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PRODUCTION OF AUTUMN VERSUS SPRING PLANTED SUGARCANE AND INTERCROPPING OF WHEAT IN AUTUMN SOWN CANE

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ABSTRACT

A comparative study of autumn versus spring cropping system of sugarcane revealed that monocropping of spring cane in the middle of March gave higher cane yield as compared to autumn crop planted in the middle of October and November and intercropped with wheat. In general, the autumn planted cane gave on an average 1·1 and 1 per cent higher recovery of juice and sucrose contents, respectively, over the spring planted cane. Within the autumn planted cane, earlier the planting, the higher was the recovery of juice and sucrose contents. Wheat interplanted in October sown cane, gave relatively lower grain and straw yields as compared to simultaneous planting of wheat and sugarcane on November 15 and the normal monocropping of wheat, both of which gave similar grain yield. Total production in case of monocropping of sugarcane was slightly higher than the multiple cropping of wheat and sugarcane, but net income was higher in case of the multiple cropping of these two crops.

INTRODUCTION

The field germination obtained by an average cane grower is 50 ± 10 per cent. This low germinability is one of the serious problems affecting the crop stand and consequently the final cane yield. Middle of March has been recognised as the best time for planting of sugarcane in this tract (Singh, 1944), but the standing wheat crop also requires simultaneous irrigation. Consequently, the limited water available with the farmers does not permit timely planting of cane in most cases. This delayed sowing of cane, besides reducing its growing period, results in poor seedling emergence due to high temperature in April and

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May and both of these factors adversely affect the cane yield and sugar recovery.

Autumn planting has been reported to be more productive practice than spring planting (Fasihi *et al.*, 1974). However, autumn planting of cane competes with the major winter crop of wheat. Therefore, it was contemplated in these investigations to compare the intercropping of wheat in October and November planted sugarcane with the normal monocropping of wheat and sugarcane in November and March, respectively.

REVIEW OF LITERATURE

Mian (1965) while working on sowing dates (September to March) of sugarcane in the NWF Province reported that the March planting significantly out-yielded autumn planted crop irrespective of the intercrops whether cereals or legumes. Fasihi *et al.* (1974) and Lodhi and Arain (1980) reported that the tonnage of cane was increased by 20-38 per cent when sugarcane was planted in autumn as compared to its conventional planting in spring. They were also of the opinion that September planting crop gave about one per cent higher sucrose contents than that of the March planted cane. This is in accordance with the findings of Fasihi *et al.* (1970) who reported that September planted cane had higher Pol, per cent than that of March planted cane. Rathi and Triphathi (1974) concluded that although the cane yield was reduced by intercropping upto 16 per cent, the most remunerative system involved double cane rows with two rows of potato followed by three rows of wheat in the 90 cm gaps between double cane rows. Tripathi and Singh (1977) found that intercropping autumn planted cane with *Brassica juncea* gave higher net returns per unit area than intercropping with wheat, barley, Egyptian clover and was also more profitable than spring planted cane. Similarly, Mathur (1976) was of the opinion that intercropping of wheat in September planted cane gave higher financial return that the monocropping of cane in March. The review given above indicates that the autumn planted cane has an edge over the normal March planted cane. Autumn planted cane can also accommodate additional "rabi" crops with appropriate management thus resulting in higher income per unit area and per unit of time.

MATERIALS AND METHODS

A comparative study of autumn versus spring cropping system of sugarcane was carried out in 1981-82, at the University of Agriculture, Faisalabad. Sugarcane was planted on October 15, November 15, and March 15 on a well prepared loamy soil of average fertility. Double setts, each with two buds, were placed end to end in 60 cm apart furrows. Total number of setts per plot was kept constant in all the treatments. Wheat variety LU-26 was sown alone on November 15 as well as interplanted in the October and November planted cane. Wheat was seeded in 22.5 cm apart rows and was fertilized at the rate of 112 kg N and 56 kg P per hectare at sowing. After the harvest of wheat, the cane crop was hoed throughly and then fertilized at the rate of 168 kg N + 84 kg P and 84 kg K per hectare. Half of the N and all of P and K were added to the crop after hoeing and was immediately followed by an irrigation. The second half of N was applied to the crop at the end of June. Both the crops were planted in replicated plots of 15.2 x 3.7 m using a Randomized Complete Block Design and were allowed to mature normally under the field conditions. Wheat and sugarcane were harvested in the third week of April and November, respectively.

RESULTS AND DISCUSSION

The data pertaining to yield and sucrose contents in cane as affected by various treatments are set out in Table 1. A perusal of this table revealed that monocropping of sugarcane in spring gave more yield of stripped cane than that of multiple cropping of autumn cane. Within the autumn plantings of cane, earlier the planting, the higher was the yield. This observation is supported by the work of Mian (1985). However, these results differ from those of Fasihi *et al.* (1974) and Lodhi and Arain (1980). They obtained higher yield of autumn planted cane as compared to the spring planted cane. This difference is probably due to variation in the experimental conditions of this study and those of the aforesaid workers. They compared monocropping of autumn and spring planting canes, while in these investigations multiple cropping of autumn cane was compared with the monocropping of spring cane. The results further indicated that the autumn planted cane gave on an average 11 and 1 per cent

Table 1. *Average wheat and stripped cane yield, juice recovery and sucrose contents as affected by monocropping and multiple cropping of sugarcane and wheat*

	Treatments	Average wheat yield (quintals/ha)		Average stripped cane yield M. tons/ha	Juice recovery (%)	Sucrose contents (%)
		Grain	Straw			
1.	Wheat seeded on November 15 in autumn cane planted on October 15	28.06b	48 83a	90.63b	64.18a	17.54a
2.	Simultaneous planting of wheat and autumn cane on November 15	29.86a	61.67b	85 73c	55.86b	16.66b
3.	Wheat alone seeded on November 15	29.50a	66.31a	—	—	—
4.	Spring cane alone planted on March 15	—	—	99.73a	53.37c	16.49b

Duncan's Multiple Range Test at 5% probability.

Any two means not sharing the same letter differ significantly.

Table 2. *Comparative production and net income per hectare of monocropping and multiple cropping of sugarcane and wheat*

	Treatments	Production (kg/ha)			Net income (Rs./ha)			± difference over monocropping of	
		Wheat		Sugarcane	Wheat*	Sugarcane	Total	Wheat (Rs.)	Sugarcane (Rs.)
		Grain	Straw						
1.	Wheat seeded on November 15 in autumn cane, planted on October 15	2806	4883	90630	4115	13644	16789	+ 14098	+ 882
2.	Simultaneous planting of wheat and autumn cane on November 15	2986	6167	85730	3689	13014	16703	+ 14084	+ 802
3.	Wheat alone seeded on November 15	2950	6631	—	2619	—	2619	—	—
4.	Spring cane alone planted on March 15	—	—	99733	—	15901	15901	—	—

* = Grain + straw.

Prices :	Treatments	Gross incom (Rs./ha)	Actual cost of production (Rs./ha)
1. Stripped cane yield @ Rs. 9/- per 40 kg.	1	26102	9313
2. Wheat grains @ Rs. 64/- per 40 kg	2	25508	8905
3. Wheat straw @ Rs. 10/- per 40 kg	3	6377	3758
	4	22439	6538

higher recovery of juice and sucrose contents, respectively, over the spring planted cane. Within the autumn planted canes, earlier the planting, the higher was the recovery of juice and sucrose contents. The higher juice recovery may be attributed to the longer growth period that was available to the autumn planted cane. This view is supported by the findings of Fasihi *et al.* (1970 & 1974) and Lodhi and Arain (1980).

The results further showed that normal monocropping of wheat and mixed planting of wheat and sugarcane on November 15, gave similar grain yield, while that of wheat interplanted in October planted cane was relatively lower. However, it was interesting to observe that even in this treatment the yield of about 28 quintals per hectare was fairly high keeping in view the average grain yield obtained in this tract. Straw yield varied from 49 to 66 quintals per hectare and it was generally lower in case of mixed or interplanting of wheat in sugarcane. This suppressive effect on the straw yield of wheat is attributeable to competitive effect of the associated cane crop. Such suppressive effects within the dence crop stand were also recognised by Locke *et al.* (1942).

The data presented in Table 2 indicated that the total production and net income from multiple cropping of wheat and sugarcane were considerably higher when compared with the monocropping of wheat. Although spring planted cane gave higher total production but the net income obtained from autumn intercropped cane was considerably high. Similar results were obtained by Rathi and Tripathi (1974), Mathur (1976) and Tripathi and Singh (1977). The lower production of multiple cropping of wheat and sugarcane than the monoculture of sugarcane was partly due to the lack of matching crop management practices that were required in this case, especially the water demand at critical development stages of autumn planted cane. Finally, matching crop management practices for multiple cropping of wheat and sugarcane need to be developed for increasing the production of the individual components in this system to maximize income per unit area.

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