SCREENING OF RICE VARIETIES SUITABLE FOR DIRECT SEEDING IN PUNJAB

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ABSTRACT

Studies regarding suitable rice varieties for direct seeding were conducted in RCBD with three replications at Rice Research Institute, Kala Shah Kaku, Sheikhupura, Pakistan during 2003 and 2004. The experiment comprised 15 medium and fine grain rice varieties viz: KS-282, IR-6, NIAB-1R9, Super Basmati, Basmati-2000, Basmati-385, Basmati-198, 98801, 98316, 98410, 98506, 97502, PK-5261-1-2-1, 99417 and 99512. The varieties were sown on 23-06-2003 during 2003 and 11-06-2004 during 2004. The results revealed that short stature and low tillering, medium and fine grain varieties viz ; KS-282, NIAB- IR9, IR-6, Basmati-2000, Super Basmati, 99512 and PK-5261-1-2-1 produced significantly higher yield than all the other varieties/lines under test.

Key words: Rice (Oryza sativa); Varieties / genotypes; direct seeding; yield

INTRODUCTION

Rice is the third biggest crop grown in Pakistan after wheat and cotton, which is not only second staple food but also provides livelihood for millions of people in Pakistan. It earns more than 550 million US $ annually. The share of Pakistan in world rice trade is around 11 percent. The per acre paddy yield in Pakistan is far below than other major rice growing countries. There are many yield-limiting factors but lesser plant population per acre, weed infestation, unbalanced use of fertilizers and scarcity of labour for transplanting and harvesting are the major constraints. High cost of farm labour invariably delay transplanting and often lead to use of aged seedlings (Santhi *et al*. 1998) which cause low yield (OM *et al*. 1993). Direct seeding is a successful method of cultivation in some countries (Adair *et al*. 1992) which save labour and is more economical than transplanting and also provides good stand establishment (Sharma.1995). Sometimes the labour may not be available at the right time of transplanting. To minimize the shortage of labour, some planting technologies/methods have been tested at different research institutes which developed technologies like direct seeding, parachute technology and mechanical transplanting etc. The direct seeding technology of rice was found almost at par in yield with the conventional planted crop (Awan *et al*., 2006). The past results of many years experimentation on direct seeding techniques revealed that this technology has great potential for adoption as substitute for transplanting if the weeds arc controlled properly with the availability of high yield potential varieties. Current high yielding rice varieties are only for transplanted rice and little is known about the yield potential and plant type requirements for direct seeding. Promising research findings and the development of cost-efficient and ecologically sound production technologies and rice varieties with higher yield potential will help to make direct seeding an important production system in the rice tract in the Punjab. The present study was made to identify suitable rice varieties for direct seeding.

MATERIALS AND METHODS

Studies were carried out during the kharif seasons of two successive years 2003 and 2004 at experimental area of Rice Research Institute, Kala Shah Kaku, district Sheikhupura. Ten fine grain rice varieties viz; 98801, 98316, 97502, 98410, Basmati-385, 98506, PK-5261-1-2-1, Super Basmati, Basmati-2000 and 99417 were tested during 2003 and nine medium plus fine grain varieties viz; KS-282, IR-6, NIAB-1R9, Super Basmati, Basmati-2000, Basmati-385, Basmati-198, 99417 and 99512 were tested during 2004 in the experiment. Randomized Complete Block Design (RC'BD) was used with three replications having a plot size of 2m × 5m. Sowing of 24 hours soaked seed was done on 23 rd of June during 2003 and 11th June during 2004. All the other agronomic practices were kept optimum in the experiment. Nitrogen was applied in three equal splits, one third as basal, one third at 30 days after seeding (DAS) and remaining one third at 55 DAS. For weed control spray of weedicides i.e. Sunstarl5 WP @ 200 gms / ha and Puma Super @ one kg / ha were done after 25 DAS. Data on plant height, tillers/m^2 , No. of filled grains per panicle, grain yield and 1000-grain weight was recorded and was statistically analyzed using Fisher's Analysis of Variance technique and treatment means were compared by LSD at 0.05 probability (Steel *et al*. 1997).

RESULTS AND DISCUSSION

The results obtained from the studies are presented in Table land Table 2.

Table 1: **Paddy yield (t/ha) of different varieties / strains in 2003 and 2004**

Varieties	2003	2004	Average
98801	3.22 bc	-	3.22
98316	3.35 b	-	3.35
98410	2.49 e	-	2.49
98506	2.79 d	-	2.79
97502	3. 10 bc	-	3.10
PK 5261-1-2-1	3.43 a	-	3.43
Basmati-385	2.73 de	3.49 d	2.95
Super Basmati	2.89 d	3.80 cd	3.35
Basmati-2000	3.57 a	3.88 cd	3.37
99417	3.17 bc	3.l6f	3.17
KS-282	-	5. 14 a	5.14
1R-6	-	4.26 be	4.26
N1AB-IR9	-	4.37 b	4.37
Basmati 198	-	3.08 de	3.08
99512	-	3.76 ef	3.76

*Similar letters in a column shows non-significant paddy yield.

All the genotypes had statistically significant variation for paddy yield during both the years. Variety Basmati-2000 gave significantly higher paddy yield of 3.57 t/ha in 2003 (Table-1) than all the other varieties / lines except new promising line 5261-1-2-1 which yielded 3.43 t/ha and was statistically at par with Basmati-2000. During 2004 the highest paddy yield of 5.14 t/ha was obtained from KS-282 followed by NIAB-1R9 and IR-6 which yielded 4.37 and 4.26 t/ha respectively (Table 1). Average paddy yield of all tested varieties / lines varied from 2.49 t/ha to 5.14 t/ha. Number of days from seeding to maturity varied from 127 to 142 (Table 2). Plant height, number of filled grains per panicle, number of tillers per m2 and 1000-grain weight had positive correlation with gram yield. Filled grains per panicle and 1000 grain weight were found important yield contributing trails and confers with Perez *et al*. (1987), Manuel and Palanisamy (1991), Mehetre *et al*. (1994) and Akhtar *et al*. (2002).

The genotypes sown during 2004 (KS-282, NlAB-lR9, IR-6, Basmati-2000, Super Basmati and 97502) were seemed to be well suited for direct seeding cultivation and are classified as semi-dwarf (Table 2). The semi-dwarf varieties resist lodging and are more responsive to fertilizers (Khush, 1984). Therefore, they were found more suitable for direct seeding (Awan *et al*. 1979). The basmati varieties showed good cooking quality for white rice and 97502 had good cooking quality for parboiled rice.

Table 2: Economic traits of different rice varieties / lines (Average of 2003 & 2004)

Variety/ line	Plant height (cm)	Tillers /m^2	Maturity days	Filled grains/ panicle	1000-grain weight (gm)	Yield (t/ ha)
98801	104	172	127	154	19.82	3.22
98316	104	203	135	127	21.05	3.35
98410	103	191	129	84	22.95	2.49
98506	109	228	130	84	21.70	2.79
97502	103	268	128	127	22.12	3.10
PK 5261-1-2-1		215	129	121	21.92	3.43
Basmati-385	113	231	135	124	22.95	2.95
Super Basmati	87	204	142	112	22.10	3.35
Basmati-2000	104	283	144	114	24.68	3.37
99417	146	141	138	112	24.23	3.17
K.S-282	86	208	122	101	25.10	5.14
IR-6	84	247	125	91	24.70	4.26
N1AB-1R9	87	281	126	94	23.80	4.37
Basmati-198	109	327	148	108	22.20	3.08
99512	114	171	135	107	21.80	3.76

Conclusion: The past results of many years experimentation on direct seeding technology has encouraged the researchers to do some extra efforts for increasing production and now yield around 4.5 t/ha is possible by adopting this technology. The technology has great potential for adoption as substitute for transplanting if the weeds are controlled properly. More research is needed to evolve short statured, resistant to lodging, low tillering and high yield potential varieties suitable to this technology.

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