

Optimum Transplanting Date for Rice Production

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Abstract: The results indicated that maximum yield of paddy was obtained from those plots which were transplanted on 20th July except 1997 where 5th August date gave the maximum but non-significant yield. Among the varieties Shaheen performed better than others. Straw yield decreased with the delay in transplanting irrespective of season. Maximum straw was produced when the lines/varieties were transplanted on 20th June followed by 5th July, 20th July and 5th August in all the years. Among the lines/varieties tested Shaheen produced the least straw.

Key words: Date of transplanting, basmati varieties, salt affected soils

Introduction

At present about 6.3 million hectares of land are salt-affected in Pakistan (Khan, 1993). Out of this about sixty percent (3.78 million hectare) of the salt-affected soils are saline sodic in nature (Muhammad, 1983). Rice is moderately tolerant to sodicity and susceptible to salinity. This 3.78 million hectare area of Pakistan affected from salinity/sodicity can be brought under rice cultivation by evolving salt tolerant varieties. In addition to variety, some production factors also affect the yield. Transplanting of rice at appropriate time is a major factor that determines paddy yield per unit area. Rao *et al.* (1996) found that optimum time of transplanting for four Basmati type varieties of rice (*Oryza sativa* viz, Basmati 370, Kasturi, Pusa and Haryana Basmati) was 15-25 July during which these varieties gave the highest yield and delay in transplanting upto 4th August reduced the grain yield by 38%. Paliwal *et al.* (1996) also found that significantly higher grain and straw yield was harvested when rice was transplanted on 25th July compared with 10 & 15 August. Similar results were also noted by Chandra and Manna (1989), Pandey and Agarwal (1991), Lakpale *et al.* (1994) and Mahmood (1995). In contrast to these workers Bali *et al.* (1995) and Singh *et al.* (1996) found early transplanting i.e. end of May and beginning of June gave higher yield than late transplanting i.e. July and August. Keeping all this in view a field experiment was conducted for three consecutive years to determine the optimum transplanting date of newly evolved promising lines of fine rice i.e. PB-95 and Shaheen in comparison to a commercial variety i.e. Super Basmati.

Materials and Methods

A field experiment was conducted to evaluate the optimum date of transplanting for better production of rice in salt affected soils. For this purpose a study was conducted for three consecutive years from 1996 to 1998 at Agric. Res. Farm, Rakh Pindi Bhattian. A moderately saline sodic field was selected having ECe 6 dSm⁻¹, pH₁ 8.8, SAR 44 (m mol l⁻¹)^{1/2}, total N 0.04%, available P 5.6 mg kg⁻¹ and extractable K 100 mg Kg⁻¹ soil. Three fine rice varieties/lines viz, PB-95, Shaheen and Super were transplanted on four different dates i.e. 20th June, 5th July, 20th July and 5th August each year. The age of seedlings at each transplanting date was 35 days. Plot size was 5 × 4 m². Nitrogen, P₂O₅ and K₂O were applied @ 120-90-70 kg ha⁻¹, Zinc sulphate @ of 10 kg ha⁻¹ was also applied along with recommended cultural practices uniformly to all the treatments. Crop was harvested at maturity and paddy and straw yields were recorded. All the data were analysed statistically by using split plot design having dates in main plots and varieties in sub plots (Steel and Torrie, 1980).

Results and Discussion

Paddy yield: Significantly higher paddy yield was obtained when the varieties/lines were transplanted on 20th July in 1996 and 1998 but in 1997 yield of this date was statistically comparable (Table 1). The minimum paddy yield was recorded from 20th June transplanted crop except 1996 when it excelled the 5th August. This indicates that too early or too late transplanting of fine rice varieties/lines may suppress their yields. Many of the workers have also found 15th to 25th July as optimum date for transplantation of Basmati varieties (Mahmood, 1995; Rao *et al.*, 1996; Paliwal *et al.*, 1996). Some workers found that transplanting of rice at end of May gave the maximum yield (Bali *et al.*, 1995; Singh *et al.*, 1996), but these workers had not mentioned the group of rice i.e. either coarse or fine. Among the varieties Shaheen Basmati out yielded the others during all the three years. Although in 1997 it remained non-significant with other varieties/lines, yet it gave the maximum yield.

Table 1: Effect of date of transplanting on paddy yield of newly evolved rice lines (t ha⁻¹)

Varieties	D1 (20 th June)	D2 (5 th July)	D3 (20 th July)	D4 (5 th August)	Average
1996					
PB-95	5.22	5.33	6.11	4.91	5.38b
Shaheen	6.38	5.80	6.60	5.55	6.08a
Super	5.31	5.70	6.91	5.15	5.76a
Average	5.64b	5.61b	6.64a	5.20c	
1997					
PB-95	5.67	5.64	5.64	5.56	5.62 ^{n.s.}
Shaheen	5.81	5.84	6.03	6.71	6.08
Super	4.73	5.44	6.11	6.33	5.62
Average	5.41	5.64	5.92	6.20 ^{n.s.}	
1998					
PB-95	3.44	4.44	5.97	5.31	4.78b
Shaheen	3.96	4.44	6.00	6.07	5.12a
Super	3.66	4.70	5.07	4.51	4.48c
Average	3.68	4.52b	5.68a	5.30a	

Straw yield: Straw yield (Table 2) was decreased significantly with the passage of transplanting time i.e. maximum was recorded at 20th June and minimum at 5th August in all the three years. The reason might be that the growing season was short for vegetative growth and the varieties/lines were forced to enter into reproductive stage due to cut into day length or temperature. These results are in contrast to Singh *et al.* (1996) who recorded maximum straw yield with late transplanting of fine rice i.e. 25th July. However other workers reported results in agreement with the present study (Chandra and Manna, 1989; Pandey and Agarwal, 1991; Lakpale *et al.*, 1994; Mahmood *et al.*, 1995; Rao *et al.*, 1996). Among the

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Table 2: Effect of date of transplanting on straw yield of newly evolved rice lines (t ha⁻¹)

Varieties	D ₁ 20 th June	D ₂ 5 th July	D ₃ 20 th July	D ₄ 5 th August	Average
1996					
PB-95	35.50	30.95	30.17	28.41	32.26a
Shaheen	29.16	29.00	26.35	26.66	27.79c
Super	35.78	27.99	26.78	26.32	29.21b
Average	33.48a	29.30b	27.76c	27.13c	
1997					
PB-95	34.50	30.99	30.17	28.88	31.14a
Shaheen	31.84	29.50	26.58	27.49	28.85b
Super	35.08	29.06	27.67	27.81	29.90ab
Average	33.77a	29.85b	28.14b	28.06b	
1998					
PB-95	43.19	33.64	21.11	16.15	28.51a
Shaheen	38.36	29.17	16.66	14.70	24.72b
Super	40.66	31.95	19.73	16.33	27.16a
Average	40.73a	31.58b	19.16c	15.72d	

varieties/lines, maximum straw yield was recorded from PB-95 and minimum from Shaheen Basmati. This leads to conclude that although Shaheen Basmati is a short duration variety yet it gives the highest paddy and the lowest straw yield compared with super and PB-95 Basmaties.

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