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Measures to Enhance Germination in Sugarcane under Field Condition

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ABSTRACT

An experiment was carried out at Sugarcane Research & Training Institute (SRTI) farm to enhance speed and percentage of sugarcane germination under field condition. Results showed superiority of preplanting 48h water soaking, 7d desiccation, 7d desiccation followed by 12h water-soaking, 48h soaking in 5% lime solution, 48h in 1% Urea solution and hot water treatment at 50°C for 30 min of seedcane over planting of fresh seedcane under field condition when ambient temperature below 20°C. It is recommended for preplanting 48h water-soaking or 7d desiccation followed by 12h water-soaking or hot water treatment at 50°C for 30 min of seedcane.

INTRODUCTION

The yield of sugarcane is very poor in Bangladesh. It is observed in a survey that 15 - 30 % lands remains vacant due to poor, and uneven germination under field condition. The germination failure under field condition is reported to be due to use of poor seed canes, physiologically over matured sugarcane buds, lower ambient temperature and soil moisture stress (Matin *et al.* 1988; Miah *et al.* 1988; Hossain *et al.* 1989; Yang and Chen, 1980) and seedcane treatment may enhance germination. In Bangladesh, 3-budded setts are directly planted in the furrows and sometimes planting is done during November to mid-February when ambient temperature goes below 20°C which prevents germination (Miah *et al.* 1988; Hossain *et al.* 1989). In this laboratory studies have been carried out to identify reasons of poor germination. In the present investigation, studies have been done on possible measures to enhance germination under field condition.

MATERIALS AND METHODS

An experiment was conducted at SRTI farm following randomized complete block design with three replications. The experiment comprised the following treatments :

T_0 : Two budded fresh setts are planted in the furrows.

T_1 : Preplanting 48h water-soaking of two budded setts.

T_2 : Preplanting 48h soaking of two budded setts in 5% lime solution.

T_3 : Preplanting 48h soaking of two budded setts in 1% urea solution.

T_4 : Preplanting 7d desiccation of seedcanes.

T_5 : Preplanting 7d desiccation of seedcanes followed by 12h water-soaking (in the form of two budded setts).

T_6 : Hot water treatment (HWT) of two budded setts at 50°C for 30 minutes.

Recommended doses of fertilizers were used and all normal cultural practices were

done as and when required to maintain optimum field condition except irrigation on germination counts were taken on 30, 45, 60 and 75th day from date of planting. Planting was done in December when ambient temperature was below 20°C

RESULTS AND DISCUSSION

The results of the experiment have been shown in the Table 1. It is seen from the table that all treatments used gave significantly higher germination percentage compared to check where two budded fresh setts were planted directly in furrows. Both speed and percentage of germination were found higher in treated setts compared to check (Table 1). Preplanting soaking or desiccation or simple desiccation followed by water soaking enhanced germination substantially at almost all the stages. Germination percentage varied from 1.9 to 12.0% on 15th day of planting while no germination was recorded in the check. Upto 75th day of planting higher germination percentage was maintained in all treatments compared to check. However, among the treatments preplanting 48h water soaking, 48h soaking in 5% lime solution, 7d desieation followed by 12h water-soaking and hot water treatment at 50°C for 30 min showed superiority over preplanting 48h soaking in 1% urea solution and simple 7d desiccation of seedcanes. Preplanting desiccation of seedcane for 7d showed lower germination compared to other treatments, and narrowly significantly higher compared to check possibly due to drying up of buds and available soil moisture was not sufficient to start enzyme activities for germination. But preplanting desiccation of seedcanes followed by 12h water soaking, showed very good germination. This indicates water requirement for germination due to drying effects of longer desiccation in the field. This result supports the report of Chen *et al.* (1986) who found higher germination in the seed cane which were soaked in 5% lime solution for one day after few days of desiccation in the field after harvesting. Preplanting hot water treatment at 50°C for 30 min enhanced both speed and percentage of germination confirmed this report of Escober (1966) who also recorded higher germination when seedcanes were given hot water treatment at 50°C for 30 minutes. Hot water treatment enhances germination possibly due to breakdown of bud dormancy and change in hormone level and enzyme activities. In our pervious reports we have identified that minimum ambient temperature below 20°C affects both speed and percentage of germination (Miah *et al.* 1988; Hossain *et al.* 1989). This result indicates that germination could not be started due to lack of enzyme activities when ambient temperature goes below 20°C. Sugarcane growers can not change their planting time due to unavoidable circumstances, and they have no control over ambient

Table 1. Effects of seedcane treatments on germination.

Treatments	Germination % at different dates (Days after planting)				
	15	30	45	60	75
T_0	nil	8.6	15.3	21.7	23.2c
T_1	9.3	17.8	32.4	35.7	39.0a
T_2	10.1	21.5	30.5	34.7	38.1a
T_3	8.4	16.7	29.9	32.2	32.7b
T_4	1.9	7.6	19.3	21.3	29.3b
T_5	11.4	28.5	35.6	41.7	43.3a
T_6	12.0	30.0	34.2	42.1	44.3a

temperature either. Sometimes they can not maintain required level of soil moisture due to lack of irrigation facilities, and/or higher cost of irrigation water. Therefore, sugarcane growers have no option other than depending on vagaries of environment. Under above unavoidable circumstances seedcane treatments following any of the above mentioned methods will substantially enhance germination under field condition at lower ambient temperature, and soil moisture stress resulting higher population minimizing gaps, and this will ultimately help in obtaining higher yield. However, this results suggests to investigate the level of hormones and enzymes activities under field condition at lower ambient temperature and soil moisture level. Therefore, it is recommended for preplanting 48h water-soaking or 7d desiccation followed by 12h water-soaking or hot water treatment at 50°C for 30 min of seedcanes.

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