

## Isd 29—A Promising Variety of Sugarcane

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### ABSTRACT

Isd 29, a promising variety of sugarcane was developed in Bangladesh Sugarcane Research Institute from the cross Isd 16 x CP 50-72, and released in 1999. The genotype was selected from original seedlings in 1987, tested in different test stages, evaluated in Preliminary and Advanced Yield trial, and finally in Zonal Yield Trials at seven agro-ecological zones for three consecutive years. The variety was found superior to standard Isd 16 in germination, tillering, millable cane, yield of cane in plant and ratoon crop, and also sugar per hectare. It is a mid-maturing variety ranging cane yield from 52-93 tons ha<sup>-1</sup> and recoverable sucrose content from 7.67-10.87 percent. The variety is resistant to red rot, wilt, smut and white leaf diseases in artificial inoculation test and tolerant to top shoot borer, stem borer, scale and mealy bug under field condition. Isd 29 is tolerant to waterlogging, drought and highly tolerant to flood stress condition. The variety is suitable for cultivation in different agro-ecological zones especially for flood prone areas.

**Key words :** Isd 29, sugarcane, promising variety, disease resistant, sugar recovery.

### INTRODUCTION

The sugar and 'gur' industries in Bangladesh is facing problem due to lack of high yielding durable varieties of sugarcane. Of course, it is a common observation that sugarcane varieties show a tendency to decline in yield and vigor after a considerable period of cultivation (Humbert, 1959). According to Poehlman and Barthakur (1959), to maintain high yield of cane it is necessary to replace varieties every few years with new clones. With other qualities the sugar mills are urgently needed the varieties having tolerance to flood, waterlogging, drought and flood stress condition. To run the sugar and 'gur' industries for a longer period with continuous supply of cane it is needed to develop new varieties of sugarcane with different maturity behaviour. Considering the facts, Isd 29-a new variety of sugarcane has been developed from Bangladesh Sugarcane Research Institute (BSRI) with better performance in respect to high yield, sugar, pest and disease resistant and tolerant to waterlogging and stress to drought and flood.

### MATERIALS AND METHODS

The variety Isd 29 has been developed from the cross Isd 16 x CP 50-72 at the Bangladesh Sugarcane Research Institute in 1985. The genotype was first selected from the F<sub>1</sub> seedlings in 1987. Subsequently, the clone was tested in different test stages and yield trials in different years. Finally, the clone was evaluated in Zonal Yield Trials (ZYT) at seven agro-ecological zones viz. Ishurdi, Darsana, Rajshahi, Joypurhat, Thakurgaon, Rangpur and Jamalpur for three consecutive years. The experiment was laid out in randomized block design with four replications where Isd 16 was planted as the standard variety. Normal cultural practices were done and fertilizers were applied as per recommended dose. The experiment was planted each year in November/December and harvested in December/January. The ratooning ability of the genotype including the standard variety was studied at

two locations-Ishurdi and Rajshahi for two consecutive years. Data on germination, tiller, millable cane, sugar recovery, tolerance to waterlog, drought and flood stress condition, diseases and insect pest reaction, cane and sugar yield were recorded in different generations.

## RESULTS AND DISCUSSION

The germination of the newly developed variety Isd 29 recorded after 75 days of planting showed higher percentage over the standard Isd 16 (Table 1). Similar result was obtained by Mannan *et al.* (1998) where they compared a newly released variety Isd 28 with the standard Isd 16. Tiller numbers after 150 days was also higher in Isd 29 ( $125 \times 10^3 \text{ ha}^{-1}$ ) over the standard variety ( $117 \times 10^3 \text{ ha}^{-1}$ ). The number of millable cane as produced by Isd 29 at harvest indicated superiority of the variety than Isd 16. The result was in conformity with the findings of Miah *et al.* (1989) in the variety Isd 18.

**Table 1. Mean performance of Isd 29 on germination, tillering, millable cane and sugar yield than the standard Isd 16.**

| Varieties | Germination (%) | Tiller ( $10^3 \text{ ha}^{-1}$ ) | Millable cane ( $10^3 \text{ ha}^{-1}$ ) | Sugar yield ( $\text{t ha}^{-1}$ ) |
|-----------|-----------------|-----------------------------------|------------------------------------------|------------------------------------|
| Isd 29    | 33.04           | 125                               | 100                                      | 5.04                               |
| Isd 16    | 27.03           | 117                               | 92                                       | 4.08                               |

In case of cane yield, Isd 29 produced the higher tonnage both in plant (Table 2) and ratoon (Table 3) cane showing 20 and 32 percent increase over the standard variety (Table 4), respectively. Higher yield of plant and ratoon cane is a good characteristic of a variety which is in agreement with the findings of Singh *et al.* (1982) who reported that the ratooning ability along with plant cane were the principal criteria for popularity of any variety among the growers. The yield of cane showed the range from 52-93 tons  $\text{ha}^{-1}$  for Isd 29 while for Isd 16 the production ranged from 51-69 tons  $\text{ha}^{-1}$  (Table 2). In case of ratoon cane, the cane yield exhibited a range from 52 - 61 tons  $\text{ha}^{-1}$  for Isd 29 and 34-43 tons  $\text{ha}^{-1}$  for Isd 16 (Table 3). The results were in partial conformity with the findings of Khan *et al.* (1995) who reported that the yield of a mid-maturing variety Co 84218 cane vary from 80-85 tons  $\text{ha}^{-1}$  in plant cane.

**Table 2. Cane yield (TCH) of Isd 29 against Isd 16 at different locations in Zonal Yield Trials (Average of three years).**

| Varieties | Locations |         |          |           |            |         |          | Mean  |
|-----------|-----------|---------|----------|-----------|------------|---------|----------|-------|
|           | Ishurdi   | Darsana | Rajshahi | Joypurhat | Thakurgaon | Rangpur | Jamalpur |       |
| Isd 29    | 66.63     | 73.12   | 90.76    | 92.64     | 58.10      | 51.75   | 62.20    | 70.74 |
| Isd 16    | 51.34     | 62.00   | 68.77    | 52.53     | 45.63      | 48.33   | 65.88    | 56.35 |

**Table 3. Ratoon cane yield (TCH) of Isd 29 compared to Isd 16 in Zonal Yield Trials-I and II (Average of two years).**

| Varieties | Locations |          | Mean  |
|-----------|-----------|----------|-------|
|           | Ishurdi   | Rajshahi |       |
| Isd 29    | 60.78     | 51.41    | 56.60 |
| Isd 16    | 42.73     | 34.08    | 38.41 |

**Table 4. Percent increase of cane and sugar yield of Isd 29 over the standard Isd 16.**

| Varieties          | Cane yield (TCH) | Percent increase | Sugar yield (TSH) | Percent increase |
|--------------------|------------------|------------------|-------------------|------------------|
| <b>Plant cane</b>  |                  |                  |                   |                  |
| Isd 29             | 70.74            | 20               | 5.04              | 19               |
| Isd 16             | 56.35            | -                | 4.08              | -                |
| <b>Ratoon cane</b> |                  |                  |                   |                  |
| Isd 29             | 56.60            | 32               | -                 | -                |
| Isd 16             | 38.41            | -                | -                 | -                |

From the chemical analysis in different months it was observed that the variety Isd 29 produced above 8 percent sucrose recovery in November which proves that the variety is a mid-maturing in habit (Table 5). Isd 29 produced the higher tonnage of sugar showing 19 percent increase over the standard variety (Table 4). This increase in sugar yield might be due to indirect effect of higher cane yield of the variety. Similar results was also obtained by Mannan *et al.* (1998) when they analysed the sucrose content of Isd 28 in comparison with the standard Isd 16.

**Table 5. Sugar recovery (%) and maturity status of Isd 29 with the standard varieties Isd 16, Isd 18 and Isd 20**

| Varieties | Months |      |       |       |       | Maturity status* |
|-----------|--------|------|-------|-------|-------|------------------|
|           | Oct.   | Nov. | Dec.  | Jan.  | Feb.  |                  |
| Isd 29    | 7.67   | 8.52 | 9.95  | 10.87 | 10.75 | Mid maturing     |
| Isd 16    | 8.51   | 9.04 | 10.43 | 11.19 | 11.31 | Early maturing   |
| Isd 18    | 7.50   | 9.50 | 9.65  | 10.71 | 10.49 | Mid maturing     |
| Isd 20    | 6.97   | 9.72 | 10.50 | 10.64 | 11.02 | Mid maturing     |

\* The clone showing 8% and above sugar recovery in mid October, mid November and mid December is considered as early, mid and late maturing variety, respectively.

Regarding tolerance to waterlog, flood and drought stress condition, Isd 29 was found tolerant in waterlog and drought but highly tolerant in flood stress condition compared with the standards Isd 20 and Isd 22, respectively (Table 6). Like Isd 16, the variety is moderately resistant to red rot, wilt, smut and white leaf diseases. In case of reaction to insect pest, the variety is at par with the standard Isd 16 against the major insects like top shoot borer and stem borer but more tolerant against root stock borer, scale and mealy bug. The results are in agreement with the findings of Miah *et al.* (1989) where they found more tolerance of a new variety to different diseases and insect pests compared to the standard variety.

**Table 6. Performance of Isd 29 under waterlog, flood and drought stress conditions.**

| Varieties | Grading (1-5 scale) |       |         | Remarks                                           |
|-----------|---------------------|-------|---------|---------------------------------------------------|
|           | Waterlogging        | Flood | Drought |                                                   |
| Isd 29    | 2                   | 1     | 2       | Evaluated on the basis of greenness of the plant. |
| Isd 20    | 1                   | 1     | 2       |                                                   |
| Isd 28    | -                   | 3     | -       |                                                   |
| Isd 22    | -                   | -     | 2       |                                                   |

Where, 1 = Highly tolerant, 2 = Tolerant, 3 = Moderately tolerant, 4 = In tolerant and 5 = Highly in tolerant.



From the results of experiment, it is evident that the newly released variety Isd 29 is superior in respect of germination, tillering, millable cane, cane yield (plant and ratoon) and sugar yield over the standard variety Isd 16. The variety is suitable for cultivation in different agro-ecological zones but specially suitable for flood prone areas.

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