

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The study on rice genotypes suitable under SRI and traditional methods of cultivation

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Abstract

The investigation entitled “The study on rice genotypes suitable under SRI and traditional methods of cultivation” was carried out with Thirty-two rice genotypes in SRI and Traditional methods of cultivation. The experiment conduct during *Kharif* season of 2006 with 32 genotypes of rice at Research Farm of Indira Gandhi Krishi Vishwavidyalaya, Raipur (Chhattisgarh). The experiment was conduct on two method of rice cultivation i.e., System of rice intensification (SRI) and Traditional method (TM). On the basis of overall performance, the genotypes Poornima, Danteshwari, R-1033-968-2-1 and R-1248-1489-2-822-1 performed better for the entire attributes viz., number of tillers, biomass and yield under SRI method of rice cultivation. The hybrid variety IRH-5 performed better under traditional method with continuous water level.

Keywords: Genotype, rice, SRI, yield

Introduction

The investigation entitled “The study on rice genotypes suitable under SRI and traditional methods of cultivation” was carried out with Thirty-two rice genotypes in SRI and Traditional methods of cultivation. The experiment conduct during *Kharif* season of 2006 with 32 genotypes of rice at Research Farm of Indira Gandhi Krishi Vishwavidyalaya, Raipur (Chhattisgarh). The experiment was conduct on two method of rice cultivation i.e., System of rice intensification (SRI) and Traditional method (TM).

SRI method of cultivation significantly increased the performance better for the entire attributes viz. plant height, tiller, bio-mass, yield and yield attributes of rice genotypes.

Days to 50 percentage flowering were observed 9 days earlier in SRI method compared to Traditional method. Plant height had also showed significant difference between the two methods of cultivation. In experiment 16 genotypes namely Poornima, Danteshwari, R-1033-968-2-1, R-1182-167-2-1, R-1162-1667-1-1, R-1217-536-1-259-1, CHANDRAHSINI, R-979-67-2-44-1, R-1248-1489-2-822-1, R-1072-360-1-1, R-1218-509-2-452-1, IR-64, R-548-89-6, R-703-1-52-1-1, R-1124-91-2-73-1 and Indira Sugandhit showed significantly higher values under SRI method. However, the rest of the 16 genotypes had no significant differences between both the methods of cultivation indicated that these genotypes have no significant environmental interaction. Radiation and thermal use efficiencies are responsible for enlargement and development of meristematic tissue at growing points, which caused faster growth of growing part, ultimately plant height.

In fact it is always felt that SRI method of cultivation gives better tillering as compared to traditional method of rice cultivation. However, the result showed that it is a genotype specific reaction. Out of 32 genotypes, 11 genotypes exhibited superiority in tillering under SRI method namely Poornima, Danteshwari, R-1099-2596-1-1, R-1013-2297-1-1, MTU-1010, R-1248-1489-2-822-1, R-1072-360-1-1, R-1250-1557-895-1, Indira Sugandhit, Mahamaya, Kranti. There was significant reduction in production of tillers with the advancement of age of seedling and water management practices. The increase in effective tillers hill^{-1} might be also due to the application of nitrogen at maximum tillering and panicle initiation stage.

The biomass production is also a positive indicator for better performance of genotypes. Out of 31 genotypes, 20 genotypes gave significantly higher biomass under SRI method of cultivation. SRI method provided sufficient space for high nutrient absorption and maintains aeration, radiation and thermal activities, which increased said plant character finally more biomass accumulation.

In case of yield out of 32 genotypes, 21 genotypes showed higher grain yield under SRI method of cultivation. the genotypes Poornima, R-1033-968-2-1, R-1099-2596-1-1, R-1013-2297-1-1, R-1182-167-2-1, SHAMLESHWARI, R-1037-649-1-1, R-1162-1667-1-1,

R-1217-536-1-259-1, RDG-1, R-1248-1489-2-822-1, IR-36, R-1072-360-1-1, R-1218-509-2-452-1, IR-64, R-548-89-6, R-703-1-52-1-1, R-1124-91-2-73-1, R-1250-1557-895-1, Madhuri and Kranti showed positively significant perform well under SRI Method. This might be due to the fact that yield is a function of growth characters and yield attributes. The grain is the result of growth and yield attributing character of crops. On the basis of overall performance, the genotypes Poornima,

Danteshwari, R-1033-968-2-1 and R-1248-1489-2-822-1 performed better for the entire attributes viz. yield, number of tillers, and biomass Production. Hence these genotypes are best suited under SRI method of rice cultivation. The hybrid variety IRH-5 performed better under traditional method with continuous water level. SRI method proved to be one of the water saving method of cultivation in rice and less expensive than since compared only with traditional method.

Table 1: Days to 50 % Flowering, Mean height (cm), Radiation (Mj), TUE (gm m⁻² / °C GDD), Mean Tiller per hill, Total Biomass (gha⁻¹) and Yield (gm m⁻²) in respect of yield production of different genotypes under SRI and traditional method of sowing

S. No.	Genotypes	Date	SRI	Date	TM	Mean height (cm)		Radiation (Mj)		TUE (gm m ⁻² / °C GDD)		Mean Tiller per hill		Total Biomass (gha ⁻¹)		Yield (gm m ⁻²)	
		50 % Flowering	GDD (°C)	50 % Flowering	GDD (°C)	SRI	TM	SRI	TM	SRI	TM	SRI	TM	SRI	TM	SRI	TM
1	Poornima	30-Sep	1085.2	15-Sep	1064.5	80.3	74.5	8650	7709	0.230	0.215	14.6	8.8	256.0	231.0	250.0	229.2
2	Danteshwari	25-Sep	1159.5	13-Sep	1029.4	83.5	76.1	9088	7364	0.198	0.229	14.5	11.5	312.6	200.6	229.2	235.4
3	R-1033-968-2-1	26-Sep	1122.0	16-Sep	1082.1	84.8	77.5	9301	7873	0.438	0.327	13.4	11.9	425.8	337.4	491.7	354.2
4	R-1099-2596-1-1	27-Sep	1140.7	20-Sep	1150.5	84.3	85.7	9380	8601	0.310	0.244	12.4	8.5	498.4	296.4	354.2	281.3
5	R-1013-2297-1-1	24-Sep	1103.4	27-Sep	1274.8	86.4	86.6	8870	9943	0.363	0.302	14.5	10.5	538.3	336.6	400.0	385.4
6	R-1182-167-2-1	28-Sep	1177.9	26-Sep	1256	104.6	90.4	9470	9725	0.371	0.249	17.8	15.5	602.4	641.0	437.5	312.5
7	Shamleshwari	25-Sep	1122.0	25-Sep	1237.4	98.4	96.2	9088	9505	0.223	0.194	12.6	13.6	633.6	484.2	250.0	239.6
8	R-1037-649-1-1	26-Sep	1140.7	25-Sep	1237.4	99.1	96.1	9301	9505	0.347	0.244	12.4	15.5	302.4	672.6	395.8	302.1
9	R-1162-1667-1-1	3-Oct	1269.3	25-Sep	1237.4	98.3	89.5	10433	9505	0.345	0.303	12.7	16.8	572.3	496.2	437.5	375.0
10	R-1102-2795-3-1	7-Oct	1339.4	27-Sep	1274.8	87.0	90.3	11232	9302	0.324	0.335	11.8	17.0	430.4	664.0	433.3	427.1
11	R-1217-536-1-259-1	26-Sep	1140.7	25-Sep	1237.4	116.8	106.0	9301	9505	0.409	0.328	10.7	15.3	466.9	689.2	466.7	406.3
12	Chandrahnsini	28-Sep	1177.9	25-Sep	1237.4	107.8	97.6	9470	9505	0.230	0.244	9.3	10.4	448.2	606.2	270.8	302.1
13	MTU-1010	2-Oct	1250.9	25-Sep	1237.4	110.2	114.5	10217	9505	0.276	0.320	14.7	11.5	493.6	539.2	345.8	395.8
14	R-979-67-2-44-1	6-Oct	1322.5	28-Sep	1293.2	118.5	106.5	11036	10156	0.394	0.435	9.5	9.6	491.2	611.0	520.8	562.5
15	RDG-1	30-Sep	1213.9	20-Sep	1150.5	68.8	86.7	9828	8601	0.275	0.217	9.5	9.5	568.7	358.0	333.3	250.0
16	IRH-5	26-Sep	1140.7	28-Sep	1293.2	126.9	116.1	9088	10156	0.353	0.338	10.4	9.5	468.2	584.8	395.8	437.5
17	R-1248-1489-2-822-1	3-Oct	1269.3	30-Sep	1329.3	96.3	86.8	10433	10325	0.443	0.329	11.5	9.0	499.7	458.8	562.5	437.5
18	IR-36	2-Oct	1250.9	24-Sep	1218.8	64.6	71.1	10217	9302	0.207	0.176	12.4	11.8	390.4	232.8	258.3	214.6
19	R-1072-360-1-1	8-Oct	1356.9	27-Sep	1274.8	101.0	93.3	11390	9302	0.322	0.245	15.3	9.5	600.5	530.8	437.5	312.5
20	R-1218-509-2-452-1	9-Oct	1374.3	28-Sep	1293.2	119.4	109.6	11523	10156	0.379	0.371	13.6	14.7	544.5	770.6	520.8	479.2
21	IR-64	5-Oct	1304.8	26-Sep	1256	114.2	102.1	10849	9725	0.335	0.323	17.0	15.5	608.0	655.2	437.5	406.3
22	R-548-89-6	9-Oct	1374.3	29-Sep	1311.6	120.9	110.3	11523	10235	0.340	0.302	8.5	15.3	471.2	957.0	466.7	395.8
23	R-703-1-52-1-1	6-Oct	1322.5	26-Sep	1256	119.1	107.3	11036	9725	0.347	0.274	13.6	14.5	720.2	806.6	458.3	343.8
24	R-1124-91-2-73-1	3-Oct	1269.3	23-Sep	1200.6	123.0	110.7	10433	9084	0.509	0.321	11.4	11.9	617.6	615.2	645.8	385.4
25	R-1250-1557-895-1	7-Oct	1339.4	28-Sep	1293.2	120.1	113.4	11232	10156	0.342	0.290	13.6	11.5	664.6	629.6	458.3	375.0
26	Madhuri	7-Oct	1339.4	24-Sep	1218.8	93.9	102.5	11232	9302	0.218	0.137	11.8	12.4	476.0	674.8	291.7	166.7
27	R-1033-2559-1-1	4-Oct	1286.9	1-Oct	1348.2	98.0	98.6	10644	10482	0.275	0.301	15.5	17.8	536.7	717.0	354.2	406.3
28	Karma Masuri	5-Oct	1304.8	29-Sep	1311.6	105.0	101.1	10849	10235	0.247	0.397	17.1	14.4	548.3	675.6	322.9	520.8
29	Indira Sugandhit	5-Oct	1304.8	30-Sep	1329.3	108.0	118.4	10849	10325	0.096	0.204	19.4	15.5	562.7	1017.8	125.0	270.8
30	R-1055-1629-4-1	8-Oct	1356.9	5-Oct	1420.1	110.9	123.5	11390	11288	0.368	0.286	10.5	9.5	454.6	540.4	500.0	406.3
31	Mahamaya	9-Oct	1374.9	4-Oct	1402.3	111.8	119.6	11523	11072	0.333	0.319	14.7	10.7	602.7	575.8	458.3	447.9
32	Kranti	6-Oct	1322.5	4-Oct	1402.3	113.1	115.7	11036	11072	0.284	0.245	11.5	14.4	455.5	800.0	375.0	343.8

Conclusion

The four genotypes viz. Poornima, Danteshwari, R-1033-968-2-1 and R-1248-1489-2-822-1 showed significantly superior performance over all the four attributes i.e. yield, tillering, plant height and plant bio-mass. The grain yield was highest in respect of genotypes R-1124-91-2-73-1 under SRI method of rice cultivation, while highest grain yield in traditional method of cultivation was obtained with genotype R-979-67-2-44-1 it is because of the thermal use efficiency also varied in respect of different genotypes under the methods of cultivation. The highest radiation use efficiency was observed in respect of genotype R-1248-1489-2-822-1 and R-1033-968-2-1 under SRI method of rice cultivation which showed that higher radiation use efficiency (RUE) is also one of the most important traits for evaluating genotype under low radiation condition during monsoon season.

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