

Performance of Some Newly Released Sugarcane Varieties in Farmers Field Condition under High Ganges River Floodplain Soils

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ABSTRACT

An experiment was conducted in farmers field to replace traditional low yielded existing varieties of sugarcane by four BSRI developed new varieties of sugarcane viz., Isd 35, Isd 37, Isd 38 and Isd 39 considering yield, yield attributes and sugar content during 2012-13 cropping year. Isd 16 was used as standard variety for comparison. The results revealed that the highest number of tillers ($141.3 \times 10^3 \text{ ha}^{-1}$), millable cane ($99.0 \times 10^3 \text{ ha}^{-1}$), yield (105 t ha^{-1}) and field brix per cent (22 %) was found in Isd 39 followed by Isd 37 and the lowest tiller, millable cane and cane yield was recorded in Isd 16. The highest gross return (2,25,750 Tk. ha^{-1}) and BCR (2.51) was recorded from cultivating sugarcane variety Isd 39 followed by Isd 37 (2,07,604 Tk. ha^{-1} and BCR 2.31). So, there is a great scope to increase productivity of sugarcane by using newly released varieties (Isd 39 and Isd 37) in farmers' field.

Key words: Sugarcane, variety, brix%, millable cane, gross return

INTRODUCTION

Sugarcane (*Saccharum officinarum* L.) is cultivating both in mill and non-mill zones mainly for sugar and *goor* production. Area coverage of sugarcane gradually decreased towards year to year in Bangladesh. The causes for this declining trend of sugarcane production are long duration, lower average yield, higher production cost. One of the important reasons for low cane yield is cultivating old cane varieties. The solution of low cane yield and sugar recovery problem lies in the planting of improved cane varieties (Chattha *et al.*, 2006). Bangladesh Sugarcrop Research Institute (BSRI) developed 40 cane varieties so far of which only the oldest and mixed varieties are occupying in different regions of Bangladesh. Miah (2006) noted that variety plays a key role for both increasing and decreasing of sugar yield per unit area, while use of unapproved, inferior quality cane varieties affect sugarcane production negatively as situation prevails today. Sugarcane varieties gradually degenerate over a considerable period of cultivation and declining yield and vigour (Barnes, 1954 and Humbert, 1959). Singh and Singh (2000) stated that recovery of sugar is dependent on several factors viz., variety, climate, physiological maturity and mill efficiency. Among the factors, variety

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occupies the prime place in influencing sugar yield. Success of variety depends upon its adaptability to agro-climatic conditions of the area. Selection of an appropriate variety to be grown in a particular agro-ecological zone is primary requisite to explore its yield. Acceptance of a cane variety by the growers depends upon its high yielding potentialities. The cane yield of the existing cultivated sugarcane varieties in experimental site is very poor. Therefore, it is needed to replace the existing sugarcane varieties by newly released varieties developed by BSRI. The objective of this experiment is to evaluate the performance of some newly developed sugarcane varieties for replacing low yielding existing traditional sugarcane varieties in farmer's field.

MATERIALS AND METHODS

The experiment was conducted in farmer's field at Muladuli, Ishurdi, Pabna, Bangladesh under irrigated condition during 2012-13 cropping season. The site of this experiment represents the High Ganges River Floodplain Soils under agro-ecological zone 11 with medium high land of sandy loam soil with pH 7.6. The experiment comprised of five treatments i.e. five varieties of sugarcane viz. Isd 35, Isd 37, Isd 38 and Isd 39 along with the standard variety Isd 16. The experiment was laid out in randomized complete block design (RCBD) with three replications. The unit plot size was 10m x 8m. Conventional two budded sett was used in this experiment. Row to row distance was 100 cm and sett placement method was end to end. Application of fertilizers for sugarcane was done @ 325, 250, 180, 190, 10 kg ha⁻¹ as Urea, TSP, MoP, Gypsum and Zinc sulphate, respectively. Full doses of TSP, Gypsum, Zinc sulphate, 1/3rd Urea and MoP were applied in trench during the time of plantation. The remaining Urea and MoP were applied in two equal splits at 120 and 150 days after planting. Irrigation was applied 4 times at germination, tillering and stem elongation stage. Other intercultural operations (weeding, mulching, earthing up, tying etc) were done as and when required. Data were recorded on germination (%), tiller population, millable cane, yield, sugar percentage. The collected data were analyzed by using the analysis of variance (ANOVA) technique with Statistic 10 software package and the mean differences were compared by least significant difference (LSD) at 5% level of probability.

RESULTS AND DISCUSSION

Germination percentage

Germination percentage varied among different varieties of sugarcane (Figure 1). The highest germination was found in the variety Isd 39 (54%) followed by Isd 37 (51%) and the lowest germination percent was found in Isd 35 (41%). However, on the basis of the average germination percentage the selected varieties can be ranked as: Isd 39>Isd 37>Isd 38> Isd 16> Isd 35.

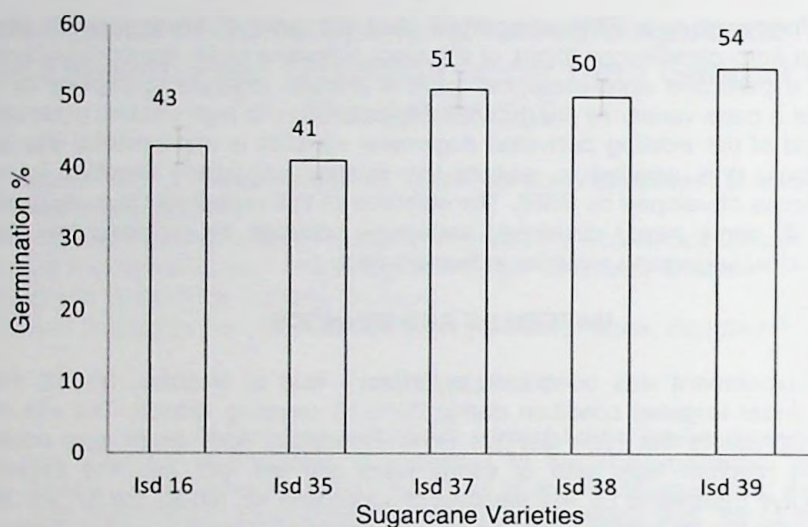


Figure 1. Germination percentage of different varieties of sugarcane

Number of tiller (000 ha^{-1})

The number of tillers of different varieties of sugarcane varied significantly. The variety Isd 39 produced the highest tillers ($141.3 \times 10^3 \text{ ha}^{-1}$) (Table 1). The lowest tiller was found in Isd 16 ($117.7 \times 10^3 \text{ ha}^{-1}$). Alam *et al.* (2006) and Rashid *et al.* (2001) also reported that tiller production varied among different sugarcane varieties.

Number of millable cane (000 ha^{-1})

The number of millable cane of different sugarcane varieties are presented in Table 1. The results showed that maximum number millable cane was found in the variety Isd 39 ($99.0 \times 10^3 \text{ ha}^{-1}$) followed by Isd 37 ($92.87 \times 10^3 \text{ ha}^{-1}$) and the minimum was in Isd 16 ($77 \times 10^3 \text{ ha}^{-1}$). Alam *et al.* (2006) and Paul *et al.* (1994) also reported that number of millable cane varied among different sugarcane varieties.

Cane yield (tha^{-1})

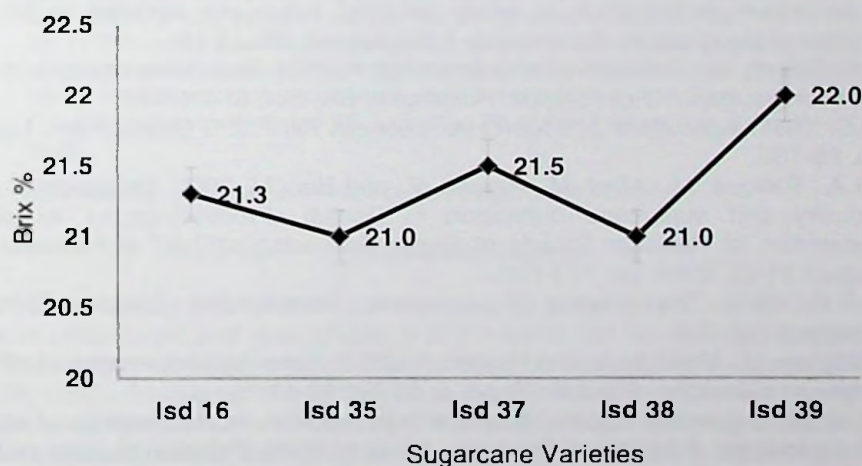
Cane yield was significantly varied among the sugarcane varieties. The maximum cane yield (105 tha^{-1}) was obtained from the variety Isd 39 followed by the variety Isd 37 (95.56 tha^{-1}) and the minimum was found in Isd 16 (79.00 tha^{-1}). Variation of cane yield among the varieties was also reported by Soheli *et al.* (2013), Bahadar *et al.* (2001) and Jamil *et al.* (2007). Maximum 32.91% cane yield was increased in Isd 39 over standard Isd 16.

Table 1. Tiller population, millable cane, cane yield of different sugarcane varieties

Treatments (Cane varieties)	Tiller ($\times 10^3 \text{ ha}^{-1}$)	Millable cane ($\times 10^3 \text{ ha}^{-1}$)	Yield (tha^{-1})	Yield increase over standard (%)
Isd 16 (Standard)	117.7 c	77.00 c	79.00 c	-
Isd 35	130.7 b	79.33 c	82.67 b	4.64
Isd 37	139.04 a	92.87 ab	96.56 ab	22.23
Isd 38	132.7 b	81.00 b	83.67 b	5.91
Isd 39	141.3 a	99.05 a	105.0 a	32.91
LSD (0.05)	8.378	6.238	8.204	-

Brix percentage

The tested varieties exhibited variation on sugar content (Field brix %) (Figure 2). The highest brix % (22) was found in Isd 39 followed by Isd 37 (21.5) and the lowest brix % (21.0) was in Isd 35. Higher brix percent of any variety is an indication for the production of higher sugar and *goor*.

**Figure 2. Brix percent of different varieties of sugarcane****Cost and return**

Economic performance of different sugarcane varieties is presented in table 2. The highest gross return (2,25,750 Tk. ha^{-1}), gross margin (1,35,750 Tk. ha^{-1}) and BCR (2.51) was achieved from cultivating sugarcane variety Isd 39 followed by Isd 37. The lowest economic return was recorded in Isd 16 (BCR 1.88). Therefore, Isd 39 and Isd 37 were found economically superior varieties compared to other sugarcane varieties.

Table 2. Cost and return analysis of different sugarcane varieties

Treatments (Cane varieties)	Total cost (Tk. ha ⁻¹)	Gross return (Tk. ha ⁻¹)	Gross margin (Tk. ha ⁻¹)	Benefit cost ratio (BCR)
Isd 16 (Standard)	90,000	1,69,850	79,850	1.88
Isd 35	90,000	1,77,740	87,740	1.97
Isd 37	90,000	2,07,604	1,17,604	2.31
Isd 38	90,000	1,79,890	89,890	1.99
Isd 39	90,000	2,25,750	1,35,750	2.51

Price of sugarcane: 2150.00 Tk. t⁻¹

The overall result revealed that newly released sugarcane varieties Isd 39 and Isd 37 performed better regarding yield and economic return. So it can be suggested for growing these two varieties at farmers field with optimum management packages for getting higher yield as well as economic benefits from sugarcane cultivation.

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