

## Short Communication

### A COMPERATIVE STUDY OF NEWLY RELEASED SUGARCANE VARIETIES IN OLD HIMALAYAN PIEDMONT PLAIN SOILS

M.N.A. Miah<sup>1</sup>, A.S.M. Amanullah<sup>2</sup>, M.M. Rahman<sup>1</sup>, M.A.B. Siddique<sup>2</sup> and R.C. Kabiraj<sup>1</sup>

An experiment was conducted at growers' field in twelve locations under Thakurgaon, Panchagar and Setabganj Sugar Mills during 2007-08 cropping season to study the performance of three newly released sugarcane varieties viz. Isd 32, Isd 33 and Isd 37. The maximum number of tillers ( $197.60 \times 10^3 \text{ ha}^{-1}$ ) were found in the variety Isd 33 at Setabganj location. The variety Isd 33 produced the maximum number of millable cane ( $105.95 \times 10^3 \text{ ha}^{-1}$ ) at Panchagar location. But at Thakurgaon and Setabganj the varieties Isd 37 and Isd 32 produced higher number of millable canes of  $90.07 \times 10^3 \text{ ha}^{-1}$  and  $86.70 \times 10^3 \text{ ha}^{-1}$ , respectively. Significantly higher cane height of 3.11 m was recorded in the variety Isd 32 followed by Isd 33 (2.93 m) and Isd 37 (2.77 m) at Setabganj. The maximum girth was found with Isd 37 at Setabganj and Panchagar locations (2.58 cm and 2.48 cm). Highest single stalk weight (1.29 kg and 1.25 kg) was obtained in Isd 37 both at Panchagar and Setabganj locations but Isd 33 showed higher single stalk weight (1.18 kg) at Thakurgaon. Highest brix (20.78%) was obtained from variety Isd 37 among all the tested varieties. Highest cane yield of  $105.41 \text{ t ha}^{-1}$  was produced in Isd 37 at Panchagar and the lowest ( $62.30 \text{ t ha}^{-1}$ ) cane yield was found in Isd 33 both at Thakurgaon and Setabganj locations. Hence among the sugarcane varieties, Isd 37 showed good performance in respect of yield and sucrose content in Old Himalayan Piedmont Plain Soils.

Sugarcane (*Saccharum officinarum* L.) is one of the most important agro-industrial crops in Bangladesh. It is cultivated on an area about 0.15 million hectares annually with an average cane yield of only 36 tons  $\text{ha}^{-1}$  (BBS 2006). Naidu (1992) confirmed that yield loss in cane occurred mainly because of stalk mortality, reduce growth, poor root system, lack of absorption of water, intolerant water logging varieties, lodging, cane breakage and improper drainage systems. The sugarcane yield of a particular variety depends upon the heredity potential of the genotype and the environment where it is exposed during the course of its life 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). The highest number of millable cane, height and girth might have contributed to cane yield as reported by Singh and Sangwan (1980).

Miah *et al.* (1986) also observed that the varieties having tall cane, more diameter and maximum number of millable canes have produced higher yield per unit areas. In Bangladesh, most of the sugarcane farmers get low yield due to late plantation, adoption of inadequate pests and disease control practices and poor agronomic management of crop cultivation. Introduction of suitable varieties may help to bring substantial improvement in cane yield, which in term will upgrade the farmer's income.

Most of the soils in Bangladesh are low in organic matter, generally containing less than 1.5% while 2.5 to 3.0% organic matter are necessary for suitable crop production (Bhander *et al.*, 1998). Sugar and gur industries in Bangladesh are facing problem due to lack of high yielding

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<sup>1</sup>Scientific Officer, <sup>2</sup>Principal Scientific Officer, Bangladesh Sugarcane Research Institute, Ishurdi, Pabna.

urable varieties of sugarcane. Developed sugarcane varieties by Bangladesh Sugarcane Research Institute do not perform equally in all agro-ecological zones (Miah *et al.*, 1994). 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. Considering the facts, three newly released sugarcane varieties (Isd 32, Isd 33 and Isd 37) were included in this study to evaluate their performance in the Old Himalayan Piedmont Plain Soils.

## MATERIALS AND METHODS

The experiment was conducted at twelve different locations under Thakurgaon, Panchagar and Setabganj Sugar Mills zones in grower's field during the cropping seasons 2007-08 under AEZ 1 (Old Himalayan Piedmont Plain Soils). The experiment was comprised of three sugarcane varieties viz. Isd 32, Isd 33 and Isd 37 considered as experimental materials. The experiment was laid out in RCB design with four replications and plot size was 10 m <sup>^</sup> 8 m. It was planted in the month of November to December 2007. Two budded setts of each variety were used as planting materials and placed in the trench end to end keeping and row to row distance 1 m. Source of seed were certified seed plots of Regional Sugarcane Research Station farm, Thakurgaon. Fertilizer application was carried out according to the agro-ecological zones (AEZ). Other normal cultural practices like weeding, mulching and irrigation were done as and when necessary.

Fifty samples were randomly collected from each plot and record yield and yield attributes. Data were collected in proper time. The yield of a particular variety depends upon the heredity potential of the genotypes and environment where it is exposed to during the course of its life cycle (Yadava, 1993). The varieties grown in the sugar mill zones of Bangladesh are not showing production in farmers' field equally (Paul *et al.*, 1994). Soil and management practices are the main factors for increasing cane yield. Yield of cane was also recorded at harvest. The soils were sandy loam textured with pH 5.5 and low in organic matter. The urea and MoP applied in three equal splits, the first split at the planting time, the second split at tiller completion stage 90 DAP (Days after plantation) and the third at grand growth phase 180 DAP. Full amount of TSP, Gypsum, Zinc sulphate and one third of MoP were applied in trenches and thoroughly mixed with soil prior to setts plantation. After sett placement in trenches Regent 3GR @ 15 kg/ha applied to control termite. Different data on germination, number of tiller, number of millable cane, unit stalk weight (Kg), height (m), girth (cm), brix (%) and yield of cane were recorded. The canes at different locations were harvested mid November to last week of December 2008. The data obtained were statistically analyzed by using analysis of variance and finally least significant difference (LSD) test at P = 0.05.

Performances of the varieties at three sugar mill zones were presented in Table 1, 2 and 3. It was revealed from the tables that data on tiller population showed significant difference among the varieties in different locations. Rahman *et al.* (2008) revealed that the variety Isd 32 produced the highest cane yield (87.37 t ha<sup>-1</sup>) and the lowest (57.53 t ha<sup>-1</sup>). The cane yield varied among the varieties due to variation in yield producing attributes like height, girth, unit stalk weight and number of millable cane. The maximum number of tillers 170.20 <sup>^</sup> 10<sup>3</sup> ha<sup>-1</sup> and 159.02 <sup>^</sup> 10<sup>3</sup> ha<sup>-1</sup> were found in the variety Isd 37 at Panchagar and Thakurgaon locations but Isd 33 gave higher number of tillers (197.60 <sup>^</sup> 10<sup>3</sup> ha<sup>-1</sup>) at Setabganj. The minimum number of tiller (105.33 <sup>^</sup> 10<sup>3</sup> ha<sup>-1</sup>) was produced in the variety Isd 32 at Thakurgaon and Setabganj. Similarly, variation in tiller production among the different varieties was reported by Miah *et al.* (1994) and Rashid *et al.* (2001).

The variety Isd 33 produced the maximum number of millable cane (105.95 <sup>^</sup> 10<sup>3</sup> ha<sup>-1</sup>) at Panchagar where at Thakurgaon and Setabganj locations Isd 37 and Isd 32 produced the higher number of millable canes of 90.07 <sup>^</sup> 10<sup>3</sup> ha<sup>-1</sup> and 86.70 <sup>^</sup> 10<sup>3</sup> ha<sup>-1</sup>, respectively. Lowest number of millable cane 76.99 <sup>^</sup> 10<sup>3</sup> ha<sup>-1</sup> was observed in Isd 33 at Thakurgaon and Setabganj locations.

Matin *et al.* (1989) and Paul *et al.* (1994) also reported similar results on millable cane production.

Cane height and girth are the important attributes which induces the yield of cane per unit area. Significantly higher cane height of 3.11 m was recorded in the variety Isd 32 followed by Isd 33 (2.93 m) and Isd 37 (2.77 m) at Setabganj. No significant difference was observed in cane height at Panchagar and Thakurgaon locations. While considering girth of the cane varieties it was evident from the table that the maximum girth was found with Isd 37 at Setabganj and Panchagar locations (2.58 cm and 2.48 cm). No significant difference was observed in cane girth at Thakurgaon.

Table 1. Yield and yield attributes of the tested three released sugarcane varieties under TSM zones in 2007-08.

| Treatments | No. of tiller<br>( $\times 10^3 \text{ ha}^{-1}$ ) | No. of millable cane<br>( $\times 10^3 \text{ ha}^{-1}$ ) | Cane height<br>(m) | Cane girth<br>(cm) | Single stalk weight<br>(kg) | Brix (%)    | Cane yield<br>(t $\text{ha}^{-1}$ ) |
|------------|--|---|--------------------|--------------------|-----------------------------|-------------|-------------------------------------|
| Isd 32     | 105.33 b   | 86.82 a   | 2.63               | 2.43               | 1.17                        | 17.87<br>b  | 71.75<br>b                          |
| Isd 33     | 109.29 b   | 76.99 b   | 2.61               | 2.42               | 1.18                        | 19.07<br>ab | 62.30<br>b                          |
| Isd 37     | 159.02 a   | 90.07 a   | 2.67               | 2.39               | 1.16                        | 20.71<br>a  | 103.60<br>a                         |
| Lsd (0.05) | 17.21  | 8.68  | NS                 | NS                 | NS                          | 2.71        | 25.55                               |

\* Figures accompanied by the same letters are not significantly different at 0.05 level of probability as per DNMRT test.

Table 2. Yield and yield attributes of the tested three released sugarcane varieties under SSM zones in 2007-08.

| Treatments | No. of tiller<br>( $\times 10^3 \text{ ha}^{-1}$ ) | No. of millable cane<br>( $\times 10^3 \text{ ha}^{-1}$ ) | Cane height<br>(m) | Cane girth<br>(cm) | Single stalk weight<br>(kg) | Brix (%)   | Cane yield<br>(t $\text{ha}^{-1}$ ) |
|------------|--|---|--------------------|--------------------|-----------------------------|------------|-------------------------------------|
| Isd 32     | 105.33 c   | 86.70   | 3.11 a             | 2.23 b             | 1.17                        | 18.35<br>b | 71.75 b                             |
| Isd 33     | 197.60 a   | 77.09   | 2.93 ab            | 2.04 b             | 1.15                        | 20.36<br>a | 63.30 b                             |
| Isd 37     | 151.52 b   | 85.56   | 2.77 b             | 2.58 a             | 1.25                        | 20.78<br>a | 98.39 a                             |
| Lsd (0.05) | 17.73  | NS  | 0.31               | 0.26               | NS                          | 1.66       | 10.29                               |

\*Figures accompanied by the same letters are not significantly different at 0.05 level of probability as per DNMRT test.

Highest single stalk weight (1.29 kg and 1.25 kg) was obtained in Isd 37 at Panchagar and Setabganj locations but Isd 33 showed higher single stalk weight (1.18 kg) at Thakurgaon. Lowest single stalk weight was observed in Isd 33 at Panchagar and Setabganj locations, which were 1.13 kg and 1.15 kg respectively. Lowest single stalk weight of 1.16 kg was found in Isd 37 at Thakurgaon. A significant difference was observed in brix among the tested varieties in different locations. Highest brix of 20.78, 20.71 and 20.58% were recorded in Isd 37 at Setabganj, Thakurgaon and Panchagar respectively.

Table 3. Yield and yield attributes of the tested three released sugarcane varieties under PSM zones in 2007-08.

| Treatments | No. of tiller<br>( $\times 10^3 \text{ ha}^{-1}$ ) | No. of millable cane<br>( $\times 10^3 \text{ ha}^{-1}$ ) | Cane height<br>(m) | Cane girth<br>(cm) | Single stalk weight<br>(kg) | Brix (%) | Cane yield<br>(t $\text{ha}^{-1}$ ) |
|------------|--|---|--------------------|--------------------|-----------------------------|----------|-------------------------------------|
| Isd 32     | 112.30c  | 86.20b  | 2.71               | 2.44a              | 1.20                        | 17.55b   | 90.18b                              |
| Isd 33     | 131.10b  | 105.95a   | 2.69               | 1.85b              | 1.13                        | 18.65b   | 75.72b                              |
| Isd 37     | 170.20a  | 91.67b  | 2.54               | 2.48a              | 1.29                        | 20.58a   | 105.41a                             |
| Lsd (0.05) | 16.67  | 13.92   | NS                 | 0.27               | NS                          | 1.31     | 15.15                               |

\*Figures accompanied by the same letters are not significantly different at 0.05 level of probability as per DNMRT test.

The variety Isd 37 gave the highest cane yield of 105.41 t  $\text{ha}^{-1}$  at Panchagar followed by 103.60 t  $\text{ha}^{-1}$  and 98.39 t  $\text{ha}^{-1}$  at Thakurgaon and Setabganj respectively. Lowest cane yield (62.30 t  $\text{ha}^{-1}$  and 75.72 t  $\text{ha}^{-1}$ ) were observed in Isd 33 at all locations. Higher brix% of any variety is an indication to produce higher gur and sugar. Considering the brix and yield of cane in the experimental area variety Isd 37 was found superior to other varieties.

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