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Performance of scented and non-scented rice (*Oryza sativa*) genotypes under direct seeding and transplanted conditions

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ABSTRACT

A field experiment comprising 12 rice (*Oryza sativa*) genotypes (8 non-scented, viz. PR 111, PR 110, HKR 120, HKR 126, HKR 86-217, HKR 86-3, HKR 46 and IR 64 and 4 scented, viz. P 615, HKR 228, Taraori, Basmati and Basmati 370) was conducted at Kaul under two separate sets of methods of planting (direct sowing under puddled condition and transplanting) during *kharif* 1994 and 1995. Studies revealed that under direct sown condition, genotype HKR 126 produced highest grain yield of 42.5 and 46.2 q/ha in 1994 and 1995, respectively. Root dry weight in 15-30 cm layer was found higher in genotypes HKR 126, HKR 120, HKR 46 and PR 111 in non-scented group and Basmati 370 and Taraori Basmati in scented group. Under transplanting condition, genotype HKR 46 produced higher grain yield but at par with HKR 126, HKR 86-3 and PR 111. Yield attributes followed the similar trend as in grain yield.

Key words: Rice, Genotypes, Direct seeding, Transplanting, Scented

Rice (*Oryza sativa* L.) is grown in different agro-ecological environment highly specific to each location. It is inevitable to formulate research strategies in selection of varieties suitable for different sets of conditions. Choice of an appropriate variety for transplanting as well as direct seeding under puddled conditions may help in improving the productivity of rice. Hence an experiment was conducted to evaluate scented and non-scented rice varieties for these conditions.

MATERIALS AND METHODS

Two sets of an experiment were laid down during the rainy seasons of 1994 and 1995 at CCS Haryana Agricultural University Rice Research Station, Kaul. In one set, sprouted seed of 12 varieties, 8 non-scented and 4 scented, were sown in second week of June by direct seeding under puddled conditions. Non-scented varieties were : PR 111, PR 110, HKR 120, HKR 126, HKR 86-217, HKR 86-3, HKR 46 and IR 64, Among scented group, Basmati 370 and Taraori Basmati were tall growing, whereas Pusa 615 and HKR 228 were dwarf varieties. In another set, the nursery of same varieties was sown simultaneously and 30 days old seedling were transplanted in the same field after giving the similar puddling requirement as in first set. The experiment was

planted in randomised block design with 3 replications in each set.

Transplanting of rice seedlings was done at a spacing of 20 × 15 cm with 2 seedlings/hill. To control weeds, butachlor 1.5 kg a.i./ha was applied at 6 days after sowing in direct seeded crop and 3 days after planting in transplanted crop. One hand weeding was also done after 30 days of herbicide application for providing weed free environment to the crop. The crop was fertilized with 120 kg N, 60 kg $P_2 0_5$ and 25 kg $ZnSO_4$/ha. Whole of P and Zn were applied as basal. N was applied in 3 equal splits. In direct seeded experiment, N was given at sowing, 30 and 50 days after sowing, whereas at 0, 21 and 42 days after transplanting in the second set.

The soil of the experimental field was clay-loam in texture with pH 8.1, OC 0.41, and 128, 18.6 and 460 kg available N, P and K, respectively. Soil samples were taken to record root growth of different varieties at the time of flowering only during 1994.

RESULTS AND DISCUSSION

Root studies

There was wide range of variation in root dry weight. It varied from 0.82 to 2.99 and 0.023 to 1.870 g/1000 cc in 0-15 cm and 15-30 cm soil depths, respectively, under direct seeded puddled condition (Table 1). But under transplanted condition, the variation ranged from 2.43 to 5.73 and 0.005 to 1.059 g/1000 cc with the respective depths (Table 2). The trend in root dry weight in 0-15 cm soil depth indicates that genotypes HKR 120, HKR 86-217, HKR 120, HKR 126, PR 111, HKR 228 and Basmati 370 under transplanted condition exhibited superiority over other genotypes. However, in sub-soil layer (15-30 cm), non-scented cultivars HKR 126, HKR 120, HKR 86-3, HKR 46 and PR 111 under direct seeding and HKR 46, HKR 86-217 and HKR 126 under transplanted condition recorded higher dry weight over other varieties. Among scented genotypes, Basmati 370 and Taraori Basmati were superior over P 615 and HKR 228 in subsoil layer under both the methods of planting. This indicates higher efficiency of these varieties to draw more water and nutrients from deeper layers of soil.

Effect of yield attributes

Under direct seeding, panicle weight and grains/panicle were the highest in cultivar HKR 126 but at per with HKR 46, HKR 120 and PP 111. Cultivar HKR 86-3 recorded the highest 1000-grain weight in 1994 and HKR 126 and IR 64 were significantly at par with HKR 86-3 in 1995. In scented group, dwarf varieties (P 615 and HKR 228) produced heavier panicles and more number of grains/panicle than Basmati 370 and Taraori Basmati. Under transplanted condition, panicle weight in all the non-scented cultivars was significantly at par except in PR 110 and IR 64 in 1994, whereas in 1995, all the yield attributes were highest in HKR 46 but comparable with HKR 126, KR 86-3 and PR 111. In secented group, panicle weight and grains/panicle in varieties P 615, HKR 228 and Basmati 370 were significantly superior to Taraori Basmati.

Effect on grain yield

Under direct sown condition, genotype HKR 126 produced highest grain yield of 42.5 and 46.2 q/ha during 1994 and 1995, respectively, which was at par with HKR 86-3 during both the years (Table 1). Genotypes PR 111, HKR 46, HKR 86-3, HKR 120 and HKR 86-217 were significantly indifferent with each other. Under transplanted condition, genotype HKR 46 produced highest grain yield which did not differ significantly with HKR 126, HKR 86-3 and

Table 1. Yield and yield attributes as affected by different genotypes under direct sown puddled condition

Genotype	Grain yield (q/ha)		Panicle weight (g)		Grains/ panicle		1000-grain wt (g)		Root dry wt* (g/1000 cm^3)	
	1994	1995	1994	1995	1994	1995	1994	1995	0-15 cm	15-30 cm
PR 111	38.8	40.2	2.36	3.02	110	114	21.9	24.0	2.12	0.046
PR 110	33.3	35.8	2.10	2.69	103	103	21.8	23.7	1.97	0.038
HKR 120	37.0	39.3	2.63	2.99	113	111	23.9	26.5	3.55	0.083
HKR 126	42.5	46.2	2.65	3.31	118	120	26.6	26.9	2.99	0.068
HKR 86-217	38.3	38.8	2.31	2.88	90	109	21.8	24.7	1.71	0.032
HKR 86-3	37.0	42.8	2.44	3.20	91	118	28.7	26.7	1.56	0.054
HKR 46	38.0	40.8	2.52	3.08	115	115	25.6	25.6	1.04	0.048
IR 64	29.7	35.0	1.42	2.60	65	102	25.3	26.9	0.82	0.023
P 615	29.5	30.0	2.05	2.40	99	107	22.0	21.8	1.65	0.027
HKR 228	21.5	28.0	1.75	2.32	91	105	20.6	21.3	1.76	0.061
Taraori Basmati	24.1	23.0	1.21	2.10	55	90	21.8	22.5	1.33	0.083
Basmati 370	25.7	27.0	1.60	2.19	80	96	21.2	21.5	2.29	1.870
CD (P = 0.05)	8.8	4.7	0.35	0.35	11	12	1.3	1.8		

* For 1994 only

Table 2. Yield and yield attributes as affected by different genotypes under transplanted condition

Genotype	Grain yield (q/ha)		Panicle weight (g)		Grains/ panicle		1000-grain wt (g)		Root dry wt* (g/1000 cm^3)	
	1994	1995	1994	1995	1994	1995	1994	1995	0-15 cm	15-30 cm
PR 111	60.5	56.2	3.68	3.45	151	129	21.8	23.9	4.54	0.034
PR 110	49.5	46.3	2.97	2.96	166	115	21.7	24.1	3.69	0.034
HKR 120	55.5	50.0	3.72	3.31	165	123	25.0	25.9	3.08	0.019
HKR 126	61.2	58.3	3.76	3.85	160	135	25.7	26.7	4.72	0.045
HKR 86-217	51.7	47.7	3.76	3.08	170	117	25.1	23.4	5.73	0.047
HKR 86-3	55.5	56.0	3.60	3.42	139	128	27.0	25.4	2.48	0.025
HKR 46	63.3	60.0	3.62	3.90	164	146	25.3	25.1	2.92	0.059
IR 64	53.3	49.3	2.16	3.17	100	118	25.2	26.2	3.60	0.005
P 615	44.5	40.3	2.43	2.41	122	112	19.9	21.3	2.43	0.018
HKR 228	41.2	38.0	2.20	2.38	124	107	22.1	20.9	4.83	0.027
Taraori Basmati	31.5	30.0	1.70	2.15	84	95	22.6	22.7	3.61	0.048
Basmati 370	30.0	31.3	2.68	2.29	116	99	21.6	21.7	4.25	0.057
CD (P = 0.05)	10.1	4.0	0.56	0.43	26	11	2.4	1.7		

* For 1994 only

PR 111 (Table 2). The increase in grain yield of cultivars might be the result of expansion of roots in terms of dry weight in sub-soil layer and the cumulative effect of increase in yield attributes. The differential response of genotypes in grain yield does not seem to be influenced distinctly by the growth of roots in plough-layer (Tables 1 and 2). Among scented genotypes, P 615 produced the highest grain yield irrespective of method of planting followed by HKR 228 except in 1994 under direct seeding condition. This might be ascribed to the higher yield potential of dwarf-scented genotypes over tall-scented varieties (AICRIP 1995).

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