

Feasibility of various sugarcane planting manipulations in wheat based cropping system

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ABSTRACT

A field experiment was conducted at Muzaffarnagar during 2007-10 to study the effect of various sugarcane planting manipulations on productivity and profitability of sugarcane in wheat-sugarcane cropping system. Significantly higher cane yield (32.57%) was recorded under “wheat broadcasting followed by furrows opened with ridger at 75 cm and cane planting by placing and pressing in mud with foot in end of February month” over that “wheat- late sugarcane” cropping system. Economic analysis revealed that the highest net profit (Rs 158231/ha) and Benefit: Cost ratio (2.02) was also recorded in the same cropping system. While, wheat- late sugarcane cropping system gave lowest economic returns (Net profit Rs 123782/ha and B: C ratio 1.70). It is concluded that for higher yield and economic return in wheat- sugarcane cropping system, sugarcane planting in standing crop of wheat at its normal time of planting should be adopted.

Key words: Sugarcane, Wheat, Intercropping, Yield, Economics.

India has witnessed tremendous progress and alterations in sugarcane cultivation as a consequence of intensification of prevalent cropping systems aimed towards profit maximization in agriculture. Sugarcane planting in north and north-west India is mainly done during the months of February-March (spring) and late spring (after wheat harvest) seasons. Late planting of sugarcane is commonly followed in western Uttar Pradesh, Punjab and Haryana where wheat is staple food and sugarcane planting is done after wheat harvest which results in poor sugarcane yield and sub-optimal sugar accumulation in cane. Continuous adoption of this practice has proved a major constraint for remunerative sugarcane cultivation as well as sugar production in these regions. Research efforts to overcome this resulted in the development of techniques like furrow-irrigated raised bed planting of sugarcane and wheat where both the crops are sown simultaneously which ensures higher input use efficiency and high system productivity. However, need of equipment like raised bed planter and poor sugarcane germination in the system often proves a major limitation in the adoption of this technique and calls for the development of farmer friendly and convenient method of wheat-sugarcane planting which can ensure profitable yield of both the crops and is easy to adopt. The present research was carried out with the objective to develop a method for sowing of wheat crop along with sugarcane in the same field during the same season of planting taking wheat sowing as reference point. Verma (2004) reported that autumn planted cane + wheat-ratoon- wheat was the best cropping system with respect of land use efficiency, yield and net return as compared to rabi crop or wheat- late sugarcane- ratoon-wheat cropping system.

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A field experiment was conducted at Sugarcane Research Station, Muzaffarnagar during 2007-09 and 2008-10 in the autumn season. The soil was sandy loam, neutral in reaction (pH 7.8) having 0.55% organic carbon, low in available phosphorus and medium in available potassium. The treatments comprised six wheat based cropping systems, viz., T1- wheat- late sugarcane (farmer practice), T2-sugarcane at 90 cm + wheat (3 row), T3-wheat broadcasting followed by furrows opened with ridger at 75 cm and cane planting by placing and pressing of setts in mud with foot in the end of February, T4- wheat broadcasting followed by furrows opened with ridger at 75 cm and cane planting at proper moisture after loosening the soil in opened furrows and covering the setts with 2cm soil layer in February, T5- wheat broadcasting followed by furrows opened with ridger at 90 cm and cane planting by placing and pressing of setts in mud with foot in end of February and T6- wheat broadcasting followed by furrows opened with ridger at 90cm and cane planting at proper moisture after refining the opened furrow and covering the setts with 2cm soil layer in February. These system were evaluated in randomized block design with 3 replications. Sowing of wheat was done after 1st week of November and sugarcane (‘CoS 97261’) was planted as per treatments. Nutrient requirement of both the crops was meted out with the supply of recommended doses of nutrients. After harvesting of wheat crop, the field was irrigated followed by application of 50kgN/ha and hoeing. Other crop management practices were followed as per the recommendation for sugarcane.

Yield attributes and yield of sugarcane were significantly effected with various treatments during both the years of study 2007-09 and 2008-10 (Table 1). However, germination of

Table 1 Effect on yield and yield attributes of various sugarcane planting manipulations in wheat based cropping system

Treatment	Germination (%)			Tillers/ha			NMC/ha			Cane Yield (t/ha)		
	2007-09	2008-10	Mean	2007-09	2008-10	Mean	2007-09	2008-10	Mean	2007-09	2008-10	Mean
T ₁	42.53	42.04	42.28	220535	225297	222916	130555	131051	130803	67.460	68.650	68.055
T ₂	43.20	42.72	42.96	233450	230324	231887	134259	133102	133680	84.491	85.070	84.780
T ₃	43.83	43.06	43.44	262000	266889	264444	147778	150000	148889	90.666	89.778	90.222
T ₄	42.45	42.07	42.26	256444	260555	258499	144222	145778	145000	88.444	87.000	87.722
T ₅	43.39	43.10	43.24	237963	245834	241898	139121	141088	140104	87.269	86.111	86.690
T ₆	42.72	42.34	42.53	234028	239931	236979	136806	137732	137269	85.648	83.912	84.780
SE _±	0.63	0.65	-	4234	4219	-	2456	2676	-	3.12	3.18	-
CD at 5%	NS	NS	-	9399	8401	-	5452	5940	-	6.92	7.06	-

Table 2 Effect on wheat yield and economics of various sugarcane planting manipulations in wheat based cropping system.

Treatment	Wheat yield (q/ha)			Net Profit (Rs/ha)			B: C ratio			CCS (%)		
	2007-09	2008-10	Mean	2007-09	2008-10	Mean	2007-09	2008-10	Mean	2007-09	2008-10	Mean
T ₁	63.34	43.98	53.16	91178	156386	123782	1.283	2.151	1.694	11.76	11.70	11.73
T ₂	57.72	43.59	50.65	105086	194304	149695	1.369	2.498	1.933	11.91	11.79	11.35
T ₃	56.09	41.67	48.88	113548	202915	158231	1.505	2.551	2.028	11.93	11.85	11.89
T ₄	55.63	40.89	48.26	110246	195594	152920	1.468	2.486	1.977	11.92	11.84	11.88
T ₅	59.41	43.79	51.60	112725	196671	154698	1.505	2.509	2.007	11.89	11.82	11.85
T ₆	58.76	42.82	50.79	109987	190476	150231	1.474	2.451	1.962	11.90	11.81	11.85

sugarcane buds was not affected by different systems. Significantly highest tillers (264444) and number of millable canes (148889) were recorded in treatment where wheat broadcasting was followed by sugarcane planting in furrows furrows opened with ridger at 75cm and placing and pressing of setts in mud with foot in end of February. The same treatment recorded significantly higher cane yield (90.2 t/ha) over other treatments. Sugarcane yield under wheat- late sugarcane system was recorded to be 68.05 t/ha, which was found significantly lower than the yield obtained under all the other treatments involving planting of sugarcane in the standing crop of wheat at different times and spacing. Various manipulations of wheat + sugarcane (T₂-T₆) were statistically at par with each other. Singh (2010) also reported that the cane yield increased (25.5%) through FIRB system as compared to late planted sugarcane.

The economics of different systems indicated that all Wheat + Sugarcane Systems (T₂-T₆) recorded higher returns as compared to the Wheat – late sugarcane system (Table2). Highest net profit of Rs 113548 and Rs 202915 during 2007-

09 and 2008-10, respectively was recorded with the treatment T₃ (wheat broadcasting followed by furrows opened with ridger at 75cm and cane planting by placing and pressing of setts in mud with foot in end of February) followed by treatment T₅- wheat broadcasting followed by furrows opened with ridger at 90cm and cane planting by placing and pressing of setts in mud with foot in end of February). The same treatment also recorded higher benefit: cost ratio. A similar effect of the system has also been reported by Singh (2010) owing to the reduced cost of production and increased profit margin.

Thus it may be concluded that late sugarcane planting after wheat can be replaced by early spring cane through this system for solving of labor problems and increasing the yield and net return per unit area.

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