

Performance of Some Sugarcane Varieties in Northern Region of Bangladesh

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ABSTRACT

An experiment was conducted at growers' field in three locations under Thakurgaon, Panchagar and Setabganj Sugar Mills during 2001-2002 cropping season to study the performance of seven BSRI bred sugarcane varieties viz. Isd 2-54, Isd 16, Isd 20, Isd 28, Isd 29, Isd 30 and Isd 31. The maximum number of tillers were found in the variety Isd 31 at Panchagar and Thakurgaon locations. Variable tiller mortality was observed among the tested varieties in different locations ranged from 23.93 to 50.38%. The variety Isd 20 produced the maximum number of millable cane ($112.66 \times 10^3 \text{ ha}^{-1}$) at Setabganj location. But at Panchagar and Thakurgaon, the varieties Isd 2-54 and Isd 28 produced higher number of millable canes of $96.70 \times 10^3 \text{ ha}^{-1}$ and $97.58 \times 10^3 \text{ ha}^{-1}$, respectively. Highest single stalk weight (0.99 kg) was obtained in Isd 28 both at Thakurgaon and Panchagar locations but Isd 31 showed higher single stalk weight (0.96 kg) at Setabganj. Highest cane yield of 96.24 t ha^{-1} was produced in Isd 28 and the lowest (61.95 t ha^{-1}) cane yield was found in Isd 30. Highest brix (20.16%) was obtained from variety Isd 16 among all the tested varieties. Thus, the sugarcane varieties Isd 28 and Isd 16 showed good performance in respect of yield and sucrose content in northern region of Bangladesh.

Key words: Performance, Sugarcane and variety.

INTRODUCTION

Sugarcane is an important cash crop in Bangladesh. The sugarcane yield of a particular variety depends on the heredity potential of the genotype and the environment where it is exposed during the course of its cycle (Yadava, 1993). Variety of a crop plays an important role as regards to the yield and quality, sugarcane is no exception (Anon., 1978). Although most of the varieties of sugarcane now grown in the sugar mill zones of Bangladesh are recommended for cultivation but a promising variety may not show better performance in all the ecological zones due to variations of Agro-climatic factors (Anon., 1979). Moreover, sugarcane varieties gradually degenerate over a considerable period of cultivation and show a tendency to decline in yield and vigor (Barnes, 1954 and Humbert, 1959). To maintain high yield it is necessary to replace varieties every few years with new varieties (Poehlman and Barthakur, 1969). These aspects provide ideas about a particular character of which greater emphasis should be given while selecting suitable plant type (Singh *et al.*, 1981) Bangladesh is not self-sufficient in sugar and gur productions. The performance of a particular variety differs from place to place and farmers to farmers, which deserves adaptability trial. Without adaptability test, we cannot recommend a particular variety for a particular location. Therefore, development of high yielding varieties with wide adaptability is urgently needed at this moment to make this crop profitable to the growers and for meeting sugar and gur deficiency in the country.

MATERIALS AND METHODS

The experiment was conducted at the growers' field of Thakurgaon, Panchagar and Setabganj Sugar Mills zones during the cropping seasons 2001-2002 under AEZ 1 (Old Himalayan Piedmont Plain Soil). The soils were sandy loam textured with pH 5.5 and low in organic matter (OM). The experiment was comprised of seven sugarcane varieties viz. Isd 2-54, Isd 16, Isd 20, Isd 28, Isd 29, Isd 30 and Isd 31 (standard) considered as experimental materials. The experiment was laid out in RCB design with three replications and plot size was 10m x 8m. Sugarcane was planted in the month of November, 2001. Three budded setts of each variety were used as planting materials and placed in the trench end to end keeping row to row distance 1 meter. Urea, Triple super phosphate (TSP), Muriate of potash (MOP) and Gypsum were used as the source of N, P, K and S respectively. Full amount of TSP, Gypsum and one third of Urea and MOP were applied in trenches as basal dose and thoroughly mixed with soil prior to setts plantation. The rest amount of Urea and MOP were applied as first and second top dressing at 90 and 180 DAP (Days after plantation) respectively. Intercultural operations were done as and when necessary. Different data on number of tiller per hectare, number of millable cane, brix percent and yield of cane were recorded in time. Cane was harvested on last week of December 2002. Single stalk weight of cane was calculated at harvest by dividing the weight of stalks from yield sample by the number of stalks and it was express as kg per cane stalk. The tiller mortality was calculated following the procedure as mention below:

$$\text{Tiller mortality (\%)} = \frac{\text{Number of tillers} - \text{Number of millable canes}}{\text{Number of tillers}} \times 100$$

RESULTS AND DISCUSSION

Performances of the varieties at three locations were presented in Table 1, 2 & 3. It was revealed from the tables that data on tiller population showed significant difference among the varieties in different locations. The maximum number of tillers $188.80 \times 10^3 \text{ ha}^{-1}$ and $181.16 \times 10^3 \text{ ha}^{-1}$ were found in the variety Isd 31 at Panchagar and Thakurgaon locations but Isd 30 gave higher number of tillers ($186.04 \times 10^3 \text{ ha}^{-1}$) at Setabganj. The minimum number of tiller ($113.38 \times 10^3 \text{ ha}^{-1}$) was produced in the variety Isd 29 at Setabganj but Isd 2-54 was found as same trend at Thakurgaon and Panchagar. Similarly, variation in tiller production among the different varieties was reported by Miah *et al.* (1994) and Rashid *et al.* (2001).

Tiller mortality mainly depends on the light, soil moisture, population density, nutrient level, time of planting and varietal character. Variable tiller mortality was observed among the tested varieties in different locations ranged from 23.93 to 50.38%. Highest tiller mortality (50.38%) was found in Isd 31 at Panchagar and Thakurgaon locations, and the lowest (23.93%) was recorded in Isd 2-54 at Pachagar location. Bokhtiar and Sakuri (2005) in a study reported that tiller mortality varied from 40 to 50% under different soil fertilities which supported our results.

The variety Isd 20 produced the maximum number of millable cane ($112.66 \times 10^3 \text{ ha}^{-1}$) at Setabganj where at Panchagar and Thakurgaon locations Isd 2-54 and Isd 28 produced the higher number of millable canes of $96.70 \times 10^3 \text{ ha}^{-1}$ and $97.58 \times 10^3 \text{ ha}^{-1}$ respectively. Lowest number of millable cane $83.99 \times 10^3 \text{ ha}^{-1}$ was observed in Isd 29 at all locations. Matin *et al.* (1989) and Paul *et al.* (1994) also reported similar results on millable cane production.

Highest single stalk weight (0.99 kg) was obtained in Isd 28 both at Thakurgaon and Panchagar locations but Isd 31 showed higher single stalk weight (0.96 kg) at Setabganj. Lowest single stalk weight were observed in Isd 30 at Setabganj and Panchagar locations which were 0.59 kg and 0.82 kg respectively. Lowest single stalk weight of 0.71 kg was found in Isd 20 at Thakurgaon.

The variety Isd 28 gave the highest cane yield of 96.24 t ha^{-1} at Thakurgaon followed by 94.85 t ha^{-1} and 94.81 t ha^{-1} at Setabganj and Panchagar respectively. The variety Isd 30 produced the lowest (61.95 t ha^{-1}) cane yield at Thakurgaon because of sandy soils, low organic matter and low soil moisture contents. A significant difference was observed in brix among the tested varieties in different locations. Highest brix of 20.16, 20.00 and 19.50% was recorded in Isd 16 at Panchagar, Setabganj and Thakurgaon respectively.

Table 1. Yield and yield attributes of the tested some released sugarcane varieties under TSM zones in 2001-2002.

Treatments	No. of Tiller ($\times 10^3 \text{ ha}^{-1}$)	No. of Millable cane ($\times 10^3 \text{ ha}^{-1}$)	Tiller mortality (%)	Single stalk weight (kg)	Cane Yield (t ha^{-1})	Brix (%)
Isd 2-54	137.91b	90.95a	34.05	0.84	76.12bc	18.86ab
Isd 16	157.16b	91.12a	42.02	0.88	80.58b	19.56a
Isd 20	155.25b	97.50a	37.20	0.71	69.30cd	18.90ab
Isd 28	181.16a	97.58a	46.13	0.99	96.24a	18.83ab
Isd 29	143.16b	89.62a	37.40	0.78	70.20c	18.13bc
Isd 30	148.00b	77.95b	47.33	0.79	61.95d	18.40bc
Isd 31	182.29a	91.24a	49.94	0.83	75.66bc	17.86c
LSD (5%)	20.00	8.36	-	-	7.93	0.80

* Figures accompanied by the same letters are not significantly different at 5% level of probability as per DNMR test.

Table 2. Yield and yield attributes of the tested some released sugarcane varieties under STSM zones in 2001-2002.

Treatments	No. of Tiller ($\times 10^3 \text{ha}^{-1}$)	No. of Millable cane ($\times 10^3 \text{ha}^{-1}$)	Tiller mortality (%)	Single stalk weight (kg)	Cane Yield (tha^{-1})	Brix (%)
Isd 2-54	130.00cde	98.89abc	23.93	0.88	87.03abc	18.50d
Isd 16	151.04bc	87.98cd	41.17	0.89	78.19bcd	20.00a
Isd 20	167.12ab	112.66a	32.58	0.76	75.34cde	18.34d
Isd 28	172.12b	104.99ab	39.00	0.90	94.85a	19.50ab
Isd 29	113.38de	83.99cd	25.92	0.87	72.99de	19.90b
Isd 30	186.04a	106.60b	42.70	0.59	63.42e	19.80ab
Isd 31	134.88cde	92.21cd	31.63	0.96	88.82ab	18.90cd
LSD (5%)	30.74	ns	-	-	12.53	0.75

* Figures accompanied by the same letters are not significantly different at 5% level of probability as per DNMR test.

Table 3. Yield and yield attributes of the tested some released sugarcane varieties under PSM zones in 2001-2002.

Treatments	No. of Tiller ($\times 10^3 \text{ha}^{-1}$)	No. of Millable cane ($\times 10^3 \text{ha}^{-1}$)	Tiller mortality (%)	Single stalk weight (kg)	Cane Yield (tha^{-1})	Brix (%)
Isd 2-54	137.25e	96.70a	29.54	0.83	80.54bc	19.14
Isd 16	154.86d	94.36abc	43.72	0.89	84.00b	20.16
Isd 20	159.81cd	87.10cd	45.49	0.89	77.31cd	19.00
Isd 28	181.70ab	96.20ab	47.05	0.99	94.81a	19.83
Isd 29	150.40de	80.82d	46.26	0.93	75.10de	19.00
Isd 30	173.00bc	88.53bcd	48.82	0.82	72.20e	19.50
Isd 31	188.80a	93.68abc	50.38	0.86	81.00bc	18.83
LSD (5%)	13.40	7.71	-	-	4.57	ns

* Figures accompanied by the same letters are not significantly different at 5% level of probability as per DNMR test.

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