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Performance of Double Intercropping in Paired Row Planting of Sugarcane with different Planting Techniques

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ABSTRACT

An experiment was conducted at Patuadangi farm during 1988-89 with a view to making the intercropping more profitable by adjusting interrow spacing to accommodate double intercrops in sugarcane. Potato was used at first intercrop. Dhanicha, indigo, mugbean and kangkong were used as second intercrops with LJC variety of sugarcane. Higher number of tiller and millable cane were obtained from all combinations of STP cane. Conventional paired row cane produced significantly the lowest number of millable cane. The highest cane yield was obtained from STP cane in conventional row with intercrop potato in single row. But the highest sale proceed and adjusted cane yield (140.8 TCH) was observed from the treatment of paired row (60 cm) STP cane and two rows potato-kangkong (120 cm). Recoverable sucrose percentage were not differed significantly among the treatments.

INTRODUCTION

Intercropping is a judicious utilization of time and space to increase the total out put per unit area. As sugarcane is a long duration crop, grown in a considerable wide row spacing, so, intercropping with sugarcane is very economic (Kabir, 1988; Ali *et al.* 1989). Farmers also adopt this technology to some extent (Bashar 1993). To make the intercropping more profitable and best utilization of the interrow space, it is necessary to produce more than one intercrop. In view of this, it was felt necessary to develop a planting technique to accommodate more rows of intercrops and to select a second intercrop without affecting the overall yield of cane or total return per unit area. Ali *et al.* (1989) observe that there was no significant adverse effects of row arrangement on germination of cane and recoverable sucrose content. So, it might be feasible to produce sequential intercrops by adopting paired row planting technique of sugarcane with adjustment of interrow spacing. It has been shown that number of tiller, millable cane, yield of cane and adjusted cane yield was significantly higher in case of paired row cane with potato-mugbean or onion-mugbean as double intercrops with sugarcane than any other treatments with single row cane or single intercrop with sugarcane (Anonymous, 1991).

Therefore, the study was undertaken to find out the appropriate row spacing to produce sequential double intercrops in sugarcane.

MATERIALS AND METHODS

The experiment was conducted at NRS farm, Thakurgaon, during the cropping season 1988-89. The study included the following treatments:

T_1 = Spaced transplanting (STP) with soil bed settling (SBS) in paired row cane (PRC) + 2 rows intercrop (potato-kangknog, 120 cm for growing intercrops & 60 cm for paired cane rows).

T_2 = STP with SBS in PRC + 2 rows intercrop (potato-dhanicha, 120 cm for growing intercrops & 60 cm for paired cane rows).

T_3 = STP with SBS in PRC + 2 rows intercrop (potato-indigo, 120 cm for growing intercrops & 60 cm for paired cane rows).

T_4 = STP with SBS in PRC + 2 rows intercrop (potato-mugbean, 120 cm for growing intercrops & 60 cm for paired cane rows).

T_5 = STP with SBS in PRC + 2 rows potato (120 cm for intercrope & 60 cm for paired cane rows).

T_6 = STP with SBS in PRC (120 cm kept vacant & 60 cm for paired cane rows).

T_7 = STP cane with SBS in conventional row + potato in single row (at rows spacing of 90cm)

T_8 = STP cane with SBS in conventional row at a row spacing of 90cm (without intercrop).

T_9 = Conventional setts in PRC (120 cm kept vacant and 60 cm. for paired cane rows planted with 3-buded sett).

T_{10} = Conventional cane in conventional row at a row spacing of 90 cm (without intercrops).

The experiment was laid out in a randomized complete block design with 4 replications. The plot size was 7.2m X 8.0m. Sugarcane variety LJC was used as main crop and potato variety kufrisinduri was used as first intercrop. The experiment was planted in November 1989. Kangkong, dhanicha (local), indigo and mugbean (baromasi) were used as second intercrops. Recommended dose of fertilizers were applied for sugarcane and two-thirds of recommended dose of fertilizers for each intercrop were used. Intercultural operations were done as and when required for sugarcane as well as for intercrops.

RESULTS AND DISCUSSION

Data on tillering, millable cane, yield of cane and yield of first and second intercrops have been shown in the Table 1. From the table, it is seen that the highest number of tillers (300×10^3/ha) was produced by the treatment T_3 (paired row STP cane + 2 rows potato-indigo) which was found identical to all the STP combinations both in paired as well as in conventional row except the treatment T_2. The lowest number of tiller (199.1×10^3/ha) was produced by conventional paired row cane (T_9) with statistical similar to T_{10} (conventional cane) and T_2 (STP and + potato - dhaincha). The tiller productivity of STP cane in the treatment T_2 might be hampered due to dhanicha intercropping where dhanicha shaded the cane plant in early tillering stage, because of its quick growth. Anonymous, (1991) reported that pure stand paired row cane produced the least tillers and significantly the highest tiller were produced in paired row cane with 3 rows potato-mugbean. The highest number of millable cane was found by the treatment T_8, which was found statistically identical with T_5, T_6, and T_7. Significantly the lowest number of millable cane was produced by the treatment T_9 (conventional paired row cane). The similar findings were observed by many researchers (Ali *et al.* 1989; Imam *et al.* 1987). Intercrop potato followed by mugbean in sugarcane was also reported to produce the highest and statistically significant number of millable cane, in another report (Anonymous, 1991)

Table 1. Yield, millable cane and number of tillers in paired row planting of sugarcane.

Treatments	No. of tiller (10^3/ha)	No. of millable cane (10^3/ha)	Yield of cane (TCH)	Yield of first intercrop (t/ha)	Yield of second intercrop (t/ha)	Recoverable sucrose (%)
T_1	266.9ab*	102.8bc	70.5ab	11.0a	22.0	8.2a
T_2	225.9bc	98.1bc	63.2ab	10.9a	32.0	8.4a
T_3	300.0a	110.0abc	62.6ab	11.8a	24.0	8.5a
T_4	269.7ab	111.0abc	61.3b	10.9a	13.0	8.2a
T_5	279.5ab	122.4a	66.1ab	13.3a	-	8.2a
T_6	292.7a	126.8a	70.5ab	-	-	8.2a
T_7	292.1a	126.0a	77.6a	11.3a	-	8.3a
T_8	286.3ab	128.3a	74.1ab	-	-	8.2a
T_9	199.1c	92.1c	65.2ab	-	-	8.4a
T_{10}	210.7c	94.4b	77.0a	-	-	8.5a

*Figures in a column accompanied by the same letters donot differ significantly at 0.05 level as per DNMR test.

The highest cane yield was observed by the treatment T_7 (STP cane in conventional row + potato in single row) and found statistically similar with T_{10} (conventional pure stand cane at 90 cm spacing). Similarly, the higher cane yield was obtained from the legumes intercrops with sugarcane (Anon. 1983). Significantly the lowest yield was obtained from treatment T_4 (paired row STP cane + 2 rows potato-mugbean). The other treatments produced statistically similar yield. However, yield of first intercrops were not differed statistically among the treatments, yield of second intercrops were not comparable because of their different nature and use of crops. On the other hand recoverable sucrose percentage was not differed statistically among the treatments.

Table 2. Sale proceed from sugarcane intercrops and adjusted cane yield.

Treatments	Sale proceed from intercrop (Tk./ha)		Adjusted cane yield (TCH)
	First	Second	
T_1	43920	2200	140.8
T_2	43400	2470	112.1
T_3	47240	2470	115.6
T_4	43560	3078	111.0
T_5	53000	-	122.6
T_6	-	-	73.5
T_7	45120	-	125.6
T_8	-	-	74.1
T_9	-	-	65.2
T_{10}	-	-	77.6

Note: a) Price of cane - Tk. 938.0/ton
b) Price of potato - Tk. 4000/ton
c) Price of kangkong - Tk. 1000.0 Ton
d) Price of biomass from dhanicha - Tk. 77.0/ton
e) Price of biomass from indigo - Tk. 103.0/ton
f) Price of biomass from mugbean - Tk. 234.0/ton

Data on sale proceed from intercrops, and adjusted cane yield (TCH) have been shown in the Table 2. It is revealed from the table that the highest adjusted cane yield

(140.8 TCH) was obtained from the treatment T_1 (paired row STP cane + 2 rows potato-kangkong) followed by T_7 and T_5.

It can be concluded that STP cane produced higher number of tiller and millable cane than the conventional cane. Millable cane production was slightly hampered by the second intercrops and the highest adjusted cane yield was obtained from STP cane with first intercrop potato followed by the second intercrop kangkong. Therefore, STP cane in paired row with first intercrop potato and second intercrop kangkong may be recommended for cultivation in Bangladesh.

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