

Studies on the Effect of Wrapping Material, Rooting Media and Duration in Marcotting of Sugarcane

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ABSTRACT

An experiment was carried out to study the effect of two wrapping materials, five rooting media and five dates of harvesting on root formation in marcotting of sugarcane. Transparent and black polythene sheets were used as wrapping material. Control (2 parts soil, 2 parts mudpress and 1 part sand), Sawdust (100%), mudpress (100%), control+sawdust (50:50) and sawdust+mudpress (50:50) were used as rooting media. Stalks were harvested every 6 days until 30 days while data were taken on length and weight of roots.

Transparent polythene was found to display it's superiority, both in length and weight of roots, over the black sheet. Hundred percent sawdust produced the longest root but maximum weight was obtained by control alone in comparison to all other media. Length and weight of roots increased with the increase of time but the maximum rate of growth was observed in 2-3 weeks of marcotting.

INTRODUCTION

Marcotting, one of the useful techniques in sugarcane breeding (Tysdal, 1956) system may be used as pre-requisite for hybridization. Marcotting is performed before any signs of flower is noticed. This method is practicable only on varieties which flower freely because a high proportion of rooted canes may be expected to flower (Anonymous, 1960). In this system, desirable stalks are selected in the field and are enclosed with rooting media. Three nodes are generally enclosed above the fourth node from the ground level. After placing the rooting media around the stalks they are covered with polythene sheet and tied on both ends of media used. Thus marcotting is completed. When sufficient roots come out the stalks are cut down just before the arrow unfolds and they are brought under the crossing shed to set up the cross. During setting up, the marcotted stalks may be kept either in the running tap water or in the earthen pot where the stalks are covered with

soil upto the marcotted portion, and water the pots regularly. This is necessary to keep the stalks alive for about 4 to 5 weeks. During this period, cross-pollination is completed and the female arrows are harvested.

Considering the importance of marcotting in cross-pollination the present experiment was conducted to investigate the effect of different wrapping materials on root development, effect of different media on root growth, and effect of time on root formation.

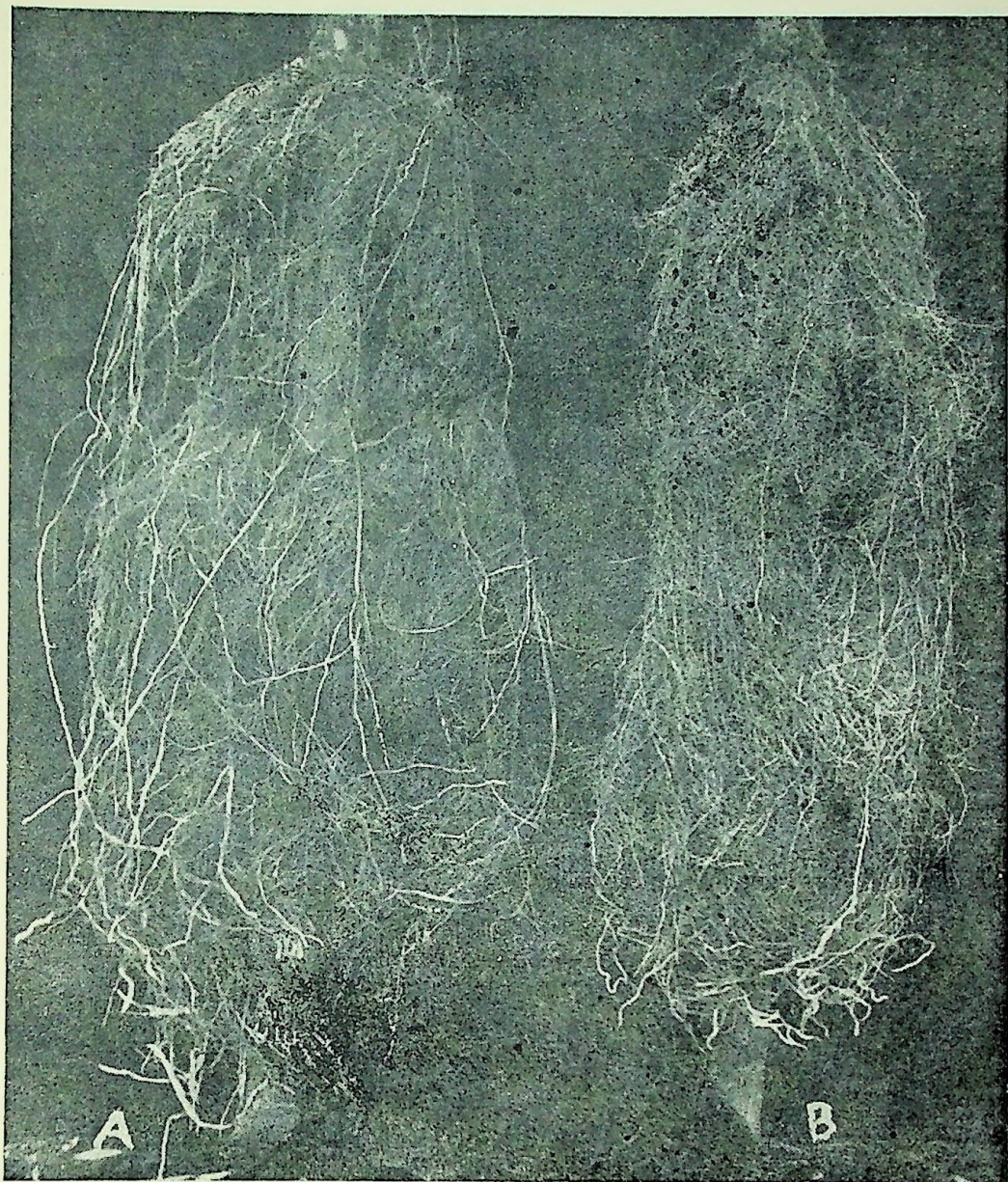
MATERIALS AND METHODS

Polythene sheets, black and transparent, were used as wrapping material in marcotting. The size of the sheets was 55cmx45cm. Five types of media (treatment) such as control, sawdust (100%), mudpress (100%), control+sawdust (50:50) and sawdust+mudpress (50 : 50) were used as rooting media. Control was a mixture of soil, mudpress and sand in the proportion of 2 : 2 : 1. All the media were saturated with water and then placed around the selected stalks covering three nodes above the fourth node from the ground level. Approximately the same volume of media was maintained for all the marcotted clones. After placing the media they were wrapped with polythene sheets. In all, 150 clones were marcotted on the same day out of which 75 were wrapped with transparent sheets and 75 were wrapped with black sheets maintaining 15 stalks for each of the five media. The variety used was Isd. 16 and the operation was done in the second week of October, 1982 while the cane was 10 months old. Three stalks from each of the media of black and transparent material were cut down every 6 days and washed in running tap water. Data on length and weight of roots were recorded. In measuring the length, twenty longer roots, ten from each node, were randomly selected and measured (cm). In case of weight, all the roots from two nodes were measured (gm). For statistical analysis both the characters were considered as average root length and weight of roots per node. Measurement of length, after 6 days of marcotting, was not taken since the roots were too short.

The recorded data were then analysed in a factorial randomized block design and the values were evaluated by Duncan's test.

RESULTS AND DISCUSSION

The results in Table 1 indicated that in case of length, transparent polythene produced significantly longer roots obtaining 19.97 cm against 14.02 cm of black polythene. The length produced by different media showed that hundred



A. Root development in Sawdust (100%) with black polythene.
B. Root development in Sawdust (100%) with transparent polythene.

percent sawdust gave the longest roots (21.58 cm) followed by control (19.20 cm), control+sawdust (15.86 cm), hundred percent mudpress (15.70 cm) and sawdust+mudpress (12.62 cm). Statistically the lengths, produced by different media, differed significantly from one another except hundred percent mudpress and control+sawdust. The length produced by transparent and black polythene in different media exhibited that the effect of the former was significantly superior to the later.

Weight of roots with transparent and black polythene showed that the former was significantly higher (22.36 gm) than the later (10.00 gm). Among the media maximum weight (24.03 gm) was observed in control which followed by hundred percent mudpress (23.38 gm). Transparent polythene in all media showed significantly better effect over the black with regard to weight of roots (Table 1).

Table 1. Mean length and weight of roots in different media with transparent and black polythene wrapping material in marcotting of sugarcane.

Characters studied	Type of wrapping materials	Rooting media					Mean
		Control	Sawdust (100%)	Mud press (100%)	Control+sawdust (50:50)	Sawdust+mudpress (50:50)	
Length (cm)	Transparent	21.54 a*	24.79 a	19.64 a	17.33 a	16.54 a	19.97 a
	Black	16.86 b	18.37 b	11.76 b	14.39 b	8.70 b	14.02 b
Mean	—	19.20 b	21.58 a	15.70 c	15.86 c	12.62 d	—
Weight (gm)	Transparent	27.17 a	23.23 a	39.77 a	11.93 a	9.70 a	22.36 a
	Black	20.90 b	9.10 b	7.10 b	7.08 b	5.91 a	10.00 b
Mean	—	24.03 a	16.17 b	23.38 a	9.51 c	7.81 c	—

*Figures with letter in common do not differ significantly at 5% level as per DNMR test.

The results were partially supported by Dutt and Hussainy (1956) who using moist soil in transparent alkathene rooting bags found that the rooting was not only quicker but the percentage of root eyes sprouted at the level of the cane was also high. The finding of this experiment also agrees with the results obtained elsewhere (Anonymous, 1960) where maximum root was produced by sawdust alone or by mixtures of bagasse, soil and sawdust.

Table 2 shows that the average length of roots increased with the increase of days, i. e., the maximum length was developed at 30 days. The mean length of roots at every harvest was statistically significant from the previous one.

It was observed that in all harvesting days, the length of roots produced by transparent polythene was significantly longer than black polythene. The mean length produced by transparent polythene was significantly longer than black one.

Table 2 also exhibits that the weight of roots increased with the increase of days, ranging from 0.91 to 36.13 gm. Among the weight of roots produced by transparent and black polythene in different harvesting dates showed that former was always statistically superior to the later except at 6 and 12 days.

It was noted that the rate of increase, both in length and weight of roots, was maximum in between 2-3 weeks of marcotting.

The findings were partially in conformity with the results of Dutt and Hussainy (1956) who obtained quicker root growth with transparent alkathane rooting bags. The results were also indirectly supported by Groot and George (1962) who found the sufficient roots between 2-3 weeks of marcotting.

Table 2. Mean length and weight of roots harvested at different dates with transparent and black polythene wrapping material in marcotting of sugarcane.

Characters studied	Type of wrapping materials	Days of harvesting					Mean
		After 6 days	After 12 days	After 18 days	After 24 days	After 30 days	
Length (cm)	Transparent	—	9.89 a *	15.57 a	24.16 a	28.25 a	19.97 a
	Black	—	6.13 b	13.97 b	13.84 b	22.13 b	14.02 b
Mean	—	—	8.01 d	15.77 c	19.00 b	25.19 a	—
Weight (gm)	Transparent	1.10 a	4.97 a	21.49 a	37.59 a	46.65 a	22.36 a
	Black	0.73 a	2.22 a	6.85 b	14.59 b	25.60 b	10.00 b
Mean	—	0.91 d	3.59 d	14.17 c	26.09 b	36.13 a	—

*Figures with letter in common do not differ significantly at 5% level as per DNMR test.

The data on length and weight of roots with different media at 6 days interval were graphically presented in figures 1 and 2. Figure 1 shows that length of roots increased with the increase of days in all media. Hundred percent sawdust was found to produce the longest roots in all dates of harvesting while control secured the second position. It is apparent also from the figure

Control
Sawdust
Mudpress
Control+Sawdust
Sawdust+Mudpress

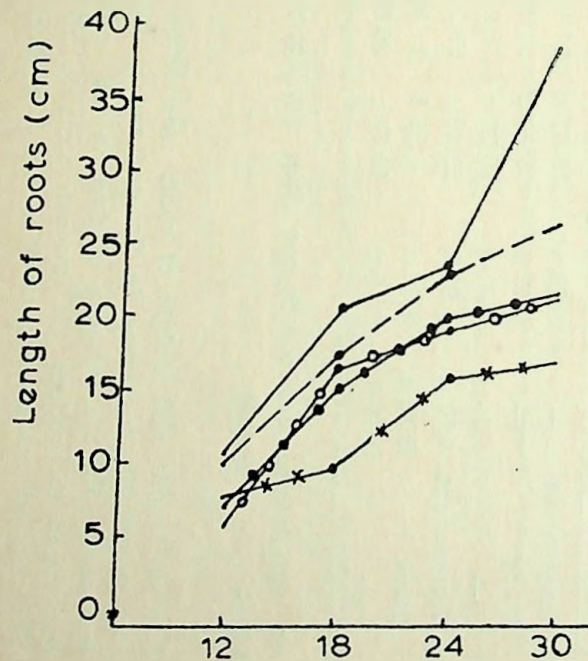


Fig 1. Harvesting days
after marcotting

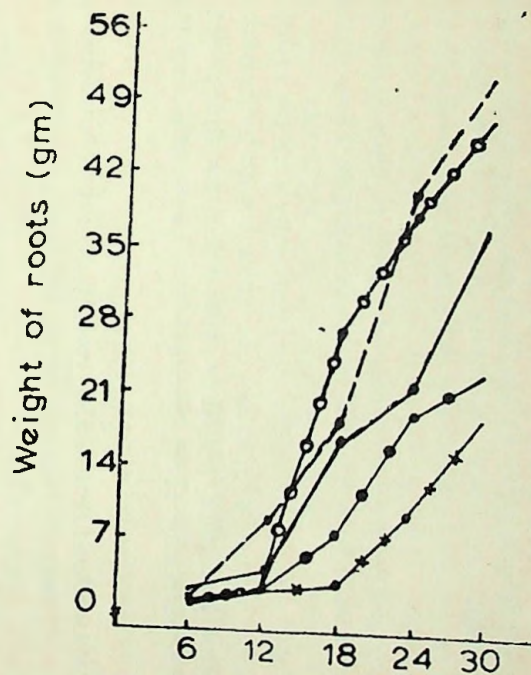


Fig 2. Harvesting days
after marcotting

that control + sawdust occupied third position in producing the length of roots in all dates except at 18 days. However, fourth and fifth places were secured by hundred percent mudpress and sawdust + mudpress, respectively.

Figure 2 shows that weight of roots, in all media, increased with the increase of duration. Control in all harvesting dates, except 18 days, gave the maximum weight while mudpress was second in position. But the later produced higher weight of roots than control at 18 days. For the same parameter, hundred percent sawdust, control+sawdust and sawdust+mudpress occupied the third, fourth and fifth places, respectively.

It was further observed that though the length of roots in sawdust was higher than in all other media but occupied third position with regard to weight of roots. This discrepancy between length and weight of roots may probably be due to less number or narrow roots.

From the results of the experiment it may be assumed that transparent polythene is better than black one; hundred percent sawdust is preferable to all other media because root development is quicker and become longer in short time; and growth rate is maximum in between 2-3 weeks of marcotting.

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