

AGRONOMIC PERFORMANCES OF BSRI DEVELOPED PROMISING SUGARCANE CLONES AT DIFFERENT PLANTING TIMES

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ABSTRACT

An experiment was conducted at Bangladesh Sugarcrop Research Institute (BSRI) farm under irrigated condition during 2017-2018 cropping season to examine the agronomic performance of BSRI developed promising sugarcane clones at different planting dates. There were two planting times: November, 2017 as early and January, 2018 as late. Four promising clones namely I 103-10, I 7-11, I 111-11 and I 230-11 were tested in this experiment, where variety Isd 39 was taken as standard. The results revealed that the highest number of tillers found in I 7-11 both in early and late plantation ($105.14 \times 10^3 \text{ ha}^{-1}$ and $71.53 \times 10^3 \text{ ha}^{-1}$, respectively). The highest yield in early and late plantation was found from I 103-10 (120.70 tha^{-1}) and I 111-11 (75.70 tha^{-1}), respectively. In addition, the highest pol (%) was found from I 111-11 in early and late plantation (14.09% and 14.75%, respectively). The results also revealed that yield and yield contributing parameters were found to be declined in the late plantation. Pol (%) cane in early planting was found almost statistically identical among selected clones/variety but significantly varied in the late plantation. However, the clones I 103-10 and I 111-11 were found most promising in the study site as they produced higher yield and yield contributing parameters over the tested clones/variety for both in early and late plantation.

Key words: Sugarcane, planting time, promising clones, agronomic performance.

Introduction

Sugarcane is an important cash crop of Bangladesh with an average yield of 45 tha^{-1} as against its theoretical approximation of 75 tha^{-1} . At present, the area under sugarcane is about 80.97 thousand hectares covering both mill and non-mill zones with an annual production of about 3142 thousand tons (BBS, 2019). There are number of reasons for lower cane yield and one of those is the planting of low yielding varieties. The main reason of poor yield of sugarcane has been identified as insufficient number of millable stalks and lower unit stalks weight. Sugar industries in Bangladesh continuously need high yielding and high sugar varieties. After a considerable period of cultivation sugarcane varieties show a tendency to decline in yield and vigour (Barnes, 1954 and Humbert, 1959). It is an obscure and puzzling problem to scientists, growers and processors. To maintain high yielding, it is necessary to replace varieties every few years with new clones (Poehlman and Barthakur, 1969). Therefore, it is need of the time to introduce new high yielding varieties with good ratoon ability in the country (Chattha and Ehsanullah, 2003). Mian (2006) reported that variety plays a key role in both increasing and decreasing per unit area sugar yield. The use of inferior quality cane varieties affects sugarcane production negatively as situation prevails today. The solution of low cane yield and sugar recovery problem lies in the planting time of improved cane varieties (Chattha *et al.*, 2006). Viator *et al.*, (2005) stated that planting date is one of the important variables that affects sugarcane stand establishment. Hoy *et al.*, (2006) observed that cane weight and maturity of sugarcane are highly associated with planting time that may influence its productivity. Due to late planting, the cane germination and tiller population become lowered consequently resulted in lesser millable cane stalk production and hence reduced final cane yield (Omoto and Abaya, 2005). Hossain *et al.* (2011) concluded that growth characters like tillers, millable cane stalks, cane height, girth and unit stalk weight were significantly influenced by different planting dates. The values of all the yield contributing factors and quality parameters were higher in the crops planted in November compared to that planted in February and

March. Early and late planting had resulted in reduced yield of sugarcane (Hoy *et al.*, 2006). Jintrawet *et al.*, (2000) found that sugarcane planted during the first week of November gave higher cane yield. Before recommendation as variety the promising clones of sugarcane are required to be studied in respect of their ability to yield production and quality both in plant and ratoon crop. From this view, four promising clones developed by breeding division of BSRI along with a standard variety were studied for agronomic performances.

Materials and Methods

The experiment was conducted at Bangladesh Sugarcrop Research Institute (BSRI) farm, Ishurdi, Pabna during 2017-2018 cropping season under irrigated condition. The site represents High Ganges River Floodplain Soil under Agro-ecological Zone 11 with medium high land of typical sandy loam soil having pH 7.6. In this experiment four promising clones of sugarcane along with a standard variety were planted to study their agronomic performances. The experiment was laid out in Randomized Complete Block (RCB) design with three replications. The unit plot size was 6 m x 6 m and the treatments (clones/varieties) were I 103-10, I 7-11, I 111-11, I 230-11 and Isd 39 and two planting times were November, 2017 as early and January, 2018 as late plantation. Conventional two budded setts were planted with row to row spacing 100 cm and plant to plant spacing 30 cm. Fertilizers were applied @ 326, 250, 180, 190 and 10 kg ha⁻¹ as Urea, TSP, MP, Gypsum and Zinc sulphate, respectively (FRG, 2012). 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, respectively. 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 ($\times 10^3$ ha⁻¹) population, millable cane ($\times 10^3$ ha⁻¹), cane yield (tha⁻¹) and 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

Yield Contributing parameters of Sugarcane : The results of the experiment have been presented in the Table 1. It is seen from the table that higher number of tillers and millable canes were produced in early planting i.e. November planting. In early planting the highest number of tillers (105.14×10^3 ha⁻¹) was obtained in the clone I 7-11 followed by clone I 230-11 (98.89×10^3 ha⁻¹) and the lowest was from clone I 111-11 (88.89×10^3 ha⁻¹). In late planting the maximum number of tillers was also obtained in the clone I 7-11 followed by clone I 111-11 and the lowest in I 230-11. In case of early planting, maximum number of millable canes 90.25×10^3 ha⁻¹ was recorded in clone I 103-10 followed by 86.94×10^3 ha⁻¹ from clone I 230-11 and the lowest was from the clone I 7-11. In case of late planting, maximum number of millable canes 69.47×10^3 ha⁻¹ was recorded in clone I 7-11 followed by 63.22×10^3 ha⁻¹ from clone I 103-10 and the lowest was from the clone I 230-11. These results indicated that tiller and millable cane production were declined in late planted cane.

Yield was significantly influenced by the planting time. The yield of cane in early planting was supported by all yield contributing characters and was superior to late planting. This finding agrees with Hogue *et al.*, 1994. In early planting the maximum cane yield (120.70 tha⁻¹) was obtained from clone I 103-10 followed by clone I 111-11 and the lowest cane yield (85.56 tha⁻¹) was recorded from Isd 39. In late planting, the highest cane yield 75.70 tha⁻¹ was obtained from the clone I 111-11 followed by clone I 7-11 and the lowest was recorded in clone I 103-10 (60.14 tha⁻¹).

Pol (%) cane: The data on pol (%) cane in early planting was found statistically identical among different clones/varieties but it was varied significantly in late planting (Fig.1). In early planting the highest pol (%)

cane (14.09) was obtained from clone I 111-11 followed by clone I 103-10 and the lowest (11.92) was recorded from standard variety lsd 39. In late planting the highest pol (%) cane (14.75) was also obtained from clone I 111-11 followed by clone I 202-97 and the lowest from clone I 7-11. However, clone I 111-11 gave maximum pol (%) cane in both early and late planting.

Table 1. Effect of planting time on tiller, millable cane and cane yield of different sugarcane clones/variety

Treatments	Tiller ($\times 10^3 \text{ ha}^{-1}$)		Millable cane ($\times 10^3 \text{ ha}^{-1}$)		Cane yield (tha^{-1})	
	Early	Late	Early	Late	Early	Late
A ₁ : I 103-10	94.16 ab	62.72 b	90.25 a	63.22 ab	120.70 a	68.14 d
A ₂ : I 7-11	105.14 a	71.53 a	82.64 a-c	69.47 a	96.31 a-c	71.81 ab
A ₃ : I 111-11	88.89 a-c	67.50 ab	83.42 a-c	58.30 b	110.00 ab	75.70 a
A ₄ : I 230-11	98.89 a	60.83 bc	86.94 ab	53.75 c	94.72 a-c	59.38 d
A ₅ : lsd 39 (Std.)	90.70 ab	65.70 ab	85.45 ab	62.33ab	85.56 b-d	70.08 ab
Mean value	95.56	65.65	85.74	60.81	101.4	67.42
LSD (5%)	24.55		21.53		-	

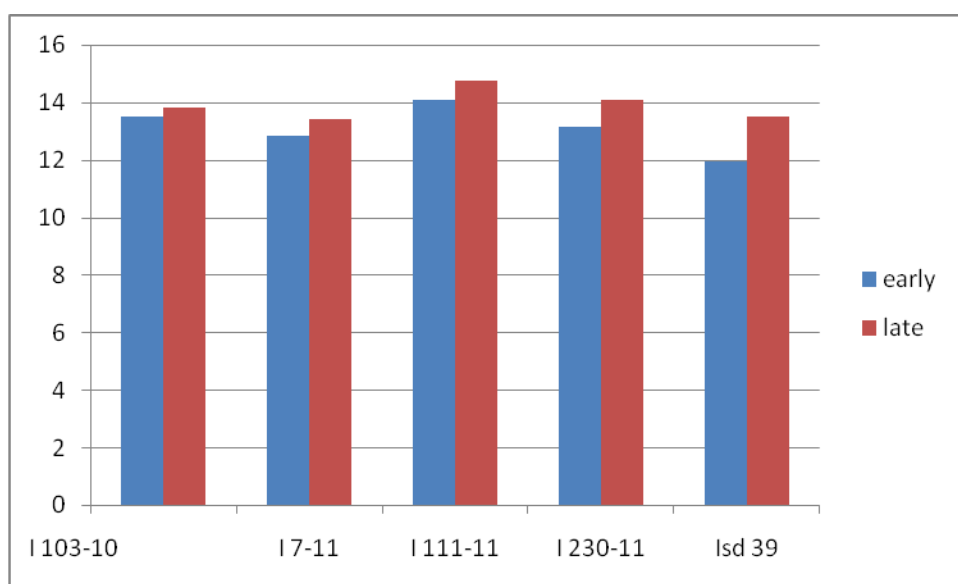


Fig. 1. Pol (%) cane as affected by different planting time

Conclusion

The overall results indicated that all the clones and variety performed better in early planting compared to late planting. Clones I 103-10 and I 111-11 proved their superiority in respect of yield contributing characters over the other tested clones both in early and late planting even to standard variety used in the experiment.

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