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Varietal performance of rice [*Oryza sativa* (L.)] cultivars grown under coastal saline soil of Orissa

N. PANDA*, A. DHAL AND S.P. SANGRAMSINGH
Instructional Farm Unit, Krishi Vigyan Kendra (OUAT), Tirtol, JAGATSINGHPUR (ORISSA) INDIA

ABSTRACT

A field experiment was conducted during the *kharif* season of 2006-07 and 2007-08 at Instructional farm unit of KVK, Jagatsinghpur, to work out the yield performance of nine rice cultivars *viz.*, Khandagiri, Naveen, Pooja, Gayatri, Swarna, Barshadhan, Pratikshya, Sarala and Chakaakhi. Studies revealed that the yield performance was highest in Gayatri (47.73 q/ha) followed by Pratikshya (46.03 q/ha) and Swarna (45.70 q/ha). There was not much difference in the yield of Pooja (45.63 q/ha) and Sarala (45.65 q/ha). The short duration variety Khandagiri (41.75 q/ha) and Naveen (42.00 q/ha) were at par.

Key words : Rice cultivars, Yield, Coastal saline soil.

INTRODUCTION

Rice [*Oryza sativa* (L.)] is the staple food for more then 70 % of Indian population. The additional yield over presently growing high yielding varieties has proved to be one of the practically feasible options to enhance production and productivity of rice in the country. High yielding variety of rice with the yield potential of 5.0 –6.0 t ha^{-1} have played a major role in meeting the growing food demand (Dwivedi *et al.*, 2006). As rice is the major cereal crop in the coastal belt of Orissa, there is a need to further enhance the productivity so as to feed the growing population. The present work is to select the best high yielding rice cultivar with reference to the saline belt of Jagatsinghpur district, Orissa, which can provide good marginal profit to the farming community of the state.

MATERIALS AND METHODS

A field experiment was conducted in the East and South East Coastal plain zone of Orissa at the Instructional farm unit, KVK, Jagatsinghpur during the *kharif* 2006-07 and 2007-08. The experiment was laid out in Randomized Block Design (RBD) with three replications with recommended fertilizer doses of 60 kg N, 30 kg P_2O_5 and 30 kg K_2O ha^{-1} of the soil. The soil under the experiment was saline in nature (EC_w=1.8 dSm^{-1}), clay loam in texture having soil pH 7.8, O.C (%) 0.47, available soil N content 214.0 kg/ha, available soil P is 20.7 kg/ha and available soil K is 192 kg/ha. The sources of the fertilizers used were urea, DAP and MOP, respectively. Nitrogen and potassium were applied in splits where as phosphorus was applied as basal dose. Rice cultivars were transplanted at a spacing of 25 x 25 cm and 2-3 seedlings per hill. All the standard methods were taken for the analysis soil and the plants (Jackson, 1973). The chlorophyll content was measured by SPAD 502 (a hand chlorophyll meter). The protein content of the grain was calculated by analysis the N content and its multiplication by a factor of 5.95. The data were statistically analyzed as per the Panse and Sukhatme (1985).

RESULTS AND DISCUSSION

Nine rice cultivars grown under coastal saline soil of Jagatsinghpur, Orissa exhibited a significant difference in grain yield (Table 1). The highest grain yield was observed in variety Gayatri (47.73 q/ha) followed by Pratikshya (46.03 q/ha) and Swarna (45.70 q/ha). These varieties are medium duration paddy cultivars. The grain yield of Swarna was at par with Pratikshya, but a good crop stand with better yield attributing characters was found in Pratikshya when compared with Swarna, the variety of same duration. The disease and pest occurrence as observed in the standing crop was the least in Pratikshya than any other variety in the test (Sangramsingh *et al*., 2007). The yield performance of Khandagiri 41.75 q/ha with good yield parameters. It performed well under semi upland condition, as it is a short duration variety. The yield performance of Barshadhan is 40.63 q/ha revealed optimum performance and acclimatized to deep-water condition particularly to few patches of the Jagatsinghpur district. The performance of Naveen was found well with a grain yield of 42.0 q/ha. The yield performance was at par with Khandagiri. The variety Chakaakhi was having a yield of 44.63 q/ha and that of Sarala the grain yield was 45.65 q/ha, which was at par with Pooja, Swarna and Pratikshya. Similar results were also observed by Dhal *et al*. (2007), Dey *et al*. (2006) and Dwivedi *et al*. (2006). The soil parameters *viz.* available N, P, K and soil pH and O.C. (%) studied after the harvest of the crop had no significant

* Author for correspondence

Table 1: Growth and yield attributes of different rice cultivars grown under coastal saline soil of Orissa (Pooled over two years data)

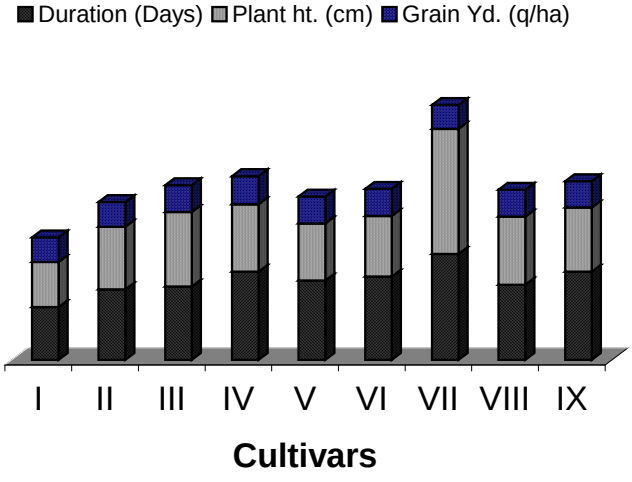
Sr. No.	Cultivars	Plant height (cm)	Tillers/hill	Hills/m^2	Panicle length (cm)	Effective grains/ Panicle	Test weight (g)	Grain yield (q/ha)	Chlorophyll content at 60 DAT (SPAD)	Protein content (%)
I	Khandagiri	76.5	16	29	21.5	56	17.2	41.75	32.7	7.10
II	Naveen	106.5	15	42	24.2	69	17.5	42.00	31.5	7.08
III	Pooja	126.5	14	45	25.3	91	18.6	45.63	32.8	7.11
IV	Gayatri	114.6	16	41	20.6	84	20.2	47.73	33.1	7.12
V	Swarna	96.9	16	36	23.5	86	19.1	45.70	32.8	7.14
VI	Pratikshya	102.9	19	37	24.3	88	19.3	46.03	33.3	7.16
VII	Barshadhan	212.9	13	29	27.6	121	22.6	40.63	33.5	7.08
VIII	Sarala	115.7	14	43	24.9	88	18.2	45.65	32.9	7.10
IX	Chakaakhi	109.3	19	42	21.1	82	20.5	44.63	32.7	7.12
C.D. (P = 0.05)		11.81	NS	2.0	0.28	3.0	NS	0.47	NS	NS

NS-Non significant

Table 2: Fertilizer status of the soil after harvest of the crop (Pooled over two years data)

Sr. No.	Soil pH	O.C. (%)	Available nutrients (kg/ha)		
			N (kg/ha)	Avail. P (kg/ha)	Avail K (kg/ha)
I	7.8	0.49	218.0	22.0	192
II	7.8	0.44	215.0	21.0	190
III	7.9	0.45	209.0	23.1	185
IV	7.9	0.46	209.0	24.8	189
V	7.9	0.45	210.0	22.9	192
VI	7.8	0.47	211.0	21.8	190
VII	7.9	0.47	208.0	22.7	182
VIII	7.7	0.46	208.0	22.9	191
IX	7.8	0.47	206.0	23.8	189
C.D. (p = 0.05)	NS	NS	NS	2.07	NS
Initial soil status	7.8	0.47	214.0	20.7	192

(I= Khandagiri, II= Naveen, III= Pooja, IV= Gayatri, V= Swarna, VI= Pratikshya, VII= Barshadhan, VIII= Sarala, IX= Chakaakhi)
NS-Non significant



(I= Khandagiri, II= Naveen, III= Pooja, IV= Gayatri, V= Swarna, VI= Pratikshya, VII= Barshadhan, VIII= Sarala, IX= Chakaakhi)

Fig. 1: Different rice cultivars in relation to their duration (days), plant height (cm) and grain yield (q/ha).

difference over the study (Table 2). The chlorophyll content (SPAD) and protein content (%) as depicted in Table 1 had slight difference but it was not significant over the cultivars. The duration of the crop growth period, plant height (cm) and the grain yield (q/ha) was depicted in Fig 1. It was concluded from the figure that the variety having medium in plant height and duration have good yield potential.

Conclusion:

From the results it was concluded that the performance of Pooja, Gayatri, Pratikshya and Sarala was optimum. These rice varieties can boost the economic condition of the farmers of the district by having an optimum production. However, the variety Naveen is suitable for the soil having more content as it provided a good outcome. In the district nearly 40,000 ha of lands are waterlogged (district agricultural statistics,

Jagatsinghpur, Government of Orissa, 2006). Hence, the variety Barshadhan is suitable for these patches with no lodging characters. For semi upland condition short duration paddy variety Khandagiri was found the best and hence recommended.

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