

Comparative Performance of different Planting and Transplanting Techniques of Sugarcane under Irrigated and Rainfed conditions

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ABSTRACT

An experiment was conducted to study the comparative performance of different planting and transplanting techniques of sugarcane under irrigated and rainfed conditions on an Old Himalayan Piedmont Soil during 1988-89 crop season. The planting techniques were 'rayungan' with two slips, 'rayungan' with single slip, soil bed settlings, polybag settlings, direct spaced plantation of two budded paired setts and three budded setts in conventional method of planting. The highest number of tiller, millable cane and yield of cane were obtained from polybag settlings followed by soil bed settlings under irrigated condition. In rainfed condition, the highest number of tiller and millable cane were obtained from polybag settlings followed by direct spaced planting method. However, the highest cane yield was obtained from polybag settlings followed by two slips 'rayungan' in rainfed condition. Percent recovery did not differ significantly among the treatments but it was always found higher in rainfed condition than that of irrigated condition.

INTRODUCTION

Sugarcane is the second most important cash crop of the country, but the average yield of this crop is reported to be around 45 TCH indicating a low level of productivity per unit area. The major causes of this poor yield have been identified to be insufficient number of millable cane per unit area and lower unit stalk weight (James, 1971; Mariotti, 1971; Khairwal and Babu, 1975; Irvine *et al.* 1980 and Rahman *et al.* 1987). On the other hand, the major causes of the insufficient number of millable cane is the result of gappy stand due to poor germination and higher tiller mortality (Miah *et al.*, 1988 and Matin *et al.* 1989) due to some adverse climatic conditions like low temperature and low soil moisture at plantation. To overcome these problems, considerable research attention has been given towards different planting techniques, such as double setts spaced planting (DSSP) and pregerminated sett transplanting (Imam *et al.* 1993 and Rahman *et al.* 1987). But no work has so far been done in northern areas i.e. in Himalayan Piedmont Soil under both the irrigated and rainfed conditions. Therefore, the present investigation has been done to study the comparative performance of different planting and transplanting techniques under irrigated and rainfed conditions on an Old Himalayan Piedmont Soil.

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MATERIALS AND METHODS

The experiment was conducted during the 1988-89 crop season at Jamalpur farm of Thakurgaon Sugar Mills (TSM), Thakurgaon and laid out in split plot design with three replications under irrigated and rainfed conditions. The following treatments were included for experimentation :

T₁: 'Rayungan' -two slips,

T₂: 'Rayungan'-one slip,

T₃: Soil bed two-eyed settling,

T₄: Polybag settling,

T₅: Direct spaced plantation (DSP) of two-budded paired setts,

T₆: Conventional planting of three-budded setts.

The cane variety Isd 2/54 was used as the test crop. The plot size was 10 m x 8 m maintaining row to row distance of one meter. Recommended dose of fertilizers was used. Necessary intercultural operations like weeding, mulching, control of pests etc. were done as per normal practices. The irrigated plots received four times irrigations including live and supplementary irrigations in the month of December, February, March and April. The experiment was set up on the 1st December, 1988 and was harvested on the 15th January, 1990.

RESULTS AND DISCUSSION

The salient results of the experiment are presented in the Table 1. Significantly the highest number of tillers ($270.5 \times 10^3/\text{ha}$) was obtained from the T₄ treatment (polybag settlings) under irrigated condition. The second highest tillers of $200.6 \times 10^3/\text{ha}$ was also recorded from the T₄ treatment under rainfed condition. Tiller population from other treatments excepts for T₄ was statistically identical under both the irrigated and non-irrigated conditions. The millable cane production was found to be significantly affected by the type of planting techniques. The maximum millable canes of $127.8 \times 10^3/\text{ha}$ was produced from the T₄ plot under irrigated condition followed by the same treatment ($118.4 \times 10^3/\text{ha}$) under rainfed condition. However, under rainfed condition the treatments T₁, T₃, T₄, T₅ and T₆ gave statistically identical millable canes. Rayungan (one slip) could be an alternative source of planting material under irrigated condition for obtaining higher number of millable canes.

Data on cane yield indicated that all the planting techniques were statistically identical under both the irrigated and rainfed conditions. However, the highest cane yield of 65.0 tons/ha was obtained from the T₄ (polybag settlings) treatment followed by the T₃ treatments (soil bed settlings) under irrigated condition. The lowest yield of 50.4 tons/ha was obtained from the T₅ treatment (two budded setts) under rainfed condition. The level

of cane yield under irrigated condition was found higher than the rainfed condition. This result further indicated that polybag settlings was superior among all the planting materials under both the irrigated and rainfed conditions. This results are in agreement with the findings of Imam *et al.* (1993) and Ali *et al.* (1989).

Table 1. Yield and yield contributing parameters of sugarcane grown from different planting and transplanting techniques under irrigated and rainfed conditions.

Treatments	Number of tillers ($\times 10^3 \text{ ha}^{-1}$)		Number of millable cane ($\times 10^3 \text{ ha}^{-1}$)		Yield of cane (TCH)		Sugar recovery (%)	
	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed
T ₁	171.2 b*	103.2 b	97.5 bc	98.4 ab	58.6 a	58.1 a	7.5 a	9.3 a
T ₂	140.5 b	105.2 b	105.6 b	89.0 b	52.5 a	55.6 a	7.8 a	9.4 a
T ₃	172.9 b	116.4 b	88.5 c	92.9 ab	64.4 a	56.4 a	8.1 a	9.8 a
T ₄	270.5 a	200.6 a	127.8 a	118.4 a	65.0 a	58.9 a	7.8 a	8.9 a
T ₅	150.3 b	116.8 b	86.3 c	101.0 ab	51.4 a	50.4 a	7.6 a	9.2 a
T ₆	139.5 b	95.5 b	96.2 bc	92.2 ab	58.3 a	55.8 a	7.9 a	9.5 a

* Figures accompanied by similar letter(s) do not differ significantly at 5% level as per DNMR test.

The recovery (%) of sugar was not significantly affected by the source of planting materials. Under irrigated condition, the maximum sugar recovery of 8.1% was obtained from the T₃ treatment (soil bed settlings) followed by the T₆ treatment (conventional three-budded setts) while the minimum of 7.5% was from the T₁ treatment (Rayungan 2 slips). In case of rainfed condition, T₃ treatment also gave the highest sugar recovery of 9.8% and the T₄ treatment gave the lowest sugar recovery of 8.9%. It is seen that the level of sugar recovery (%) in rainfed cane was higher (1.4 to 1.7%) than that of the irrigated cane.

Thus, the overall results of this experiment showed that the treatment T₃ (soil bed settlings) would be the best planting technique for obtaining optimum cane yield and sugar recovery (%) under both the irrigated and rainfed conditions.

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