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# Effect of Time of Transplanting on Performance of Different Basmati Rice (*Oryza sativa* L.) Cultivars

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**Abstract**

Field experiment was conducted during *kharif* of 2005. Two transplanting dates (20 July and 5 August) were tested to observe the response of four basmati cultivars for growth and their yield. Twenty-five days old seedlings were transplanted manually in puddled field at a spacing 20 × 15 cm. All basmati cultivars gave significantly higher yield (38.5 q/ha) when transplanted on 20 July, as there was linear decrease in yield when transplanting was delayed up to 5 August (22.9 q/ha) irrespective of cultivars. On the other hand, all basmati rice cultivars differed significantly in their yield attributes and yield as Pusa Basmati-1 gave grain yield followed by Super Basmati, Basmati-370 and Basmati-386. The findings thus showed that timely planting (around 20 July) of short stature basmati rice cultivars gave better yields on loamy soils of Punjab.
**Key words : Seedlings, Basmati rice, Cultivars, Transplanting.**

With the evolution of high yielding input responsive varieties and attractive support price, of scented rice is lot of scope to expand area under basmati rice. In spite of price premium and better adaptability of basmati rice under Punjab conditions, its area is staggering around 1–1.25 lakh hectares with productivity level of 12–15 q/ha. On the other hand, the yield limiting factors in basmati rice are cultivation of low nutrient responsive cultivars which are prone to lodging, delayed transplanting of basmati rice, appearance of stem borer at earing stage. Farmers usually start transplanting of basmati rice after completion of transplanting of coarse rice and assign basmati rice to the field vacated by zaid crops, which results in delayed planting and ultimately results in poor crop yields. So time of planting is major driving factor for attaining higher productivity and the maximum productivity was achieved by planting crop in stipulated time frame at any specific location, which may vary from variety to variety (1—3). In this aspect, investigation was, therefore, conducted to determine the response of four different basmati rice cultivars to different time of transplanting under Punjab conditions.

## Methods

An experiment was conducted during *kharif* of 2005 at Agronomy Farm of Punjab Agriculture University, Ludhiana, Punjab. The soil was loamy sand in texture, found slightly alkaline in reaction and low in organic carbon. The field N-status was low while variable P and K found to be medium. Four basmati rice cultivars (Basmati-370, Basmati-386, Super Basmati, and Pusa Basmati-1) were used to study the effect of transplanting time on their growth and yield. An experiment was laid in split plot design by keeping the two transplanting dates in main plots and cultivars in sub-plots. The seeds will be treated with recommended fungicides (emisan 6 and stretocycline) and allowed to sprout for 30 hours and then sown in nursery and transplanting was done on attaining the age of 25 days. The transplanting of basmati was accompanied on two dates (20 July and 5 August). Weeds were controlled by applying butachlor at 1.5 kg/ha two days after transplanting. Fertilizer and plant protection measures were applied as per package of recommendations of PAU, Ludhiana. Data on various growth and yield indices were recorded periodically and statistically analyzed as described by cochran and Cox (4). The comparisons were made at 5% level of significance.

## Results and Discussion

The data revealed that two transplanting dates

**Table 1.** Growth, yield attributes and yield different basmati rice (Oryza sativa L.) cultivars transplanted under various time of transplanting.

| Treatments | Plant height (cm) | Effective tillers $m^2$ | Panicles length (cm) | Spikelets per panicle | 1000 grain wt (g) | Grain yield (q/ha) | Straw yield (q/ha) |
|---|---|---|---|---|---|---|---|
| **Dates** | | | | | | | |
| 25 July | 133.2 | 361 | 27.1 | 74 | 22.0 | 38.5 | 92.3 |
| 5 August | 125.5 | 248 | 24.5 | 64 | 20.7 | 22.9 | 74.0 |
| CD ($P$ = 0.05) | 6.0 | 47 | 1.1 | 7 | 0.6 | 2.0 | 7.7 |
| **Cultivars** | | | | | | | |
| Basmati-370 | 132.2 | 283 | 25.2 | 65 | 21.4 | 29.0 | 94.4 |
| Basmati-386 | 143.2 | 280 | 24.8 | 58 | 20.9 | 26.3 | 98.6 |
| Super Basmati | 118.1 | 326 | 26.6 | 75 | 21.5 | 32.4 | 92.8 |
| Pusa Basmati-1 | 104.1 | 329 | 26.6 | 77 | 21.7 | 35.2 | 88.4 |
| CD ($P$ = 0.5) | 5.0 | 53 | 1.08 | 7 | NS | 2.5 | 3.5 |

and four basmati rice cultivars differed significantly with respect to yield and yield attributes except 1000-grain weight, which was statistically same for all cultivars but differed significantly with respect to transplanting date (Table 1).

*Transplanting Date*

Table 1 shows that plant height was significantly greater when basmati rice was transplanted on 20 July as compared to crop transplanted on 5 August. The crop transplanted on 20 July gave grain yield of 38.5 q/ha and this was significantly higher by large margin of 15.6 q/ha than the crop transplanted on August 5 (22.9 q/ha)

The more yield of crop transplanted on 20 July attributed to significantly more effective tillers, panicle length, spikelets per panicle and 1000 grain weight as compared to crop transplanted on 5 August. This might be due to decreased source capacity of plant to support the development of panicle and other yield attributes which ultimately resulted in poor yield under delayed planting conditions as result of low temperature coupled with less solar-radiation interception i.e. less congenial (thermo-periodism and photo-periodism) were responsible for lower production of yield and yield attributes in late planted crop. These results are close to the finding of Singh et al. (5), Venkateswarlu (6).

*Cultivars*

Basmati-386 (143.2 cm) and Basmati-370 (132.2 cm) are tall varieties thus, attained greater plant height than super Basmati (118.1 cm) and Pusa Basmati-1 (104. 1 cm). All cultivars differed significantly in grain yield as Pusa Basmati-1 produced highest yield 35.2 q/ha amongst the cultivars followed by Super Basmati (32.4 q/ha), Basmati-370 (39.0 q/ha) and lowest yield produced by Basmati-386 (26.3 q/ha). This trend of decreasing yield among the cultivars may be attributed to more number of effective tillers/$m^2$, number of grains per panicle, panicle length and higher 1000-grain weight in two former cultivars than later ones. However all their above mentioned growth and yield attributes followed same trend of yield reduction from Pusa Basmati-1 to Basmati-386. These results closely followed the findings of Mahmood et al. (7). The maximum number of spikelets per panicle and panicle length was obtained in Pusa Basmati-1 followed by Super Basmati, Basmati-370 and Basmati-386. Similarly the maximum number of filled grains per panicle was obtained in Pusa Basmati-1 (77) which was found at par with that obtained in Super Basmati (75), but significantly more than Basmati-370 (65) and Basmati-386 (58). All the cultivars were statistically at par with respect to 1000-grain weight.

*Conclusion*

Thus the finding signifies the usefulness of timely

planting of basmati rice. Preferably short stature basmati rice cultivars (like Pusa basmati-1) could be planted around 20 July for better yields on loamy soils of Punjab.

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