

Performance of Three Sugarcane Varieties as Transplant and Ratoon Cane under Rainfed Condition

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ABSTRACT

Three sugarcane varieties viz. Isd. 17, L.Jaba-C and BO. 70 were examined for their tillering and productivity as plant and ratoon cane at Teesta Flood Plain Soils of Jaipurhat Sugar Mills farm under rainfed condition. The mortality of tillers ranged from 16 to 38 percentage in plant cane, and 50 to 65 Percentage in ratoon cane. Ratoon cane suffered from higher percentage of tiller mortality compared to plant cane. The highest yield of cane (124 t/ha) was obtained with variety Isd-17 at 60 cm spacing followed by L.Jaba-C (117 t/ha) in plant cane at 30 cm spacing while in ratoon cane highest yield (49 t/ha) was recorded with variety BO. 70 followed by L.Jaba-C. Mean stalk weight was found to be little higher under wider spacing compared to closer spacing in both plant and ratoon cane. Recoverable sucrose percentage was found much higher in ratoon cane than that of plant cane in all tested varieties. For Jaipurhat Sugar Mills farm condition, inter-plant spacing lower than 60 cm is not necessary to optimize number of millable stalks per unit area. Lower yield of ratoon cane explore the future need for conducting research on the improved management practices for boosting up ratoon yield.

INTRODUCTION

Sugarcane is a relatively risk-free cash crop for low rainfall belt of the Gange's River Flood Plain as well as low to moderately fertile high lands of the Himalayan Piedmont Plain and the Teesta Flood Plain areas of Bangladesh. Its cultivation is thus concentrated in the greater districts of Rajshahi, Pabna, Kushtia, Jessore, Faridpur, Dinajpur, Rangpur and Bogra. In Bangladesh average yield of sugarcane currently estimated at 45 tons per hectare is poor compared to its theoretical approximation of 75 tons per hectare under rainfed condition. The major causes of poor yield however, have been identified to be insufficient number of millable stalks per unit area and poor stalk weight. It is also reported elsewhere that gappy germination leading to inadequate number of stalks and poor stalk weight (Matherne, 1974; Khairwal and Babu, 1975; Irvine *et al.*, 1980).

Considerable amount of work has been done elsewhere on various agronomic aspects pertaining to yield contributing factor of sugarcane (James, 1971; Mariotti, 1971; Kanwar and Sharma, 1974; and Tang, 1977). Among different planting techniques adopted for increasing number of millable stalks spaced transplanting (STP) received considerable attention in recent years (Tang and Chen, 1974; Rahman and Rahman, 1979; Srivastava *et al.*, 1985; and Rahman *et al.*, 1987). Informations are still inadequate as to relative merits and performances of different varieties under transplanted condition. In Bangladesh about 15-20% area is under ratoon cane. With the gradual adoption of transplanted technology, the area under transplanted ratoon cane is likely to increase in future. The ratooning potential of different varieties need to be tested under STP condition. The present investigation was therefore, undertaken

to evaluate relative yielding potential of plant and ratoon cane of three selected varieties transplanted at two inter-plant spacings.

MATERIALS AND METHODS

Seven weeks old polybag settlings of three sugarcane varieties such as Isd-17, L.Jaba-C and BO. 70 were transplanted in Autumn at Jaipurhat Sugar Mills farm (JSM) under rainfed condition during 1985-86 crop season. The residual soil moisture at time of transplanting (late October) was found to be adequate for establishment of settlings. Transplanting was done at two inter-plant spacings such as 30 and 60 cm in one meter apart rows. The treatments were replicated four times in a Randomized Block Design. Commercial fertilizers viz., Urea, Triple-Super Phosphate (TSP) and Muriate of Potash (MP) were applied @200N 80P₂O₅ and 185 K₂O kg ha⁻¹.

Intercultural operations and control of insects pests were done as and when necessary. Data on tiller production and mortality were recorded on ten selected clumps per plot (8mx6m). Tiller mortality was determined according to Miah and Sarkar (1982). Data on millable cane, yield and other yield parameters were recorded at harvest. The recoverable sucrose percentage was determined at harvest according to dry-lead-sub-Acetate method.

After harvesting of plant cane, a ratoon crop was grown following normal practices for ratooning. Spade shaving of harvested clump was done within one week of harvesting and fallow land between the cane rows opened by country plough. Latter on field was fertilized with commercial fertilizers viz., Urea, TSP and MP at recommended doses. Other necessary intercultural operations including weeding, pest control etc were done as per requirement. Ratoon cane was harvested and data on different parameters were taken as plant cane mentioned earlier.

RESULTS AND DISCUSSION

Data on tillering of transplanted cane showed that variety L.Jaba-C produced the highest tiller number of $197 \times 10^3 \text{ ha}^{-1}$ at closer inter-plant spacing of 30 cm followed by the variety BO. 70 ($179 \times 10^3 \text{ ha}^{-1}$). Minimum tiller number of $122 \times 10^3 \text{ ha}^{-1}$ was obtained from L.Jaba-C variety at wider inter-plant spacing of 60 cm. This results expands and confirm our previous findings (Rahman *et al.*, 1987). It is further evident from the Table 1 that variety Isd-17 and BO. 70 responded similarly in tiller production, and did not differ significantly at different inter-plant spacings. However, variety L.Jaba-C showed significant differences in tiller production between two inter-plant spacings. In case of ratoon cane, highest tiller of $176 \times 10^3 \text{ ha}^{-1}$ was recorded in variety Isd. 17 with closer inter-plant spacing followed by the same variety at wider inter-plant spacing. The lowest tiller of $129 \times 10^3 \text{ ha}^{-1}$ was produced by the variety BO. 70 with 60 cm spacing. The table further indicated that all the tested clones performed equally well in respect of tillering potential and did not differ significantly at both the inter-plant spacings.

Tiller mortality of different varieties in plant and ratoon cane is shown in the Figure 1. The Figure indicated that closer inter-plant spacing resulted in higher tiller mortality than wider inter-plant spacing in both the plant and ratoon cane. It is further revealed

that ratoon canes suffered from higher mortality of tillers compared to plant cane. Similar trend of tiller mortality was reported by Anon., 1987 and Rahman *et al.*, 1987. In plant cane, maximum tiller mortality of 38 percentage was recorded in BO. 70 where as minimum (15.7%) tiller mortality was found in L.Jaba-C (Figure 1). In case of ratoon cane, however; maximum tiller mortality (64.2%) was found in variety Isd-17 while minimum tiller mortality (50%) was obtained in BO. 70. This result further indicated that more than 50 percentage of the total tiller died out possibly as a result of higher competition for light, nutrients and moisture.

Table 1. Tillering potential and yield contributing parameters of three autumn transplanted sugarcane varieties at two inter-plant spacings under rainfed conditions at JSM farm.

Varieties	Spacing (cm)	Tiller population (10^3ha^{-1}) 0 in May		Millable cane (10^3ha^{-1}) at harvest		Recoverable sucrose (%)		Cane Yield (t ha^{-1})		Sugar yield (t ha^{-1})		Mean stalk weight (kg)	
		Plant cane	Ratoon cane	Plant cane	Ratoon cane	Plant cane	Ratoon cane	Plant cane	Ratoon cane	Plant cane	Ratoon cane	Plant cane	Ratoon cane
Isd-17	30	171a*	176 a	110 a	62 ab	7.5	11.2	115 abc	35 b	8.6	3.9	1.05	0.56
	60	176 a	161 ab	117 a	59 b	7.4	11.1	124 a	35 b	9.1	3.9	1.06	0.59
L. Jaba-C	30	197 a	142 bc	125 a	63 ab	6.3	10.8	117 ab	45 a	7.4	4.8	0.93	0.71
	60	122 b	141 bc	115 a	64 ab	6.6	11.0	103 bc	48 a	6.8	4.9	0.98	0.75
BO. 70	30	179 a	153 abc	111 a	69 a	6.0	11.1	114 abc	49 a	7.9	5.4	1.06	0.71
	60	164 ab	129 c	105 a	65 ab	5.8	11.0	97 c	48 a	5.6	4.8	1.09	0.74

*Figures accompanied by similar letters do not differ significantly as per DNMR test at 5% level of significance.

In plant cane, data on millable canes at harvest indicated that variety L.Jaba-C gave the highest number of millable canes of $125 \times 10^3\text{ha}^{-1}$ at 30 cm inter-plant spacing followed by variety Isd-17 at 60 cm spacing. The lowest millable canes of $105 \times 10^3\text{ha}^{-1}$ were obtained in BO. 70 at wider inter-plant spacing. In ratoon canes, the maximum number of millable canes ($69 \times 10^3\text{ha}^{-1}$) were recorded in Isd-17 at wider inter-plant spacing. Millable cane production in ratoon cane was found much lower compared to plant cane. This might be due to higher percentage of tiller mortality in ratoon canes. Further the table revealed that all test clones did not differ significantly in their response at different inter-plant spacings, and in their ultimate potential to produce millable stalks in both plant and ratoon canes. Mean stalk weight was found to be little higher at wider inter-plant spacing in both plant and ratoon canes indicating that thinner stalks are produced at closer spacing due to more higher population resulting higher competition for light, moisture and nutrients. This is in conformity with the findings of Miah *et al.*, 1983 and Rahman *et al.*, 1987.

It is seen from the Table 1 that variety Isd-17 gave the highest sugar yield of 9.07 t ha^{-1} , while the variety BO. 70 produced the lowest sugar yield of 5.63 t ha^{-1} in plant cane. But the sugar yield was obtained almost 40-50 percentage lower in ratoon canes compared to plant canes although recoverable sucrose (%) was about 40-50 percentage higher in all test clones in ratoon cane over plant cane. This lower sugar

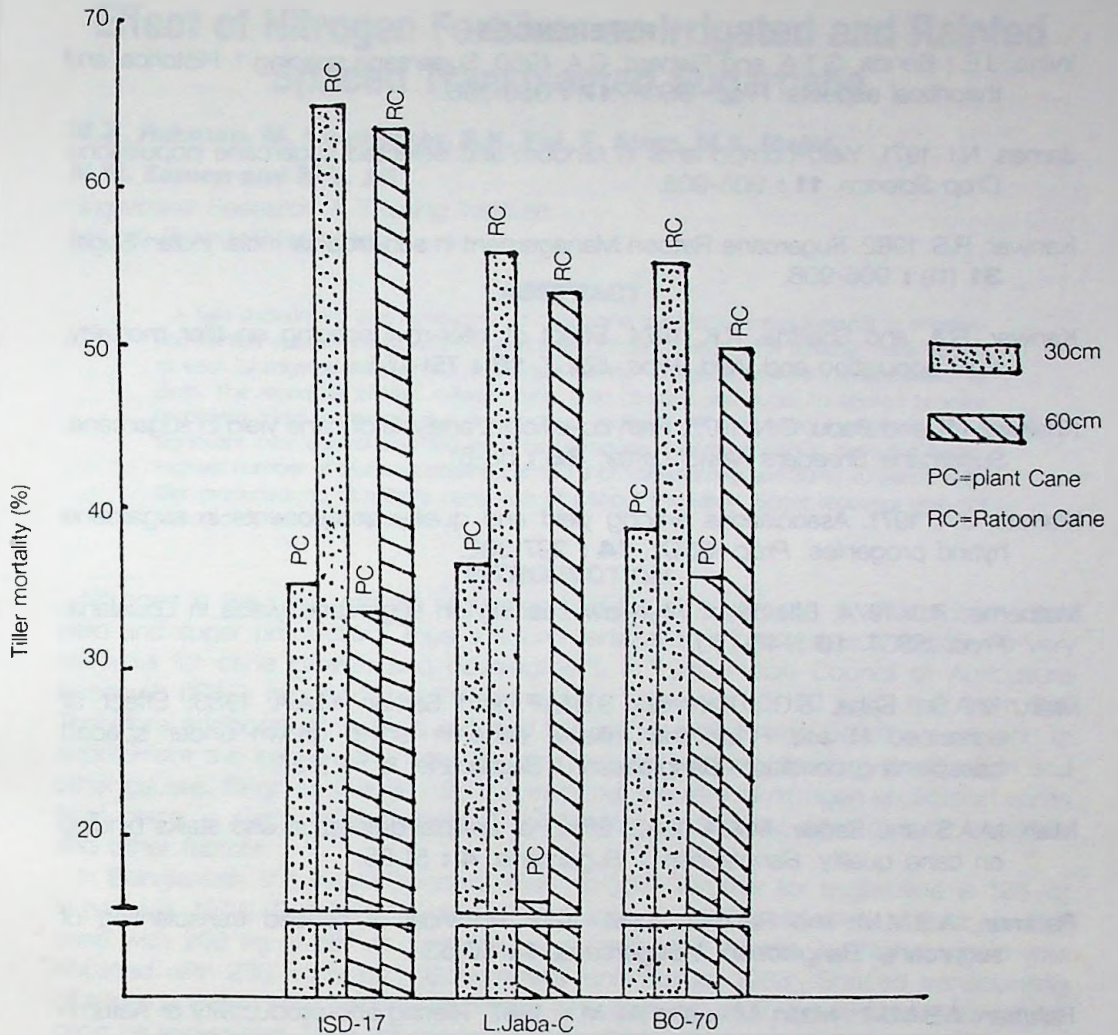


Figure 1. Tiller mortality of three autumn transplanted sugarcane varieties at JSM farm.

yield was due to poor yield of ratoon cane. Higher sucrose content in ratoon cane was also reported elsewhere (Yadav, 1979 ; Kanwar, 1982)

In light of results obtained, it could be concluded that (i) inter-plant spacing for transplanted sugarcane should not be lower than 60 cm for autumn planting, (ii) Jaipurhat Sugar Mills farm soil has great potential to support transplanted sugarcane under rainfed condition (iii) results sought for further experimentation to improve yield of ratoon cane.

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