

Performance of Modern Sugarcane Varieties for Gur Production in Modhupur Tract Soils

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ABSTRACT

An experiment was conducted at Bangladesh Rice Research Institute Farming Systems Research and Development site, Kapasia under Modhupur Tract Soils to evaluate performance of six sugarcane varieties, Isd 16, Isd 21, Isd 24, Isd 28, Amrita and Khowai along with a local check, Misrimala during 1998 - 1999 cropping season. Results showed that variety exerted significant influence on all the parameters studied except seedlings mortality and millable canes per hectare. The variety Isd 28 produced significantly higher yield per hectare and differed with all other varieties except Isd 21. The variety Isd 21 and Isd 28 produced significantly higher Gur yield per hectare and differed from rest varieties. Variety Isd 21 and Isd 28 gave 42 and 33% higher gross margin respectively than the farmer's local variety, Misrimala.

Key words: Sugarcane, gur, varieties, Isd 21, Isd 28, cane yield.

INTRODUCTION

Participatory Rural Appraisal (PRA) report reveals that Farming System Research and Development Site, Kapasia is characterized by growing sugarcane. Modhupur Tract is under sugarcane non-millzone area and farmers plant sugarcane in the month of March and April under rainfed situation (Quddus *et. al.* 1998). Such late planted sugarcane gives lower yield. Survey data also reveals that cane produced in this area is mainly used for gur making and process of gur preparation is very labour intensive. In this area one locally adapted variety, Misrimala is being cultivated since a long period. But variety Misrimala is highly susceptible to red rot and white leaf diseases. Recently the area covered by Misrimala is decreasing gradually because of its lower yield. Moreover, there is no other suitable variety that could be used as an alternate to Misrimala (BSRI, 1999). In case of replacing varieties it is considerable that newly released varieties do not perform equally well in all locations. It is, therefore, important to evaluate sugarcane varieties suitable for the area for sustainable sugarcane production and to ensure sugarcane supply to the gur makers. Considering the fact, a study with six modern sugarcane varieties was undertaken in the farmers' field of Modhupur Tract soils to evaluate performance of modern varieties for gur production.

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MATERIALS AND METHODS

The experiment was conducted at Bangladesh Rice Research Institute (BRRI) Farming Systems Research and Development Site (FSR & D), Kapasia during 1998-1999 cropping season. The soil is sandy loam in texture, belongs to Modhupur Tract of Agro-ecological zone 28. The study included six sugarcane varieties, Isd 16, Isd 21, Isd 24, Isd 28, Amrita, Khowai and a local check (Misrimala). The experiment was laid out in a randomized complete block design with three replications. The size of unit plot was 7.2m x 6m. The land was prepared in early December and fertilizers @ 150kg N, 50kg P, 130 kg K, 25 kg S and 2 kg Zn per hectare as urea, triple super phosphate, muriate of potash, gypsum and zinc sulphate respectively, were applied as per recommendation. Seedlings of sugarcane were transplanted in the main field on 24 December 1998. Two budded soil bed seedlings were transplanted maintaining 90 cm row spacing and 45 cm plant spacing. Intercultural operations were done as per normal practice. The crop was harvested at maturity in December 1999.

Observations on individual plant parameters were recorded from ten randomly selected plants in each plot whereas number of millable cane, tiller and yield of cane were measured from whole plot. Gur was prepared from juice extracted immediately after harvest by open pan boiling method. The average values of all parameters were statistically analyzed and differences were determined through Duncan's New Multiple Range (DMR) Test.

RESULTS AND DISCUSSION

All the characters studied showed significant effects except seedlings mortality (Table1). Data on germination showed that the variety Isd 16 germinated the highest (86.2%) and differed significantly with Khowai (74.3%), Amrita (70.4%) and Misrimala (62.1%). Similar observation on germination by variety was also reported by Mannan *et al.* (1981) and Snehal. Seedling mortality in all varieties were found statistically identical but the variety Khowai and Isd 24 showed better performance (0.35 and 0.69%, respectively). In case of cane height, the variety Isd 24 and Isd 21 showed significantly dwarf plants compared to Misrimala whereas Isd 28 showed significantly taller than all other varieties. The highest number of internode was found in Isd 24 (34.5) and was significantly higher than that of other varieties.

Table 1. Growth characters of different sugarcane varieties.

Variety	Germination (%)	Seedling mortality (%)	Plant height (m)	No. of Internode stalk ⁻¹ (no.)
Isd 16	86.2 a	1.73	3.63 b	31.9 b
Isd 21	81.2 ab	1.39	3.43 c	30.3 bc
Isd 24	82.0 ab	0.69	3.39 c	34.5 a
Isd 28	80.1 ab	1.39	3.99 a	30.7 bc
Amrita	70.4 c	1.04	3.55 b	29.0 c
Khowai	74.3 bc	0.35	3.58b	30.9 bc
Misrimala	62.1 d	3.48	3.66 b	31.4 bc
CV (%)	5.7	83.4	1.8	4.1

Figure with same letter(s) do not differ significantly at 5% level as per DMRT.

Results also showed that variety exerted significant influence on all parameters studied except millable canes per hectare (Table 2). The variety Isd 28 produced the highest number of tillers (186.7 ha^{-1}) and differed significantly with that of Isd 16 and Amrita. Considering the number of millable canes, there was no significant difference among tested varieties in millable cane production. However, the highest number of millable canes was obtained from Isd 21 ($95.7 \times 10^3 \text{ ha}^{-1}$) and the lowest from Misrimala (80.7×10^3). Matin *et al.* (1989) and Paul *et al.* (1994) also reported similar results on millable canes production. The varieties Amrita and Isd 28 produced significantly the cane of higher weight (1.77 and 1.75 kg cane $^{-1}$ respectively) than rest varieties. In case of cane yield, variety Isd 28 produced significantly the highest (169.6) tons cane per hectare (TCH) and differed with all other varieties except Isd 21 (158.0 TCH). The findings supported results of Singh *et al.* (1999) and Arvind *et al.* (1997) where they also found variation in cane yield among different varieties. The highest cane yield of Isd 28 was associated with the highest plant height and single cane weight while for Isd 21, number of millable canes per hectare (Table 1, 2). Results supported finally of Singh *et al.* (1998) and BSRI (1999). Variety Isd 21 indicated higher per cent of Brix and differed significantly with Amrita and Isd 24. The variety Isd 21 and Isd 28 produced significantly higher yield of gur (16.85 and 16.06 t ha^{-1} respectively) and differed from rest varieties (Table 2). This higher gur yield coming from Isd 21 apparently corresponded to its higher Brix percentage. BSRI (1997) also reported that significantly higher Brix percentage indicated higher gur producing variety.

Table 2. Yield and yield components of different sugarcane varieties.

Variety	Tillers (10^3 ha^{-1})	Millable canes (10^3 ha^{-1})	Single cane weight (kg)	Cane yield (TCH)	Brix (%)	Gur yield (TCH)
Isd 16	123.0 c	92.8	1.23 b	133.7 c	19.43 ab	13.01 b
Isd 21	183.0 ab	95.7	1.32 b	158.0 ab	21.37 a	16.85 a
Isd 24	169.6 ab	82.3	1.27 b	109.5 d	18.78 b	10.15 c
Isd 28	186.7 a	94.3	1.75 a	169.6 a	18.89 ab	16.06 a
Amrita	153.3 b	89.0	1.77 a	148.6 bc	18.04 b	13.40 b
Khowai	178.6 ab	87.6	1.32 b	132.9 c	19.52 ab	12.86 b
Misrimala	157.0 ab	80.7	1.33 b	140.0 c	18.91 ab	13.26 b
CV (%)	9.9	14.2	15.5	6.3	7.6	10.6

Figure with same letter(s) do not differ significantly at 5% level as per DMRT.

Economic analysis indicated that variety Isd 21 and Isd 28 gave an average gross margin of Taka 141590 and 132400 ha^{-1} respectively, which were 42% and 33% higher than local Misrimala (Table 3). Due to higher gur yield of Isd 21 and Isd 28, these two varieties resulted higher gross margin.

Table 3. Economic return of sugarcane varieties as gur production.

Variety	Variable cost* (1000 Tk. ha ⁻¹)	Gross return** (1000 Tk. ha ⁻¹)	Gross margin (1000 Tk. ha ⁻¹)
		195.15	97.72
Isd 16	98.43	252.75	141.59
Isd 21	111.11	150.75	61.75
Isd 24	89.00	240.90	132.40
Isd 28	108.50	201.00	101.30
Amrita	99.70	192.90	94.96
Khowai	97.94	198.90	99.64
Misrimala	99.26		

*Variable cost includes cane production and gur processing cost.

**Gross return from gur (Price of gur ton⁻¹) = Tk. 15000.00

Over viewing the experimental results, it could be concluded that the variety Isd 21 and Isd 28 might be recommended for cultivation in Modhupur Tract soils.

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