

Effect of Interrow Spacing & Planting Time on the Yield and Yield Contributing Factors of Co. I158 at TSM Farm

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ABSTRACT

The effect of time of planting and row spacing were studied at Potuadangi Farm of Thakurgaon Sugar Mills in 1980-81 Season. There were four dates of planting with one month interval starting from 15th November. Four row spacings were 30 cm, 75 cm, 90 cm, and 105 cm.

Sugarcane planted on 15th November produced the highest yield (64.63 TCH) at 75 cm row spacing followed by 60 cm row spacing with same planting date. The significantly highest yield of November planting was influenced by highest germination, tiller and millable cane production. The yield and yield contributing factors were found to decrease as the planting date proceeded and row spacing increased.

November planting with closer spacing (75 cm) may be recommended for higher cane yield in Thakurgaon area.

INTRODUCTION

The yield of Sugarcane and Sugar is very low in our country. Planting time and interrow spacing among several factors play a vital role in good production. In Bangladesh, sugarcane plantation is conventionally done between November to February (Anon., 1977-78). Similarly interrow spacing also vary from 30 cm to 120 cm irrespective of variety, location or planting time. It is reported that time of planting alone can increase the yield of cane by 25-30% (Anon., 1981).

Planting between 30th November and 1st January tended to produce more cane than those planted after this period (Anon., 1979). Bull (1975) reported that yield of sugarcane is positively correlated with the final stalk population and the latter is governed by interrow spacing. Stalk population increase per unit area as the interrow spacing decreases (Matherne, 1974 and Matherne & Irvine, 1978). In South Africa conventional row spacing is 140 cm and yield may

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be increased by about 5% for every 30 cm reduction in interrow spacing down to 60 cm (Thompson, 1962). In North India, a row spacing of 90 cm and particularly in Punjab state a row spacing of 60 cm is used (Kanwar and Sharma, 1974).

The agro-climate of the cane growing regions of Bangladesh varies from place to place. The micro climate and soil condition of Northern cane zone, specially Thakurgaon Sugar Mills are different from other parts.

As such, the present research work was undertaken to find out an optimum time of planting corresponding to suitable row spacing of Thakurgaon area.

MATERIALS AND METHODS

The experiment was conducted at the Potuadangi Farm of Thakurgaon Sugar Mills Ltd. during the cropping season 1980-81 under rainfed condition. The soil of the experimental plot was sandy loam and belonged to the tract of Teesta flood plain with pH ranging between 5.5 to 6.5. The treatments were distributed in split plot design with four replications. Each replication represents block of the experiment and was divided in to four main plots to which planting time factors were assigned. Each main plot was again divided in to four sub plots to which row spacing factors were assigned at random. The plot size was 9.6m x 6.4m.

The following factors were considered :

Planting times	Interrow spacings
i) 15th November, 1980—N	i) 60 cm.
ii) 15th December, 1980—D	ii) 75 cm.
iii) 15th January, 1981—J	iii) 90 cm.
iv) 15th February, 1981—F	iv) 105 cm.

In the sub plots, the trenches were made by spade maintaining the row spacing as allocated. The soil of the trenches were treated by heptachlor and fertilizers were applied as per recommended dose.

The cane variety Co.1158 was used in the experimental plot. Equal number of setts having three eye buds were planted end to end.

All intercultural operations appropriate to the crop were done and the data on the following crop characters were studied.

- i) Germination at 90 days of plantation (%)
- ii) Number of tillers after 145 days of planting (no.)
- iii) Plant height at harvest (cm)
- iv) Number of millable cane at harvest (no.)
- v) Average weight of 30 canes per treatment (kg.)
- vi) Percent recovery of sucrose (analysed just a day before the harvest the sample consisting of 5 sticks randomly selected from each plot %).

The whole of the experimental field was harvested on 9th January, 1982 at ground level and necessary post harvest data were taken.

RESULTS AND DISCUSSION

Significantly higher germinations were obtained from November and January planting over December and February planting (Table 1). The spacing treatments had no significant effect on germination. November and January planting received optimum soil moisture and temperature for higher and quick germination over others (Fig 1). Hoey and Hossain (1981) reported that germination for early planted cane was faster than the late planted cane. They also noticed that there was a depression of emergence with a fall in temperature. Temperature, influences germination has been reported elsewhere (Barnes, 1974, Humbert 1968).

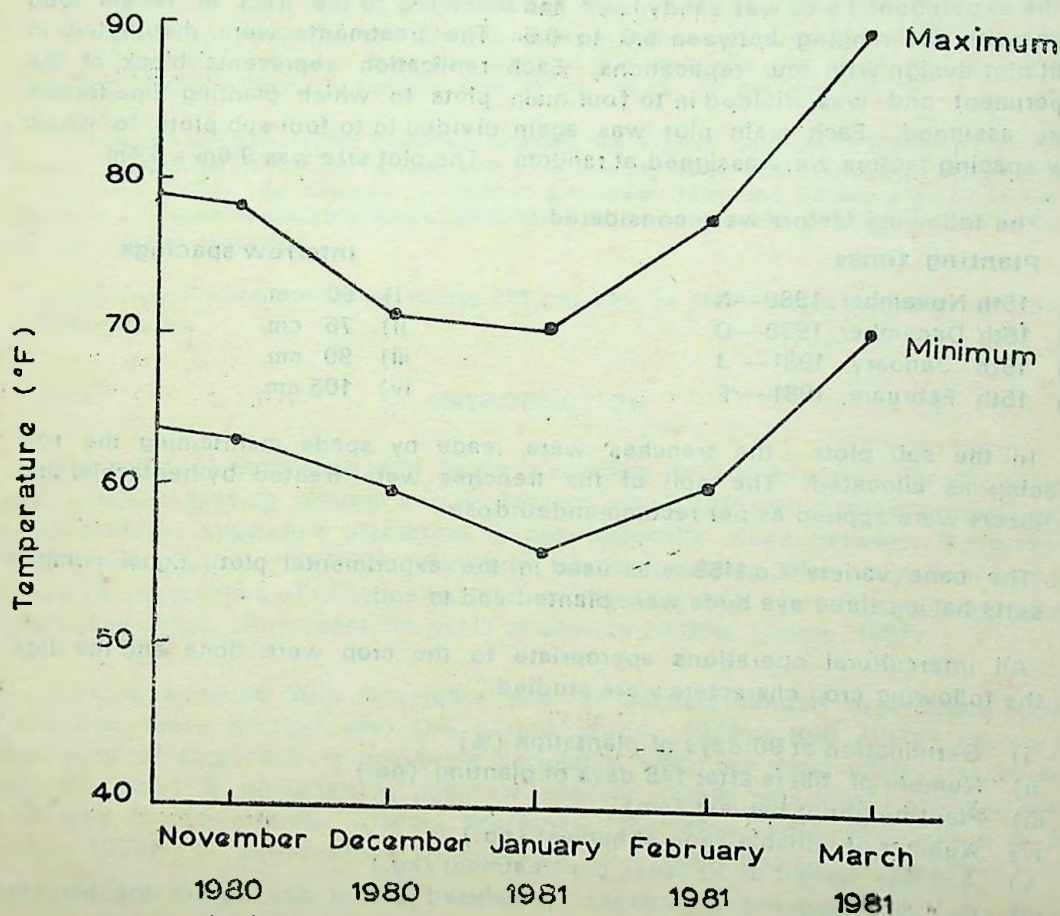


Fig. 1. Temperature range during germination period

Table 1. Effect of row spacing and time of planting on germination, tillering, millable cane and height of the cane.

Treatment	Germination Percentage					No. of tillers/ha X 1000					No. of millable cane/ha X 1000					Height of the cane at harvest (in metre)				
	N	D	J	F	Mean	N	D	J	F	Mean	N	D	J	F	Mean	N	D	J	F	Mean
Planting time																				
Row spacing																				
60 cm	43.27	36.20	43.99	34.30	39.42	96.83	76.09	66.88	64.39	76.05	91.62	90.11	89.25	85.14	89.03	2.35	2.02	1.84	1.95	2.05
					a					d					c					a
75 cm	42.91	35.37	42.52	33.91	38.68	79.43	77.23	59.91	62.60	69.79	91.37	88.28	84.77	88.76	88.30	2.37	2.26	1.96	1.80	2.10
					a					c					c					a
90 cm	41.08	35.56	44.26	36.79	39.43	64.39	69.41	63.46	50.25	61.88	79.06	80.57	83.26	73.78	79.92	2.38	2.04	2.03	1.91	2.09
					a					b					b					a
105 cm	42.01	32.63	44.16	36.11	38.74	56.28	57.06	46.09	48.87	52.07	71.57	66.19	72.87	68.51	69.78	2.24	2.05	1.87	1.97	2.03
					a					a					a					a
Mean	42.32	34.94	43.74	35.26	—	74.24	69.95	59.08	56.53	—	83.41	81.29	82.54	79.80	—	2.34	2.09	1.93	1.91	—
	b	a	b	a		b	b	a	a		a	a	a	a		b	a	a	a	

* Figures with similar letter do not differ significantly at 5% level as per DNMR test.

Table 2. Effect of row spacing and time of planting on weight of 30 cane, yield of cane and recovery of sucrose %.

Treatment	Weight of 30 cane/Treatment (kg)					Yield of cane/ha (TCH)					Recovery of Sucrose (%)				
	N	D	J	F	Mean	N	D	J	F	Mean	N	D	J	F	Mean
Planting time															
Row spacing															
60 cm	21.65	20.95	16.74	16.44	19.04 a	64.25	52.42	47.04	44.94	52.16 b	9.76	9.79	9.78	9.74	9.77 a
75 cm	22.35	20.14	17.94	18.64	19.74 a	64.63	60.87	49.67	53.09	57.06 c	9.85	9.43	10.29	9.44	9.75 a
90 cm	22.05	22.05	18.64	18.64	20.24 a	58.49	56.11	50.26	41.97	51.71 b	9.68	9.64	9.62	9.69	9.66 a
105 cm	23.15	20.95	16.74	19.04	19.34 a	51.67	45.27	40.92	42.23	48.07 a	9.63	9.32	9.80	10.03	9.70 a
Mean	22.35 b	20.95 b	17.54 a	18.14 a		59.76 b	53.67 ab	46.97 a	45.56 a		9.73 a	9.55 a	9.87 a	9.73 a	

* Figures with similar letter do not differ significantly at 5% level as per DNMR test.

Highest number of tiller production was attained by November planting followed by December planting and was significantly superior to other dates of planting. Hoey and Hossain ((1981) also observed similar response. On the other hand, significantly higher number of tillers were produced by 60 cm row spacing. The number of tiller decreased with the increase of row spacing (Table 1). Higher tillering by narrow row spacing were due to higher number of germinated eyebud in per unit area. The results were in full agreement with Kanwar and Sharma (1974), who noticed higher tiller production in closer spacings.

The time of planting did not affect number of millable cane production. However, 60 cm and 75 cm row spacing produced identical and significantly higher number of millable canes per unit area over 90 cm and 105 cm row spacings. Poorest number of millable cane were produced by 105 cm row spacing. Similar results were obtained by Kanwar and Sharma (1974). Miah and Rahman (1981) observed that row spacing of 60 cm gave higher population of cane.

In respect of 30 canes weight it was observed that significantly heavier canes were produced by November and December planting while there were no significant differences in any of the row spacings tested (Table 2). Similarly, tallest canes were produced by November plantings and the remaining plantings produced canes with identical height. The row spacing treatments had no effect on the length of sugarcane stalk.

Sugarcane yield was significantly influenced by the planting time. November planting significantly out yielded all other plantings followed by December planting, whereas January and February plantings were identical to each other (Table 2). The highest yield of November planting was supported by all yield contributing characters and was superior to other planting dates. This finding agrees with similar works done elsewhere (Anon., 1979 ; Chen and Tse, 1969).

Highest yield of cane/ha was produced by the interrow spacing of 75 cm and lowest cane yield was resulted by the row spacing of 105 cm. This result partially agreed with the findings of Thompson and Thompson (1962) who obtained higher yield at closer spacings.

The recoverable sucrose content remained unaffected by all the treatments.

Interaction between treatment had no significant effect on any of the cane production parameters studied except tillering. November planting at 60 cm row spacing produced significantly highest number of tiller per unit area followed by December planting with 75 cm row spacing. The tiller production decreased gradually as the planting time was delayed and row spacing increased.

The results show that Co.1158 variety of sugarcane grown at Thakurgaon area gives higher yield when planted around 15th November with 75 cm inter-row spacing. Delay in planting and wider spacings reduced the yield sharply. Therefore, this result may be applied for commercial production of Co.1158 around Thakurgaon.

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