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Performance of Six Rice Cultivars Under Direct Wet Seeded Conditions of Dera Ismail Khan

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bstract

n experiment was conducted to evaluate the performance of 6 rice cultivars. The variety KS-282 produced the highest umber of tillers per plants as compared to IR-6, Swat-I, JP-5, Swat-II, and DR-83, KS-282 was also the tallest among the ltivars, while the remaining cultivars were almost of the same height. Number of panicles/plant and spikelets/panicle were so the highest in KS-282. 1000-grain weight was also the highest in KS-282. Moreover, cultivar KS-282 outyielded all e cultivars in straw and paddy yield (12.15 and 6.31 t ha ^{1}, respectively). The highest partitioning of the assimilates wards the economic yield (37.43 %) was also recorded in the cultivar KS-282, while other cultivars possessed almost e same harvest index. The maximum normal kernels (%) were also observed in the cultivar KS-282 with a minimum erility percentage, as compared to other cultivars, included in the trial.

troduction

ce (*Oryza sativa* L.), the principal food crop in the world, longs to the family Poaceae (Gramineae). It is grown ost extensively in the tropical and sub-tropical regions of e world.

ce is the mainstay of the economy of Pakistan, as far as e earning of foreign exchange is concerned. Rice exports r 1997-98 amounted to Rs. 70 billions (The Daily Mashirq ted 12.3.1999). In the year 1994-95, the total area der rice cultivation was 5430 thousand ha and total oduction was 14318 thousand tons in Pakistan gricultural Statistics, 1994-95). In D. I. Khan rice was wn on an area of 8985 ha during 1998 (Personal mmunication).

iah *et al.* (1990) reported that the rice cv. Nigersail and utant lines Mut NS.1 and Mut NS-5. Plant height and mber of grains/panicle were greater in Mut NS-1 than in gersail. Kurmi and Das (1993) conducted a field periment on 5 rice cultivars directly sown on 12, 20 or Sep. produced average grain yields of 2.14, 1.75 and 07 t ha^{-1}, respectively. CV IET 11432 (2.39, 1.84 and 72 t) and Heera (2.77, 2.59 and 1.92 t) produced asonably stable yields across the sowing dates.

Datta *et al.* (1989) reported the recent advances in eed control technology for tropical low land rice with a ecial reference to method used in broadcast, flooded rice. e widespread used of modern semi-dwarf rice varieties hich respond to high fertilizer levels has led to an creasing burden of weeds as a result.

cently, Shah, *et al.* (1999) obtained the highest yield (8.3 a^{1}) in KS-282 as compared to DR-83 and Lateefy in the udies under the transplanted conditions of D.I.Khan.

ith the commissioning of Chashma Right Bank Canal in D. Khan, more and more acreage is coming under the high lta and labour intensive crops like rice and sugarcane, hereas, the command areas is very sparsely populated with a consequently scarcity of labour. Therefore, the conventional transplant method has emerged as not only uneconomical, but also un-feasible this study was carried out to investigated the performance of 6 rice cultivars vis KS-282 IR-6, Swat-I, JP-5, Swat-II and DR.83 under direct seedling conditions.

Materials and Methods

The experiment was carried out at the experimental area of the Gomal University, Dera Ismail Khan. The experiment was laid out i a randomized complete block design having four replications with a plot size of 4 x 3 m^{2}. A seed rate of 100 kg ha^{-1} was used in a direct seedling system as recommended by Sheikh *et al.* (1971). Soaked seed was broadcasted in a well prepared seed bed during early May. The recommended dose of 120 kg N, 90 P2O5 and 60K2O ha^{-1} as Urea, Single Super Phosphate and Potassium Sulphate, respectively were applied. All P2O5 and K2O was applied before planting, while half of N was applied at planting time and another half was applied at the late tillering stage. Flood irrigation was maintained into the field throughout the growing period.

Maturity data of each variety was assessed at the number of days from seeding to maturity of panicles with some of the lower spikelets in the panicle still green. Plant height (cm) was measured at maturity from the base of the culm to the tip of the main panicle. Thousand grain weight (g) was determined by counting the randomly selected kernels. to observe the occurrence of sterility/abortivess (flowers which were fertilized but stopped development at an early stage) and opaqueness (kernels which attained full size but did not become translucent due to lack of proper carbohydrate development) in panicle, a common electric lamp and seed working board were used. Ten panicles were randomly selected in each treatment and the sterility was

Table 1: Performance of 6 cultivars of rice for some agronomic traits under broadcast wet seeded conditions of D. I. Khan

Cultivars	Tillers/ plant (No.)	Height (cm)	Panicles/ plant (No.)	Spikelets/ panicle (No.)	1000-grain wt. (g)	Paddy yield (t ha^{-1})	Straw yield (t ha^{-1})	Harvest index	Normal kernel (%)	Sterility (%)
KS-282	19.75a	110.00a	20.75a	11.00a	26.70a	6.13a	12.15a	37.43a	88.00a	12.00a
IR-IR-6	16.75b	85.75b	17.75b	9.75ab	26.58a	4.47b	11.10ab	26.87b	84.22ab	15.77b
Swat-I	15.25bc	82.25b	15.00c	9.50ab	25.17ab	3.85bc	10.71ab	26.44b	81.21bc	18.78b
JP-JP-5	14.25bcd	81.75b	12.50cd	9.25b	24.67bc	3.20cd	9.75abc	25.14b	79.01bc	20.98bc
Swat-II	13.50cd	81.00b	11.752d	9.00b	23.98bc	2.76de	8.55bc	24.47b	77.21c	22.78bc
DR-83	12.50d	79.75b	11.25d	8.25b	23.37c	2.30e	7.47c	23.46b	75.78c	24.22c
$C.D_{0.05}$	2.502	5.88	2.668	1.547	1.481	0.772	2.596	8.150	5.085	5.082

[3]Means sharing a letter in the respective column, do not differ significantly by Least Significant Difference test at P<0.05

observed on the seed working board. The percent sterility was computed with the following formula.

$$\% \text{ Sterility} = \frac{\text{No. of sterile kernels}}{\text{Total No. of kernels}} \times 100$$

The individual data for each trait were subjected to the analysis of variance technique, as outlined by Steel and Torrie (1980) and the means were separated by Least Significant difference Test.

Results and Discussion

Tillers per plant (No.): The highest number of tillers were produced by the cultivar KS-282 (19.75). It was closely followed by IR-6 (16.75). The cultivar IR-6 was in turn at par statistically with Swat-I (15.25) and JP-5 (14.25). The cultivars Swat-I also produced statistically equal yield with JP-5 and Swat-II (13.50). The cultivar JP-5 in turn produced statistically equal yield with Swat-II and the worst performing cultivar DR-83 (12.50) [Tale 1]. These results are in close conformity with those reported by Shah *et al.* (1999).

Plant height (cm): The data revealed that plant height at maturity was significantly influence due to varietal difference. The cultivar KS-282 was the tallest (110 cm). The remaining cultivars possessed statistically the same height. The highest numerical value in the remaining cultivars (85.75 cm) was possessed by IR-6, while the lowest plant height (79.75 cm) was possessed by the cultivars DR-83 (Table 1). Ilhamuddin *et al.* (1988) and Shah *et al.*, also reported a varying height among the cultivars studied.

Panicles per plant (No.): The analysis of data revealed that the number of panicles per plant were influenced due to genotypic variation. The data of mean comparisons as presented in Table-1, indicate that the more number of panicles per plant were obtained in the cultivar KS-282 (20.75). It was closely followed by IR-6 (17.75). IR-6 was in turn closely followed by Swat-I (15.00) and JP-5 (12.5). The study of Table-1 further reveals that the cultivars Swat-I was at par statistically with JP-5. Moreover, the cultiv JP-5 produced statistically equal panicles per plant wit cultivars Swat-II (11.75) and DR-83 (11.25).

Spikelets per panicle (No.): The analysis of data exhibite that the spikelets per panicle were affected due to varie differences. The data presented in Table-1 show that th maximum number of spikelets per panicle were recorded the cultivar KS-282 (11.00). It was in turn at p statistically with IR-6 (9.75) and Swat-I (9.50), howeve the cultivar IR-6 and Swat-I were also statistically equ with rest of the cultivars viz: Swat-I (9.5), JP-5 (9.25 Swat-II (9.00) and DR-83 (8.25) in the production spikelets per panicle.

1000-grain weight (g): The ANOVA manifested that 100 grain weight was influenced due to varietal differences. T data presented in Table 1 show that the maximum 100 grain weight was obtained in cultivar KS-282 (26.70) a IR-6 (26.58g). Both the cultivars were equally bolder. T study further reveals that these cultivars were in turn at p statistically with Swat-I (25.17g). The cultivar Swat-I a gave statistically equal sized grains with JP-5 (24.67g) Swat-II (23.98g). The cultivar JP-5 in turn produced gr of similar size with Swat-II (23.98g) and the lowest 10 grain weight was recorded in DR-83 (23.37g) and Olowest 1000-grain weight was recorded in DR-83 (23.3 [Table-1]. Analogous results were reported by Majid et (1983) and Khan *et al.* (1985), while working on rice.

Paddy yield (t ha^{-1}): The NOVA revealed difference paddy yield among the cultivars. The data presente Table-1 reveal that the cultivar KS-282 (16.13 t ha^{-1}) yielded rest of the cultivars included in the studies. it closely followed by IR-6 (4.47 T Ha^{-1}). The perusal of data further indicates that the cultivar ir-6 was in tu par statistically with Swat-I gave statistically equal with Swat-II (2.76 t ha^{-1}). The lowest paddy yield o plant basis was harvested in DR-83 (2.30 t ha^{-1}). T findings are in a great analogy with the work of Shah, (1999), who obtained higher yield in KS-282 as com to DR-83.

Straw yield (t ha^{-1}): The analysis of data reveal th

straw yield was influenced due to varietal differences. The data presented in Table-1 reveal that the highest numerical straw yield was produced by the cultivar KS-282 (12.15). It was closely followed by IR-6 (11.10), Swat-I (10.71) and JP-5 (9.57). The cultivars IR-6, Swat-I and JP-5 also gave statistically equal yield with Swat-II (8.55). The cultivar JP-5 was in turn produced statistically equal yield with Swat-II and the worst performing cultivar DR-83 (4.47).

Harvest Index: The analysis of data reveal that Harvest index was influenced due to varietal differences. The highest partitioning of the assimilates towards the economic yield (37.43 %) was recorded i the cultivar KS-282 (Table 1_. All other cultivars included in the trial possessed the same harvest index, statistically. The superiority of the cultivar KS-282 in transforming the phostoassimilate to the paddy yield is an encouraging aspect for its exploitation in general cultivation and Rice Breeding Programmes for synthesizing superior genotypes.

Normal Kernel (%): The analysis of data reveals that the percentage of normal kernels was influenced due to varietal differences. The data presented in Table 1 reveals that the maximum normal kernels were observed in the cultivar KS-282 (88.00). It was closely followed by IR-6 (84.22 %). The cultivar IR-6 was in turn at par statistically with Swat-I (81.21 %) and JP-5 (79.00%). The cultivar Swat-I was at par statistically with JP-5 in fertility. The cultivar JP-5 in turn was statistically similar with the lowest producing cultivars Swat-II (77.21 %) and DR-83 (75.78 %) [Table-1].

Occurrence of Sterility (%): The ANOVA showed differential sterility among the cultivars. The minimum sterility percentage was found in cultivar KS-282 (12.00 %) [Table-1]. It was closely followed by IR-6 (15.77%). IR-6 was in turn at par statistically with Swat-I (18.78 %) and JP-5 (20.98 %). The cultivar Swat-I was also at par statistically with JP-5 in sterility. The cultivar JP-5 in turn was statistically similar with the lowest producing cultivars Swat-II (22.78 %) and DR-83 (24.22 %).

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