

Comparative Performance of Planting Methods on Yield of Chewing Sugarcane with Intercrops

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ABSTRACT

An experiment was conducted to find the suitable planting method for chewing cane production at Sreepur, Gazipur under Madhupur tract under non mill zone farmers' field during cropping season 2004-05. Three planting methods PRC (paired row cane) wider spacing, PRC closer spacing and pit were used in the experiment. Potato, tomato and IPSA motorshooty were cultivated as intercrop with sugarcane. The highest cane yield (122.33 tha⁻¹) was found in pit method with intercrop potato followed by PRC wider spacing intercropped with tomato. The benefit cost ratio was highest (2.55) in PRC wider spacing method with intercrop tomato followed by pit method with intercrops potato.

Key words: *Saccharum officinarum*, planting methods, yield, intercrops

INTRODUCTION

Intercropping in sugarcane field is a burning issue in our agriculture system. Day by day the number of population is increasing geometrically which requires high amount of sugar. To fulfill the requirement of sugar we need more cultivation of sugarcane. Sugarcane (*Saccharum officinarum* L.) is a long duration crop which requires 10-14 months for its proper growth and development. In Bangladesh, intercropping of short duration crops with sugarcane is essence for more production from minimum land resources. Kabir (1988) observed that potato, mustard and gram are most compatible intercrops with sugarcane which reduced cost of cultivation. Now-a-days intercropping is being popular to the farmers' for getting extra benefit though it requires additional investment in different inputs. Intercropping in space between two rows of sugarcane crop in early stages of growth helps increased utilization of solar energy and at the end of 70 days period, proportion of diffused solar radiation was 82% in a crop of sugarcane alone while intercrop of mungbean, cowpea, and castor oil reduced this value to 60, 57 and 48%, respectively, indicating better utilization of solar energy (Hossain, 1984). Cane yield was obtained significantly higher from sugarcane+potato combination followed by sugarcane+onion and these two combinations were statistically identical (Gani *et al.*, 2000). Rathi and singh (1981) reported that wheat, potato and onion can be cultivated with sugarcane as intercropped. Among them a number of crops reduced cane yield but it was increased with all combinations involving potato as an intercrop and the most profitable alternatives were intercropping with potato and onion. In a view of the above facts, the present research work has undertaken to evaluate the effects of different planting methods of chewing sugarcane with intercrops.

MATERIALS AND METHODS

An experiment was conducted at Sreepur during 2004-05 cropping season in order to evaluate the appropriate planting methods for cultivating chewing sugarcane and appropriate intercropping system. Sugarcane variety Amrita was selected as chewing cane transplanted with three planting methods in a randomized complete block design with three replications. The plot size was 10 m × 8 m. The planting methods were PRC (Paired Row cane) wider spacing, PRC closer spacing and pit method. Potato, IPSA motor and tomato were used as intercrops. The treatment combinations were PRC wider spacing + potato, PRC wider spacing + IPSA motor, PRC wider spacing + tomato, PRC closer spacing + potato, PRC closer spacing + IPSA motor, PRC closer spacing + tomato, pit method + potato, pit method + IPSA motor and pit method + tomato. The distance between row to row and plant to plant in PRC Wider spacing were 175 cm and 100 cm, 175 cm & 50 cm in PRC closer spacing and 100 cm and 100 cm in pit method. In PRC within pair the distance was 55 cm. Intercrop potato variety diamont was planted at line to line distance 55 cm and plant to plant 15 cm in both PRC wider and closer spacing. Similarly tomato was planted at line to line 60 cm and plant to plant 59 cm. Potato and tomato were planted in paired row (wider and closer) cane 2 lines and 1 line in pit method. IPSA motorshooty was planted at line to line 30 cm and plant to plant 20 cm distance. While in paired row cane (wider and closer) 4 lines & 2 lines in pit method. Fertilizers were applied as per recommended dose for each crop. Data on growth and yield contributing characters of sugarcane under different planting methods and intercrop combinations were taken and analyzed statistically "Analysis of Variance" technique.

RESULTS AND DISCUSSION

Results presented in Table 1 indicated that all the treatments gave significant effects. Tiller production was significantly higher ($135.99 \times 10^3 \text{ ha}^{-1}$) in pit method intercropped with tomato and motorshooty ($133.87 \times 10^3 \text{ ha}^{-1}$) compared to PRC closer spacing + motorshooty but did not differ with other treatments. Among the three planting methods with different intercropping combinations pit method differed significantly with PRC wider and PRC closer methods for millable cane and yield of cane. In case of millable cane in pit method, intercropped potato produced the highest ($82.00 \times 10^3 \text{ ha}^{-1}$) millable cane and differed significantly among the intercrops in the same method and other methods of planting with different intercrops. The same results were observed in yield of cane. Ali *et al.* (1989) found that intercropping potato with sugarcane increased cane yield compared to pure stand sugarcane irrespective of different row adjustment. Singh and Singh (1973) also found increased cane yield by 64.3% from intercropping potato with sugarcane. Pit method with intercrop potato produced highest cane yield (122.33 MTha^{-1}) compared to PRC wider and closer methods. Sugarcane with pit method + IPSA motorshooty, PRC Closer + Potato and Pit method + Potato combinations required higher cost of production than the remaining treatments. Gross return from pit method + Potato combination was the highest followed by PRC wider spacing + tomato.

Economics of three planting methods of each intercropping combinations were analyzed and presented in Table 2. Among nine intercropping combinations, sugarcane cultivation in PRC wider spacing with tomato intercropping system gave the highest benefit cost ratio (BCR) (2.55) followed by pit method with potato intercropping system.

The figure gave an idea on cost of cultivation of sugarcane in different planting methods with different intercrops. The total cost of cultivation was higher in PRC wider spacing with potato, PRC closer spacing with potato and pit method with potato combinations than remaining treatments. Similarly, figure 2 revealed that gross return was the highest in pit method with potato combination followed by PRC wider spacing with tomato combination.

On the basis of above scenario, it can be calculated that chewing sugarcane in pit method with potato intercrop is profitable, economic and suitable.

Table 1. Effects of planting methods on the yield and yield contributing characters of chewing sugarcane with different crops as intercrop during 2004-2005

Treatments	Tiller ($\times 10^3 \text{ ha}^{-1}$)	Millable cane ($\times 10^3 \text{ ha}^{-1}$)	Cane yield (t ha^{-1})	Yield of intercrops (t ha^{-1})
T ₁ - PRC wider spacing + potato	130.16	61.00	86.67	5.18
T ₂ - PRC wider spacing + IPSA motorshooty	119.04	58.67	81.00	0.70
T ₃ - PRC wider spacing + tomato	116.41	79.00	105.67	4.12
T ₄ - PRC closer spacing + potato	126.95	68.33	92.50	4.88
T ₅ - PRC closer spacing + IPSA motorshooty	112.70	62.00	88.83	0.69
T ₆ - PRC closer spacing + tomato	120.41	63.50	90.33	4.63
T ₇ - Pit method + potato	125.16	82.00	122.33	5.50
T ₈ - Pit method + IPSA motorshooty	133.87	73.00	94.50	0.79
T ₉ - Pit method + tomato	135.96	71.00	93.91	3.88
LSD ($P \leq 0.05$)	21.48	5.37	19.12	-
CV(%)	10.0	4.50	11.60	-

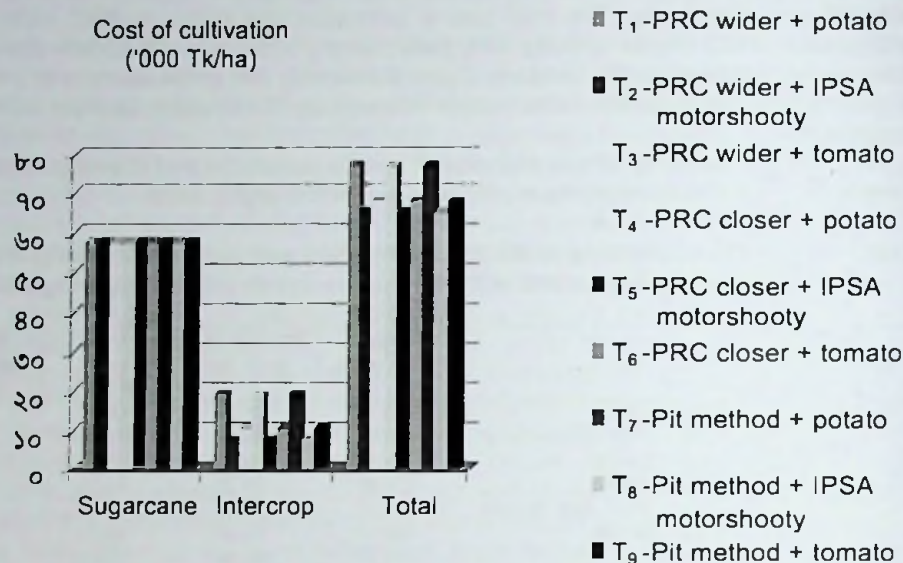


Figure1. Cost of cultivation of sugarcane in different planting methods with intercrops

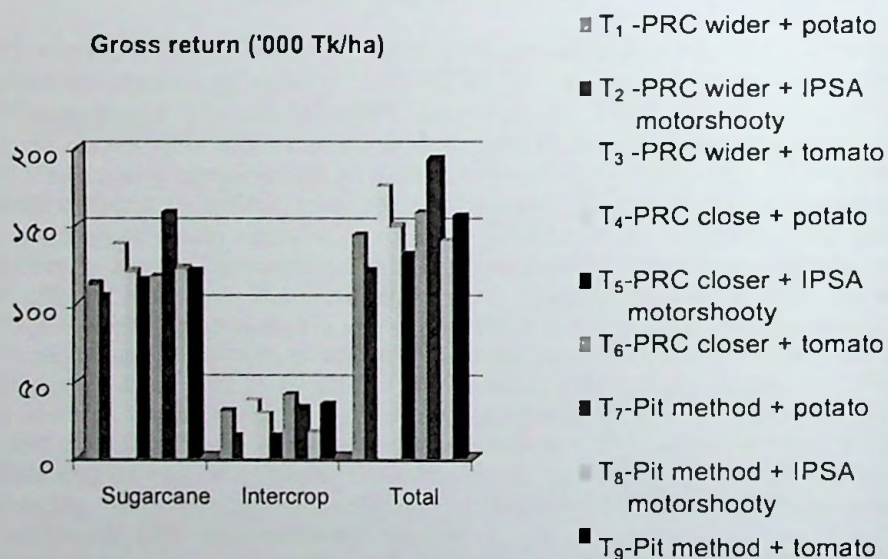


Figure 2. Gross return from sugarcane in different planting methods with intercrops

Table 2: Economics of planting methods on the yield and quality of chewing sugarcane with different crops as intercrop during 2004-2005

Treatments	Cost of cultivation ('000 Tk./ha)			Gross return ('000 Tk./ha)			Net return ('000 k./ha)	Benefit cost ratio
	Sugarcane	Intercrops	Total	Sugarcane	Intercrops	Total		
T ₁	57.50	19.38	76.88	112.67	31.88	144.55	67.67	1.88
T ₂	57.50	7.50	65.00	105.30	15.40	120.70	55.70	1.85
T ₃	57.50	10.76	68.26	137.37	37.08	174.45	106.19	2.55
T ₄	57.50	19.38	76.88	120.25	29.28	149.53	72.65	1.94
T ₅	57.50	7.50	65.00	115.48	15.18	130.66	65.66	2.01
T ₆	57.50	10.76	68.26	117.43	41.67	159.06	90.84	2.33
T ₇	57.50	19.38	76.88	159.03	33.00	192.06	115.18	2.49
T ₈	57.50	7.50	65.00	122.85	17.38	140.23	75.23	2.15
T ₉	57.50	10.76	68.26	122.08	34.92	157.00	88.74	2.30

Price of crops : Sugarcane : Tk. 1,300.00/ton IPSA motorshooty : Tk. 22,000.00/ton
 Potato : Tk. 6,000.00/ton Tomato : Tk. 9,000.00/ton

REFERENCES

- Ali, M.; Hossain, A.H.M.D.; Imam, S.A. and Shaheen, M. 1989. Row adjustment of sugarcane on the yield of intercropping cane and potato. *Bangladesh J. Sugarcane*.11: 78-82.
- Gani, M.O.; Rashid, M.A. and Pal, S.K. 2000. performance and profitability of intercrops with sugarcane in some Non Mill Zone Areas of Bangladesh. *Bangladesh J. Sugarcane*. 22: 31-35.
- Hossain, A.H.M.D. 1984. Intercropping with reference to sugarcane cultivation in Bangladesh, Unpublished M.S. Thesis submitted to University of reading U.K.pp.44-48.
- Kabir M.H.1988. Economics of intercropping with sugarcane in some selected areas of North Bengal Sugar Mills Zone. *Bangladesh J. Sugarcane*.10: 81-86.
- Rathi, K.S. and Singh, R.A. 1981. Summary of effects of intercropping of different rabi crops on cane yield and net profit in comparison to pure autumn. *Indian Sugar crops J.* 8: 21-26.
- Singh, P.P. and Singh, K. 1973. Studies on intercropping in sugarcane in Central Uttar Pradesh. *Indian sugarcane J.* 35: 559-562.