

Agrotechniques for multiple ratooning in sugarcane

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ABSTRACT

A field experiment was conducted during 1997–98 to 2000–2001 at Rajasthan College of Agriculture, Udaipur, to assess the role of various agrotechniques in yield and quality of ratoon crops. Amongst agrotechniques tested, stubble shaving + trash burning followed by irrigation and cultivation recorded the highest cane yield (60.62 and 50.90 tonnes/ha during I and II ratoon respectively), commercial cane sugar (7.74 and 7.74 tonnes/ha), net returns (Rs 53,144/ha) and benefit : cost ratio (3.86) compared to least cane yield (46.87 and 34.10 tonnes/ha), commercial cane sugar (6.06 and 4.71 tonnes/ha, net returns (Rs, 35,588/ha) and benefit : ratio (2.74) recorded under the control.

Key words : Agrotechniques, Yield, Quality, Ratoon crops, Economics

According to National Projection, 22.17 and 22.29 million tonnes of sugar would be required by 2010 and 2020 AD respectively. Besides, the country will also require 16.18 and 20.69 million tonnes of Indian jaggery during the same period to fulfil its domestic demand. In order to achieve these targets, 348.5 and 415 million tonnes of sugarcane would be required as source of sugar (IISR, 1997), compared to present production of 289.41 million tonnes. In the north-west zone of the country, the possibility of increasing the area under sugarcane is meagre and the only option left to meet the above requirements is through increasing the productivity.

Amongst different technological consideration, ratoon management is one of the most important factors as ratoon crop occupies more than 54% of cane acreage and yield only 30% of the sugarcane production (Sundara, 1987), thus there is ample scope for improving sugarcane productivity by following proper ratoon-management practices vis-à-vis improvement in sugar production (Srivastava *et al.*, 1992). Therefore a study was carried out to assess different agrotechniques for multiple ratooning in sugarcane.

MATERIALS AND METHODS

The field experiment was conducted under irrigated condition during 1997–98 to 2000–01 at Agronomy Farm, Rajasthan College of Agriculture, Udaipur, on clay loam soil, medium in available N (283.5 kg/ha), P (18.5 kg/ha) higher in K content (299.3 kg/ha) and slightly alkaline in reaction (pH 7.9.).

The treatments consisted of various agrotechniques, viz. control, leaving field without any cultural operation (T_1), laying trashes in alternate rows, irrigation and cultivation (T_2), trash burning followed by irrigation and cultivation (T_3), stubble shaving followed by T_2 (T_4), T_4 + Phorate 10 G 15 kg/ha (T_5), T_3 + stubble shaving (T_6), T_4 + gap-filling with polythene bag raised seedlings (T_7) and T_5 + gap-filling with polythene raised can seedling (T_8). The experiment was laid out in randomized block design and replicated 4 times. The full maturity cultivar 'Co. 419', a poor ratooner but occupies more than 75% area of Rajasthan under sugarcane, was planted at row spacing of 75 cm in the second fortnight of February and harvested in February during both the years. After harvesting plant crop, various agrotechniques were applied. After harvesting the first ratoon crop, the same treatments were repeated with same layout to observe their effect on the second ratoon crop. All the recommended cultural operations to raise the plant crop were given. However, for ratoon crop the agrotechniques were applied as per treatments. In case of burning treatment, dry leaves of cane were used. In gap-filling, 3-leaf seedlings were used. These seedlings were planted only where a gap of 30 to 45 cm was observed. The gross and net plot sizes was 30 m² and 20.25 m² respectively. The millable cane from each plot were sampled randomly for cane juice quality.

RESULT AND DISCUSSION

Cane yield

Agrotechniques for multiple ratooning showed non-sig-

Table 1. Effect of agrotechniques on yield of plant and ratoon crops (I and II) of sugarcane

Treatment	Yield (tonnes/ha)										
	Plant crop			I ratoon crop			II ratoon crop			Economics (mean)*	
	1997-98	1998-99	Pooled	1998-99	1999-2000	Pooled	1999-2001	2000-2001	Pooled	Net returns (Rs/ha)	Benefit:cost ratio
T ₁ , Control (leaving field without any cultural operation)	72.90	80.30	76.60	50.27	43.46	46.87	30.08	38.13	34.11	35,588	2.74
T ₂ , Laying of trash in alternate row, irrigation and cultivation	73.80	80.25	77.03	53.27	49.10	51.19	38.25	44.33	41.29	41,888	3.08
T ₃ , Trash burning followed by irrigation and cultivation	74.50	79.37	76.94	60.17	55.66	57.92	45.25	52.46	48.86	50,768	3.82
T ₄ , Stubble shaving followed by T ₄	72.80	82.62	77.71	54.57	51.10	52.74	40.90	46.42	43.66	44,120	3.20
T ₅ , T ₄ + Phorate 10 G (15 kg/ha)	72.40	80.40	76.40	55.64	520.6	53.85	40.25	47.27	43.76	43,661	2.93
T ₆ , T ₃ + stubble shaving	74.40	82.40	72.40	62.61	58.62	60.62	47.05	54.78	50.92	53,144	3.86
T ₇ , T ₄ + Gap-filling with polythene bag-raised cane settling	71.70	80.32	76.01	50.90	56.09	53.50	45.53	52.61	49.07	46,262	3.30
T ₈ , T ₅ + Gap-filling with polythene bag raised cane settling	73.30	81.00	61.31	57.25	59.28	46.33	53.34	49.84	49,067	49,067	2.99
CD (P=0.05)	NS	NS	NS	6.81	8.34	7.59	3.83	4.32	4.05		

*Mean data of 2 years

Table 2. Effect of agrotechniques on quality of plant and ratoon crops (I and II) of sugarcane

Treatment	Sucrose (%)			Commercial cane sugar (tonnes/ha)					
	Plant crop			I ratoon crop			II ratoon crop		
	1997-98	1998-99	Pooled	1998-99	1999-2000	Pooled	1999-2000	2000-2001	Pooled
T ₁ , Control (leaving field without any cultural operation)	17.63	17.49	17.56	6.54	5.57	6.10	3.84	5.57	4.70
T ₂ , Laying of trash in alternate row, irrigation and cultivation	17.65	17.16	17.41	6.95	6.29	6.60	4.89	6.48	5.70
T ₃ , Trash burning followed by irrigation and cultivation	17.67	17.60	17.64	7.84	7.30	7.50	5.75	7.66	6.71
T ₄ , Stubble shaving followed by T ₄	17.61	17.51	17.56	7.13	6.53	6.83	5.18	6.81	6.00
T ₅ , T ₄ + Phorate 10 G (15 kg/ha)	17.64	17.33	17.49	7.17	6.72	6.95	5.28	6.92	6.14
T ₆ , T ₃ + stubble shaving	17.60	17.60	17.60	8.04	7.43	7.74	6.04	8.84	7.44
T ₇ , T ₄ + Gap-filling with polythene bag-raised cane settling	17.61	17.49	17.55	7.82	7.20	7.51	5.84	7.74	6.79
T ₈ , T ₅ + Gap-filling with polythene bag-raised cane settling	17.67	17.64	17.60	7.96	7.3	7.65	5.79	7.84	6.82
CD (P=0.05)	NS	NS	NS	1.04	1.18	0.96	0.89	0.73	0.74

nificant variation in plant crop yield during both years. However, in I and II ratoon crops, stubble shaving + trash burning significantly enhanced the ratoon crop yield over the control (leaving field without any cultural operation after harvesting plant crop). On pooled basis, the increase was 29.3 and 49.3% during I and II ratoon respectively. Higher yield under stubble shaving + trash burning agrotechnique could be ascribed solely to increase in underground sprouting which in turns increased the number of millable canes and thereby yield of I and II ratoon crops. Singh (1993) and Misra (1996) also observed that number of canes had direct effect on cane yield.

Economic evaluation of plant and ratoon crops under various agrotechniques (Table 1) also revealed that highest net returns (Rs 53,144/ha) and benefit : cost ratio (3.86) were recorded with aforesaid agrotechnique, being 49.3 and 40.9% higher over the control.

Commercial cane sugar

The sucrose percentage of plant crop showed non-significant variation during both the years. But the agrotechnique which proved best in terms of ratoon yield, viz. stubble shaving + trash burning, also recorded significantly higher commercial cane sugar tonnes/ha compared to the control. On the pooled basis, the extent of increase was 27.7 and 58.0%, respectively, over control during both the years. The improvement in commer-

cial cane sugar under aforesaid best agrotechnique could be ascribed to enhancement in yield of ratoon crops. The observed relationship is in close agreement with the findings of Misra *et al.* (1996) and Yadav (2000). They reported that higher cane yield had positive and direct effect on commercial cane sugar (tonnes/ha).

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