

Effect of Top, Middle and Bottom Seed Materials of Cane with Varying Number of Eye Buds on Yield Parameters.

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ABSTRACT

An experiment was conducted at the Sugarcane Research and Training Institute in 1979-80 cropping season to determine the optimum number of eye buds in setts collected from top, middle and bottom portion of the whole cane and their effects on different production parameters.

Results showed significantly higher (%) of germination and recoverable sucrose from cane of top cuttings regardless of the number of eye buds on the setts. The highest raw yield of cane (80.85 TCH) was obtained from two eyed setts taken from middle portion of cane stalk, but the mean yield of top and middle cuttings were identical to each other regardless to the number of eye buds. The setts taken from bottom portion gave lower results in yield & other parameters.

Since top cuttings with one eyed setts were found to give higher yield supported by highest germination, highest millable cane production & highest recovery, these could be used as seed materials for commercial purpose.

INTRODUCTION

Selection of sugarcane seed materials and size of the seed pieces depends upon the local condition of soil, climate, time of planting and age of seedcane etc. Parthasarathy (1972), reported that the use of top portion of cane as seed material is an ideal practice because more mature lower portion, where accumulation of sugar take place (Alexander, 1973; Parthasarathy, 1972), may go to factory resulting higher recovery and immature portion with poor sugar may be used for seed. Parthasarathy (1972), also stated that top portion of cane gives better and quick germination due to having more reducing sugar, buds are not covered by dry scales, root initials are tender, more easily available moisture and young age of the bud. The buds of the bottom portion contain less growth regulating substances. Besides, the bottom portion may have infestation with soil born diseases—namely wilt, grassy shoots etc. (Parthasarathy, 1972). That is why Parthasarathy (1972), recommended to use the late planted young crops of 8-9 months old as seed materials of sugarcane.

Although it is advocated that the top portion of cane gives better and quick germination (Parthasarathy, 1972) and cuttings containing three eye buds is the optimum size of seed piece (Clements, 1940), yet no report is available on such

work under Bangladesh conditions. Therefore, this experiment aims at determining the optimum size of seed setts and select better portion of a whole cane stalk for seed material to get better performance of different yield parameters.

MATERIALS AND METHODS

The experiment was set-up at SRTI Farm in 3 x 3 factorial design with four replications. The cane setts were planted on 12th November, 1979 using variety Co.1158 which was harvested on 14th January, 1981 (14th months after planting). One, two and three eyed cuttings were taken from top, middle and bottom portions of the seedcane. Cuttings treated by Aretan-6 prior to planting were planted in all plots of size 9.45 m x 6.30 m. Trenches were constructed by mechanical trencher at a row spacing of 1.05 m and recommended doses of fertilizers (123 kg N, 123 kg P_2O_5 and 109.8 kg K_2O per hectare) were applied. All normal cultural practices were applied from time to time to provide right conditions for optimum growth and development of plants.

Data collected throughout the experiment were on percentage of germination of eye buds, number of tillers, number of millable canes, cane yield, recovery percentage & sugar yield. The results were analysed to test the level of significance.

RESULTS AND DISCUSSION

Position of setts and number of eye buds affected germination (Table 1). Single eyed seed pieces collected from the top portion gave highest germination (81.61%). This result agrees with that of Clements (1940), who came to a conclusion that the longer the seed piece, the lower the germination (%) and the average shoot vigour. Dillewijn (1952) reported that the terminal (youngest) bud on the sett would germinate rapidly with an inhibiting effect on the lower ones, thus retarding or even preventing their development, with the result that the average germination (%) would be less than cuttings with minimum number of eye buds.

In Mauritius (Anon., 1935), a negative correlation was found between the reducing sugar content of sett and the number of days required for germination indicating that a high content of reducing sugar hastens germination while Dutt and Narasimhan (1940) found that presence of starch in cutting promoted germination.

The highest germination obtained from top setts may be due to the fact that they contain nitrogenous compounds (Clements *et al.*, 1941, Clements and Moriguchi, 1942), and starch matters (Dillewijn, 1952), in an adequate quantity which might have helped for higher and quicker germination.

Although the highest number of tillers per hectare (149.82×10^3) was produced by two eyed middle cuttings, but were identical to the rest of the treatments either on the number of eye bud per sett or on the position of the setts on the cane (Table 1).

Table 1. Effect of seed materials on yield parameters of sugarcane.

Yield parameter No. of eye bud Sett	Germination %				No. of tiller/ha. ('000')				No. of millable cane/ha ('000')				Yield of cane/ha (in TCH)				Recovery %				Sugar Yield/ha. (in TSH)			
	1	2	3	Mean	1	2	3	Mean	1	2	3	Mean	1	2	3	Mean	1	2	3	Mean	1	2	3	Mean
Top	81.61	66.71	59.92	69.41 _a	142.82	135.34	138.52	138.90	99.95	86.94	91.28	93.55 _a	77.81	74.33	76.60	76.23 _a	10.22	10.19	10.18	10.20 _a	7.94	7.57	7.80	7.77 _a
Middle	66.76	63.89	54.59	61.75 _b	133.89	149.82	137.54	140.40	97.26	93.60	86.86	92.56 _{ab}	75.59	80.85	74.11	76.85 _a	9.91	9.83	9.72	9.82 _b	7.48	7.94	7.20	7.54 _{ab}
Bottom	57.85	53.70	47.53	53.03 _c	124.49	137.24	120.93	127.55 _a	86.49	89.57	87.67	87.92 _b	67.51	71.73	70.10	69.81 _b	10.41	9.76	10.21	10.13 _{ab}	7.05	6.95	7.16	7.05 _b
Mean	68.74 _a	61.43 _b	54.01 _c	—	133.73 _a	140.80 _a	132.32 _a	—	98.57 _a	90.88 _{ab}	88.61 _b	—	73.66 _a	75.64 _a	73.61 _a	—	10.18 _a	9.93 _a	10.04 _a	—	7.49 _a	7.49 _a	7.39 _a	—

* Figures bearing similar letter do not differ significantly at 1% level.

Top cuttings with single eyed bud produced significantly highest number of millable cane (99.95×10^3) per hectare followed by one budded cuttings of the middle portion of cane stalk (Table 1).

There were no significant difference in yields of cane related to the number of eye buds used per sett. However, the highest yield of 80.85 TCH was produced by two eyed sett taken from the middle portion of cane stalk (Table 1), but setts from top and middle portions, regardless of their number of eye buds produced identical yields and were superior to that obtained from the setts of bottom portion of cane.

Highest recoverable sucrose contents was produced from top cutting with single eye bud (10.22%). This might be due to quick germination of shoots with early start of tillering which produced healthy millable cane compared to others & got longer time for accumulation of sugar. Highest sugar yield/hectare (7.77 TSH) was obtained from top cuttings but in respect of eye bud all of the mean sugar yield are identical.

The results discussed above indicates the superiority of top cuttings with one eye sett to others in respect of germination (%), millable cane production, recovery (%) and yield of sugar (TCH).

ACKNOWLEDGEMENT

The authors are thankful to Mr. M. A. A. Sarker, Principal Sugar Chemist, Mr. M. A. Ghafur, Asstt. Statistician and Mr. M. A. Kashem, Scientific Assistant for their assistance in chemical analysis of cane samples, statistical analysis of the data and cultural management to the crop under the experiment.

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