

Sett size, seed rate and sett treatment vis-à-vis yield and quality of sugarcane

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ABSTRACT

A field experiment was conducted for three consecutive years (2008-09 to 2010-11) to study the effect of sett size, seed rate and sett treatment on yield and quality of sugarcane at Regional Agricultural Research Station, Anakapalle (A.P.). The result of the experiment indicated that sugarcane planting with 2 and 3 budded setts yielded 86.3 t/ha and 84.9 t/ha, respectively. These yield levels were significantly superior to single budded setts (77.9 t/ha) during all the three years of experimentation. The increase in cane yield was 10.8% and 8.9% in 3 budded setts and 2 budded setts, respectively over single budded setts. Similar increase in cane yield was observed with normal seed rate of 1,20,000 buds/ha (86.2 t/ha) as compared to lower seed rate of 80,000 buds/ha (80.2 t/ha). Significant differences in cane yield were not observed due to sett treatment either with Carbendazim alone @ 0.1% (83.0 t/ha) or Carbendazim @ 0.1% + Gibberellic acid @ 100 ppm for 15 minutes (84.0 t/ha). Sucrose content in juice did not vary with sett size or seed rate or sett treatment. Thus, higher sugar yield was obtained with 2 budded or three budded setts at normal seed rate (1,20,000 buds/ha).

Key words: Sugarcane, Sett size, Carbendazim, Gibberellic acid, Sucrose, Cane yield

Sugarcane is vegetatively propagated crop through stem cuttings (setts) for the establishment of commercial fields. Sugarcane production cost is becoming high due to increase in labour cost and inputs including seed. Seed is the costlier input in sugarcane cultivation and accounts for nearly 25% of the total operational cost in sugarcane. Generally 40,000 three budded setts from 10 tons/ha of short crop (seed crop) or top 1/3rd portion of healthy matured cane is recommended for sugarcane grown under irrigated conditions. Saving of seed material by changing type of seed material (sett size) and seed rate without any deleterious effect on plant stand may help in getting higher cane yield with lower cost of production. Hence, to reduce the cost of production through seed economy technologies the experiment was conducted.

MATERIALS AND METHODS

A field experiment was executed for three years from 2008-09 to 2010-11 consecutively in a sandy loam soil of Regional Agricultural Research Station, Anakapalle (Andhra Pradesh). The soil of experimental plot was neutral in reaction (pH: 7.0), low in organic carbon (0.54%) and (available nitrogen-207.9 kg N/ha), medium in P_2O_5 (22.7 kg/ha) and high in K_2O (305.8 kg/ha). The treatments consisted of three types of seed material viz., three budded setts, two budded setts, and single bud setts, two seed rates, viz., 1,20,000 buds/ha and 80,000 bud setts and two sett treatments (Carbendazim @ 0.1% for 15 minutes and Carbendazim 0.1% + GA @ 100 ppm for 15 minutes).

The experiment was conducted in randomized block

design with factorial concept and replicated thrice. The sugarcane variety used was 93A145. Three, two and single budded healthy cane setts having viable buds were planted after sett treatment in different plots as per treatments. The crop was uniformly fertilized with recommended dose of 112 kg N, 100 kg P_2O_5 and 120 kg K_2O /ha. The crop was planted during first fortnight of February and harvested in the month of December during all the three years.

RESULTS AND DISCUSSION

Percent germination

Germination counts were recorded at 35th day after planting of different setts. Significant variation in germination was observed with different treatments during all the three years of experimentation (Table 1). Significantly higher germination was recorded with three budded setts (64.1 %) or two budded setts (63.1 %) as compared to single bud setts (51.9%). Increase in germination percent due to planting of two budded setts and three budded setts is 19.5% and 17.6 % respectively over single budded setts. Similar results were also reported by Singh et al. (2008).

Decreasing the seed rate by 25% of normal seed rate or sett treatment with Carbendazim 0.1% or Carbendazim 0.1% + GA @ 100 ppm for 15 minutes did not improve the germination percent during 2009-10 and 2010-11 years.

Number of millable canes

The effect of seed size on number of millable canes was significant (Table 1) during all the three years of

[illegible]

Table 2 Yield and quality of sugarcane as influenced by type of sett size, seed rate and sett treatment

Treatment	Percent sucrose				CCS (%)				Cane yield (t/ha)				Sugar yield (t/ha)			
	2008	2009	2010		2008	2009	2010		2008	2009	2010		2008	2009-	2010-	
	-09	-10	-11	Mean	-09	-10	-11	Mean	-09	-10	-11	Mean	-09	10	11	Mean
<i>Sett size (no. of buds per sett)</i>																
Three bud setts	18.59	17.31	17.91	17.94	13.90	12.28	11.91	12.70	90.9	84.8	78.9	84.9	11.9	10.4	9.5	10.6
Two bud setts	18.58	17.39	17.98	17.98	13.05	12.21	12.01	12.42	92.7	85.8	80.5	86.3	12.1	10.5	9.7	10.8
Single bud setts	18.62	17.3	17.77	17.90	13.05	12.07	11.8	12.31	84.1	77.8	71.8	77.9	11.0	9.4	8.5	9.6
SEm +	0.04	0.08	0.06	0.06	0.08	0.05	0.08	0.07	0.7	0.8	2.5	1.33				
CD (0.05)	NS	NS	NS	NS	NS	NS	NS	NS	2.1	2.4	6.3	3.6				
<i>Seed rate (No. of buds / ha)</i>																
1,20,000 buds/ha	18.62	17.39	17.86	17.96	13.20	12.33	11.86	12.46	92.3	86.1	80.2	86.2	12.2	10.6	9.5	10.8
80,000 buds/ha	18.57	17.28	17.93	17.93	13.07	12.16	12.05	12.43	86.2	80.5	73.8	80.2	11.3	9.8	8.9	10.0
SEm +	0.03	0.06	0.05	0.047	0.06	0.04	0.07	0.057	0.6	0.7	2.1	1.13				
CD (0.05)	NS	NS	NS	NS	NS	NS	NS	NS	1.7	2.1	5.1	2.97				
<i>Sett treatment</i>																
Carbendazim 0.1 % for 15 minutes	18.58	17.32	17.78	17.89	13.17	12.28	11.9	12.45	89.4	82.6	77	83.0	11.8	10.1	9.2	10.4
Carbendazim + GA @ 100 ppm for 15 minutes	18.65	17.35	18.01	18.00	13.12	12.2	12.03	12.45	90.2	83.5	78.2	84.0	11.8	10.2	9.5	10.5
SEm +	0.04	0.06	0.05	0.05	0.06	0.04	0.07	0.057	0.7	0.8	2.1	1.2				
CD (0.05)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS				
Interaction	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS				

Sugar yield

The sugar yield was obtained by multiplying the commercial cane sugar percent with cane yield in different treatments and presented in Table 2. The sugar yield followed the same trend as that of cane yield during all the three years of experimentation.

It could be concluded that, in sugarcane cultivation 2 budded setts or 3 budded setts can be used as seed material for getting higher cane and sugar yields instead of single bud setts in tropical part of the country. Irrespective of sett size, decrease in the seed rate to 25% of normal (80,000 buds/ha) reduced cane and sugar yields as compared to normal seed rate of 1,20,000 buds/ha. Sett treatment with Carbendazim 0.1% alone or along with Gibberellic acid @ 100 ppm for 15 minutes had no beneficial effect on germination of buds or cane and sugar yields.

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