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Effect of time, geometry, wheat (*Triticum aestivum*) and legume incorporation on yield of planted crop of sugarcane (*Saccharum officinarum*)

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Sugarcane (*Saccharum officinarum* L.)–wheat (*Triticum aestivum* L. emend. Fiori & Paol.) is the leading cropping system in sugarcane dominated belt of western Uttar Pradesh. Sugarcane and wheat are inseparable system therefore, harvesting of one crop reflects on the time of sowing of another crop. Late sowing of sugarcane during May–June and wheat during December–January is a common phenomenon in the area. Saini *et al.* (1992) reported reduction up to of 50% or more in the yield of sugarcane and wheat due to delayed planting. To sustain the productivity of the system the present study was undertaken.

An experiment was started during the winter season of 1991–92 at the PDCSR, Modipuram, The soil of the experimental field was sandy loam with 200 kg/ha, 18 kg/ha and 145 kg/ha available N, P and K respectively and pH 7.8. Six treatment combinations (Table 1) were tested in randomized block design with 4 replications. 'Cos 767' sugarcane, was sown on 20 November, 1991 as sole and also as intercropped with wheat. As a traditional practice sugarcane was also sown after harvest of wheat in sugarcane–wheat system. Sugarcane was planted in paired row spaced at 150 cm between the pairs and 30 cm within the pair, whereas for sole crop of sugarcane recommended spacing (90 cm) was adopted. Three (20,18 and 15 cm) spacing were tried for wheat which was intercropped between the interspaces of 2 paired rows of sugarcane. *In-situ* incorporation of cowpea [*Vigna unguiculata* (L.) Walp.] was also one of the treatments in sugarcane planted after harvest of wheat. Recommended doses (120, 60,40 kg/ha for wheat and 150,80, 40 for sugarcane) of N, P_2O_5 and K_2O and irrigation as per need of the crops were given.

Superiority of the modified system of intercropping wheat was observed between the interspace of the paired row spaced 150 cm between the pairs and 30 cm within the pair. Autumn-planted sugarcane undoubtly gave significantly higher cane yield than other dates of planting, viz winter and summer but on cost of equally important wheat produce of grain and straw. Alike to it summer planted sugarcane gave significantly lower cane yield than autumn and winter-season planted cane. However, the adverse effect of delayed planting in sugarcane could minimized to a great extent by *in-situ* incorporation of cowpea (45 days after sowing). In intercropping narrowing the spacing of wheat sown in the interspaces of the sugarcane paired rows from 20 cm to 18 cm or 15 cm further reduced cane yield to the level of significance. However, this practice enabled to get wheat yield at par to that of

Table 1. Yield of planted crop of sugarcane and wheat as influenced by date and method of planting and legume incorporation

Treatment	Yield (sugarcane and wheat) and economics						Net profit (Rs/ha)
	Economic yield			Cane top and wheat straw			
	Cane (tonnes/ha)	Wheat (q/ha)	Income from the system (Rs)	Cane top (tonnes/ha)	Wheat straw (q/ha)	Income from the system (Rs)	
T_1 Wheat–sugarcane (S)–ratoon*	34.14	55.00	36,813	15.94	109.37	18,907	33,220
T_2 Wheat–sugarcane (S) + cowpea**–ratoon	40.74	64.22	39,525	20.31	116.56	21,811	38,636
T_3 Sugarcane (A)–ratoon	81.33		36,598	24.72		12,360	33,958
T_4, Sugarcane (W) paired + wheat (20 cm row)–ratoon	54.46	57.34	43,429	25.16	95.62	22,142	43,071
T_5, Sugarcane as in T_4 + wheat (18 cm)–ratoon	49.92	57.92	41,594	21.37	103.59	21.044	40,138
T_6, Sugarcane as in T_4 + wheat (15 cm)–ratoon	48.89	59.37	41,592	20.69	91.41	19,486	38,578
CD (P = 0.05)	3.78		5.04				

* S, Summer-planted sugarcane; A, autumn-planted sugarcane; W, winter-planted sugarcane; **cowpea-intercropping for *in-situ* incorporation
Traditional or local practice
Price (Rs/q); Sugarcane 45, wheat grain 330, wheat straw, cane top 50

sole wheat. Planting sugarcane in winter (November or December) in paired row as above and simultaneously intercropping of wheat at 20 cm row-to-row spacing between the paired rows of sugarcane proved better preposition from productivity as well as profitability point of view.

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