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Effect of water-soaking and dessication of seedcane on germination and yield of sugarcane

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ABSTRACT

An experiment was conducted at the Sugarcane Research and Training Institute Farm, Ishurdi, during 1981-82 crop season to evaluate the effect of water-soaking and dessication of seedcane on germination and yield of sugarcane. Highest percent germination, number of tillers/ha, number of millable cane/ha, yield of cane and sugar and percent recoverable sugar were obtained under the treatment where 48-hours water-soaked seedcanes were planted.

INTRODUCTION

The most important factor in crop establishment after land preparation and planting is the optimum germination (King, 1965). Germination constitutes a critical period in the life of the cane plant; good germination means good start and provides the basis for a safe crop. Maximum germination will result when both internal and external factors are optimal (Steiner and Comstock, 1975). Deterioration in the germination of the buds may be due to genetic or physiological factors (Mukherjee, 1960). Variation in sucrose content, water, age, food, nutrient and hormonal content have been explained as variation in the germination behaviour of sugarcane buds (Anon., 1972).

Pre-sowing treatments to sugarcane setts with water i. e., soaking, effect of dessication, nutrients, various physical stimuli and also other aspects regarding germination of sugarcane setts have been carried out extensively in different cane growing countries of the world (Eastwood, 1972). Some of these treatments are found to be very effective in increasing the germination of the buds. Soaking in water during 12 to 36 hours was a common practice in Queensland (King. 1965). Khanna (1963) stated a higher germination, more vigorous growth, greater number of tillers/plant and heavier crop at harvest time due to water soaking treatment. Beneficial influence of water soaking may be attributed to the

essential character of water for the germinating bud which after being absorbed eventually brings many favourable chemical changes conducive to quicker and better germination, more important being the conversion of sucrose into reducing sugars (Panje *et. al.*, 1968). General experience has shown long since that the germination of cuttings improves if, prior to planting, they are allowed to loss part of their moisture by drying (Chen and Lo, 1982). The stimulating effect of drying may be obtained in practice by exposure to the sun for a few days. A similar beneficial effect of a delay between cutting and planting of setts has been reported by Kanwar *et. al.* (1975). Sarkar *et, al.* (1982) found that drying increase the inversion of sucrose into simple sugars. No such observation has been made in Bangladesh. Therefore, this experiment was undertaken to study the effect of water-soaking and dessication of seedcane on germination and yield of sugarcane.

MATERIALS AND METHODS

The experiment was conducted at the Sugarcane Research and Training Institute (SRTI) farm in 1981-82 crop season following randomized camplete block design with three replications. The treatments were as follows. The veriety was Isd.16.

T_1—Plantation on the same day of harvesting of seedcane (control).
T_2—Plantation on the 3rd day of harvestlng of seedcane.
T_3—Plantation on the 7th day of harvesting of seedcane.
T_4—Plantation of 24-hours water-soaked seedcane.
T_5—Plantatlon of 48-hours water-soaked seedcane.

Seedcanes of the treatments T_2 and T_3 were kept in the field for dessication. Seedcanes of the treatments T_4 and T_5 were soaked in ordinary tap-water. The size of each plot was 10mx10m. Equal number of three budded assorted setts were planted with row spacing of 105 cm. The end to end method and recommended doses of fertilizers were used. Plantation of all the treatments were made on the same day, i. e. on 14th December, 1981. All normal cultural practices were done as and when required for optimum growth and development of the plants. The samples of the setts of each treatments were chemically analysed for its sucrose content at the time of plantation (Table 1). Data on germination on the 30th and 45th day from the date of plantation were recorded (Table-1). Count on tillering was done once in every month starting from March to July, 1981. The experiment was harvested on 12th January, 1982 and data were taken on number of millable cane and yield of cane. Chemical analysis for percent recovery were carried out by taking samples of ten randomly selected stalks for each replication following

Horne's Dry Lead Method (Meade, 1963). The collected data were statistically analysed and the significance of mean difference were adjusted as per Duncan's New Multiple Range Test (Steel and Torrie, 1960).

RESULTS AND DISCUSSION

The effects of water-soaking and dessication of seedcane on germination and yield of sugarcane have been presented (Table 1 & 2). Highest percent germination, tillers, millable cane, yield of cane and sugar and percent recovery were obtained in the treatment where 48-hours water-soaked seedcanes were planted.

Table 1. Effect of different treatments on sucrose content and germination.

Treatments	Sucrose content (%)	Germination percent	
		30th day	45th day
T_1	11.18	30	50
T_2	10.53	34	57
T_3	8.23	29	44
T_4	11.12	65	76
T_5	11.09	70	80

Observations on the number of buds germinated were made after 30 and 45 days from the date of sowing. The highest initial and final germination (%) of sugarcane buds were obtained in the treatment where 48-hours water-soaked seedcanes were planted. Slightly lower germination (%) were found in the treatment T_4, where 24-hours water-soaked seedcane were planted. The findings corroborated with the observation of Mukherjee (1960). Table 1 shows that dessication had some effect on the sucrose content in the setts on the date of planting. The highest sucrose content was found under treatment T_1 (Control), i. e., plantation on the same day of harvesting of seedcane. Sucrose content was gradually decreased in treatments T_2 and T_3 where dessication was allowed for 2 days and 6 days respectively. This might be due to the inversion of sucrose into invert sugar. Similar observations were made by Sarkar *et. al.*, (1982). The sucrose content was also found to be slightly less in treatments T_4 and T_5 where water soaking of setts were carried out for 24 and 48 hours respectively than that of the control (T_1). This might be due to the dilution of the sucrose content of the cane soaked in water. The beneficial influence of water-soaking may be attributed to the essential character of water for the germinating bud which after being

Table 2. Effect of different treatments on production of tillers, millable canes, % recovery, tons cane/ha, and tons sugar/ha.

Treatments	Tillers production/ ha ('000')	Millable cane/ha ('000')	Yield of cane/ha (TCH)	% Recovery	TSH
T_1	76.2 b	70 0 a	69.00 a	11.00 ab	7.59 a
T_2	78.8 b	72.9 b	72.81 b	11.72 bc	8.53 b
T_3	72.1 a	70.8 b	70.18 a	10.85 a	7.61 a
T_4	78.2 b	77.6 c	75.45 c	12.00 c	9.05 c
T_5	79.7 b	78.5 c	76.11 c	12.22 c	9.31 c

* Same letters in column do not differ significantly at 5% level of probability.

absorbed eventually brings many favourable chemical changes conducive to quicker and better germination, more important being the conversion of sucrose into reducing sugars (Panje *et.al.*, 1968).

Highest number of tillers/ha was produced by the treatments T_5, i. e., plantation of 48-hours water-soaked seedcane. This result agrees with that of Chen and Lo (1982).

Highest number of millable cane/ha, yield of cane and sugar/ha and percent recovery were found under treatment T_5, i. e., plantation of 48-hours water-soaked seedcane.

The results discussed above indicate the superiority of water-soaking of seedcane to dessication/drying in respect of germination (%), tiller and millable cane production, recovery (%) and yield of cane (TCH) and sugar (TSH).

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