Seed Research, Vol. 34(2): 218-220, 2006

Short Communication

Effects of Transplanting Dates on Seed Yield and Quality of Paddy cv. Pusa 44

N.K. CHOPRA, NISHA CHOPRA, R.N. YADAV AND K.C. NAGAR

Indian Agricultural Research Institute, Regional Station, Karnal 132 001

Seed quality plays a crucial role in realizing the full genetic potential of variety as well as benefits of other agricultural inputs [1]. Pusa 44 is a long duration rice variety, which is popular among the Punjab farmers due to its high yield, non-lodging nature and suitability for combine harvesting. Under field conditions, the environmental factors are difficult to control and they exert pronounced effect on yield production and quality of seed. In Haryana and Punjab the practice of transplanting of rice by farmers in the month of April and May has resulted in lowering of water table and therefore, it has been advocated that transplanting of rice should commence in last week of June by the time the first monsoon rain lowers the temperature and evaporation of water resulting in less load on underground water. Time of transplanting enormously influences the growth and yield of rice [2]. Since meager information is available, regard to seed yield and quality under timely and delayed transplanting of Pusa 44, the present study was conducted on these aspects.

The experiment was conducted during rainy seasons of 2000 and 2001 at seed production farm, Regional Station Karnal. The soil texture of experimental area is clay loam having pH 8.0; the organic carbon content (0.42 %), electrical conductivity (0.35 mS/cm) and available N, P and K were 122, 23 and 301 kg/ha, respectively. Six transplanting dates (30th June, 7th, 14th, 21st, 28th July and 4th August) were chosen in randomized block design with 4 replications. Nursery of rice cultivar Pusa 44 was raised in staggered manner. Thirty days old seedlings were transplanted in plots (4 x 6 m^2) having uniform spacing of 20 cm x 15 cm in all the treatments. The fertilizer was applied @ 100 kg N, 40 kg P_2O_5, 30 kg K_2O and 25 kg/ha of zinc sulphate, respectively. Full dose of phosphorus, potash, and zinc was applied at the last puddling operation. Nitrogen was applied in two equal splits at 14 and 30 days from transplanting. Observations on seed yield and yield attributing characters were recorded at the time of harvesting. Pooled data of two years was analyzed statistically. For seed quality the seed were germinated in between paper towels at 25°C. The observation on seed germination, seedling length was recorded on 14th day as per ISTA rules [3]. Seedling dry weight was recorded after drying of seedlings in oven at 70°C until constant weight is achieved.

Days to 50 and 100 per cent flowering were significantly affected due to delay in transplanting (Table 1). For the occurrence of 50 and 100 per cent flowering maximum number of days were required in 30th June transplanting and difference of 7-10 days was observed between 30th June and 28th July and 4th August planting. The growth and yield of paddy was significantly influenced due to the time of transplanting (Table 1). Transplanting on 30th June, 7th and 14th July resulted significantly in higher yield than transplanting on 21st, 28th July and 4th August. The better performance of yield under earlier planting may be owing to longer duration of growing period and favourable climatic conditions for crop growth that is expressed in better yield parameters. The present results are in agreement with the findings of Dhiman et al. [2]. Highest seed yield was recorded with 30th June planting

Received February 2004 Revised May 2006 Accepted July 2006

Table 1. Effect of transplanting time on days to flowering, yield attributes and seed yield of paddy cv. Pusa 44 (Values are mean of two years)

Date of transplanting	Days to flowering 50%	Days to flowering 100%	Plant height (cm)	Number of panicles	Panicle length (cm)	1000-seed weight (g)	Seed yield (q/ha)
30th June	79.7	84.0	73.43	13.35	27.07	21.98	73.67
7th July	78.5	83.2	73.85	13.20	26.41	21.48	72.74
14th July	76.7	79.5	73.57	12.90	26.07	21.25	67.78
21st July	76.5	78.2	71.88	11.50	24.71	20.07	51.47
28th July	72.2	75.5	71.45	9.80	22.80	19.49	42.37
4th August	69.5	72.2	70.82	7.70	22.46	18.03	21.73
CD = at 5%	2.10	2.10	1.86	1.62	1.76	1.52	13.28

and there was considerable reduction in seed yield on July 21st (30.13 %), July 28th (42.48%) and 4th August (70.50 %). Seed yield of June 30 planting was at par with 7th and 14th July. Similarly, number of panicles/hill, panicle length, and 1000-seed weight could not bring any significant difference among the first three transplantings. Drastic reduction in all the yield parameters was observed at 28th July and 4th August planting and the values being 26.59 and 42.32, 15.77 and 17.02, 11.46 and 17.97 per cent in number of panicle/hill, panicle length, and 1000-seed weight compared to 30th June transplanting.

Significant differences were observed among the different transplanting dates with respect to 1000-seed weight, per cent germination, seedling length, seedling dry weight. Higher 1000-seed weight in earlier plantings (30th June, 7th and 14th July) is primarily due to suitable climatic conditions, resulting in better growth and uptake of nutrients, which translocated from vegetative parts to reproductive parts, thereby resulting in bolder seeds. Maximum germination, seedling length and seedling dry weight (94.7%, 24.2 cm and 8.42 mg, respectively) recorded in 30th June transplanting, which was significantly superior to 28th July and 4th August transplanting (Table 2).

Germination per cent was above the minimum standard of seed certification (80 %) up to 28 July, however, further delay in transplanting (4 August)

Table 2. Seed quality attributes as affected by date of transplanting in Pusa 44 (Values are mean of two years)

Date of transplanting	EC. (mS/cm/g)	Germination (%)	Seedling length (cm)	Seedling dry weight (mg)
30th June	0.441	94.75	24.24	8.42
7th July	0.463	92.87	24.27	8.33
14th July	0.499	90.75	24.03	8.19
21st July	0.506	86.22	20.78	7.45
28th July	0.618	83.35	19.72	6.52
4th August	0.792	71.06	18.90	6.21
CD at 5%	0.100	5.46	1.84	0.87

resulted in seed with germination per cent below the minimum seed standard. Lower germination in late transplanting is probably due to low temperature at flowering, seed setting and seed maturity, resulting in low seed set and poor seed development [4]. Higher values of seedling length and seedling dry weight in early transplanting may be due to the higher 1000-seed weight. Similar findings have been reported by Chopra et al. [5]. All the seed quality attributes were found to decrease with delay in transplanting from 30th June to 4th August but drastic reduction took place in 28th July and 4th August.

Electrical conductivity from seed leachate showed progressive increase with delay in transplanting, remaining statistically at par between 30th June and 21st July. Significant increase in electrical conductivity was observed at 28th July and 4th August compared to all early transplanting. As electrical conductivity is negatively correlated with other seed quality attributes, lesser the value, higher the probability of good quality of seed. The difference in loss of sugars from seeds of different transplanting dates may be due to difference in relative amount of sugars present in seed or due to difference in sensitivity to uptake of water during imbibition or both [6].

Hence from the experimental results it can be concluded that seed crop of Pusa 44 may be transplanted in the first fortnight of July for achieving higher yield with good quality seeds under Karnal conditions.

REFERENCES

1. SESHU D.V. & MALAVIKA DADLANI (1993). Seed vigour in rice (Oryza sativa): Its assessment and impact on crop performance. Seed Res., (Spl. Vol.) **2**: 700-706.
2. DHIMAN S.D., D.P. NANDAL & HARI OM (1997). Performance of scented dwarf rice (Oryza sativa) varieties under different time of transplanting. Indian J. Agron., **42:** 253-256.
3. ANONYMOUS (1985). International Rules for Seed Testing. Seed Sci. Technol., **13**: 299-355.
4. BHUBIHAR B.R., K.G. MAHAKAL, P.B. KALE & S.G. WANKHEDE (1989). Effect of time of sowing and summer picking of green fruits on growth and seed yield of okra (Abelmoschus esculents L. Monech), Panjabrao Krishi Vishvidalya Research Journal, **13**: 39-43.
5. CHOPRA, N.K., NISHA CHOPRA & S.N. SINHA (2002). Influence of dates of transplanting on production and quality of scented rice (Oryza sativa) seed. Indian J. Agril. Sci., **73:** 12-13.
6. PERRY D.A. & J.G. HARRISON (1970). The differential effect of water and low temperature on germination of pea seed. J. Expt. Bot., **21**: 504-512.