

Germination Behaviour of SRTI Released Seven Sugarcane Varieties

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ABSTRACT

An experiment was conducted at Sugarcane Research & Training Institute (SRTI) farm to find out the germination behaviour of SRTI released seven sugarcane varieties. Germination behaviour regarding speed and percentage of tested seven varieties greatly differed between lower and higher ambient temperature irrespective of varieties. At higher temperature level (30.9/22.2°C) the varieties Isd-18 gave the highest germination percentage (70.7%) while the lowest percentage (49.3%) was obtained in variety Isd-16. The comparative response to higher temperature level regarding germination percentage was Isd-18 > Isd-19 > Isd-20 > L.Jaba-C > Isd-2/54 > Isd-21 > Isd-16. At lower temperature level (26.6/13.1°C) the highest germination was obtained in L.Jaba-C and the lowest germination in Isd-16. The comparative response regarding germination percentage was L.Jaba-C > Isd-21 > Isd-18 > Isd-19 > Isd-20 > Isd-2/54 > Isd-16. It is recommended to avoid cold temperature and selection of cold tolerant varieties for planting during lower temperature.

INTRODUCTION

Germination of sugarcane is influenced by many internal and external factors (Hossain *et al.* 1989; Matin *et al.* 1988; Miah *et al.* 1988). Among external factors ambient temperature and soil moisture are very important. Besides external factors, varietal response to ambient temperature exists due to built-in genetic potentiality in different sugarcane varieties. Difference in sensitivity to ambient temperature and soil moisture level speed and percentage of germination of sugarcane buds also greatly varies (Miah *et al.*, 1988; McMartin, 1957; Went, 1957). It has been reported earlier from this laboratory that commercial variety L.Jaba-C is relatively cold tolerant compared to variety Isd-16 (Miah *et al.*, 1988). The SRTI has released several new high yielding high sugar varieties in the recent past. But comparative merits in respect to germination response to lower ambient temperature have not yet been evaluated. Therefore, the present investigation was undertaken to study and evaluate germination behaviour of SRTI bred and released seven high yielding high sugar varieties at lower ambient temperature.

MATERIALS AND METHODS

An experiment was conducted at SRTI farm with seven sugarcane varieties including two old commercial varieties such as Isd-16, Isd-18, Isd-19, Isd-20, Isd-21, Isd-2/54 and L.Jaba-C. In each fortnight a number of 100 two budded setts of each variety were planted starting from 1st August and continued up to following March. Speed and percentage of germination was recorded at an interval of 7d starting from 7d after planting, and continued up to 84 d. Number of days required for emergence of 1st shoot and last shoot after planting, and days required between 1st and last emergence of shoot were also recorded. Watering and intercultural operations were done as and when required to maintain similar soil moisture level throughout the experimental period. Data collected were statistically analysed.

RESULTS AND DISCUSSION

The results of the investigation have been presented in the Figures 1-4. It is revealed from the Figures 1-2 that speed and percentage of germination behaviour greatly differed between lower and higher ambient temperature levels irrespective of varieties. It is seen from the Figure 1 that 1st imergence of shoot started within 7d of planting attaining peak germination within 28 d of planting in all seven varieties tested, and then come to a pleatu when average maximum and minimum ambient temperature were 30.9 and 22.2°C respectively. On the otherhand, Figure 2 shows that emergence of 1st shoot could not be started until 21 d of planting having a great lag phase upto 28 d

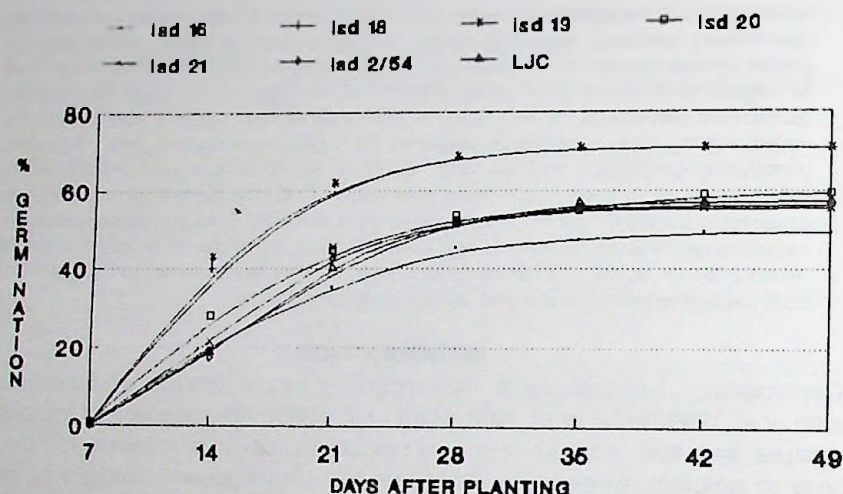


Figure 1. Germination behaviour of seven sugarcane varieties (30.9/22.2°C).

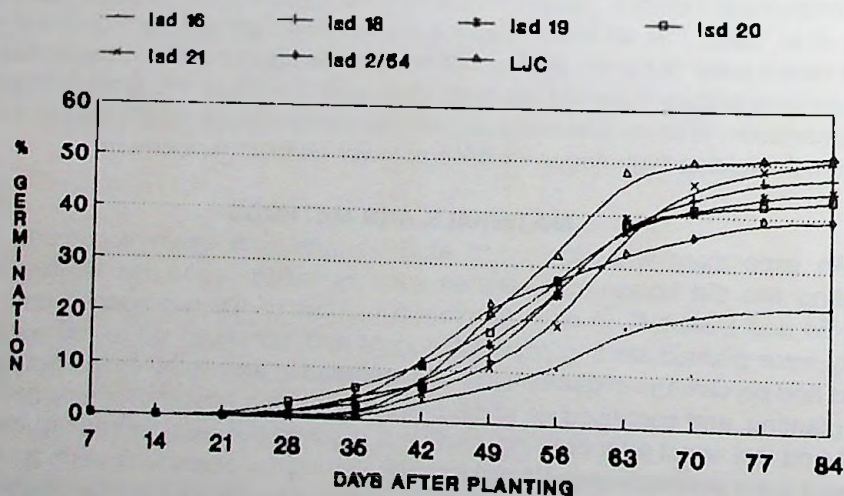


Figure 2. Germination behaviour of seven sugarcane varieties (26.3/13.1°C).

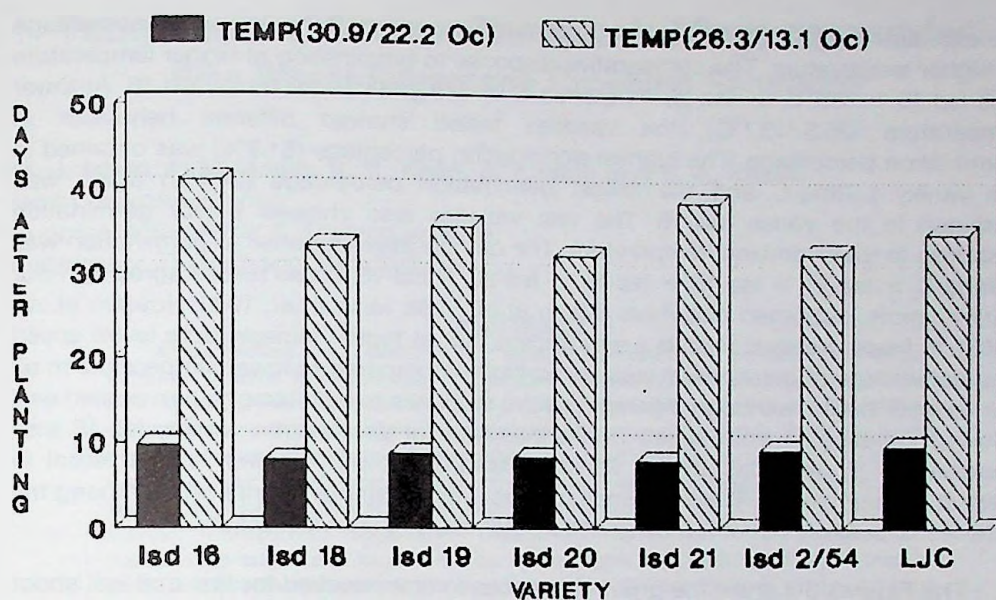


Figure 3. Number of days required for emergence of 1st shoot after planting.

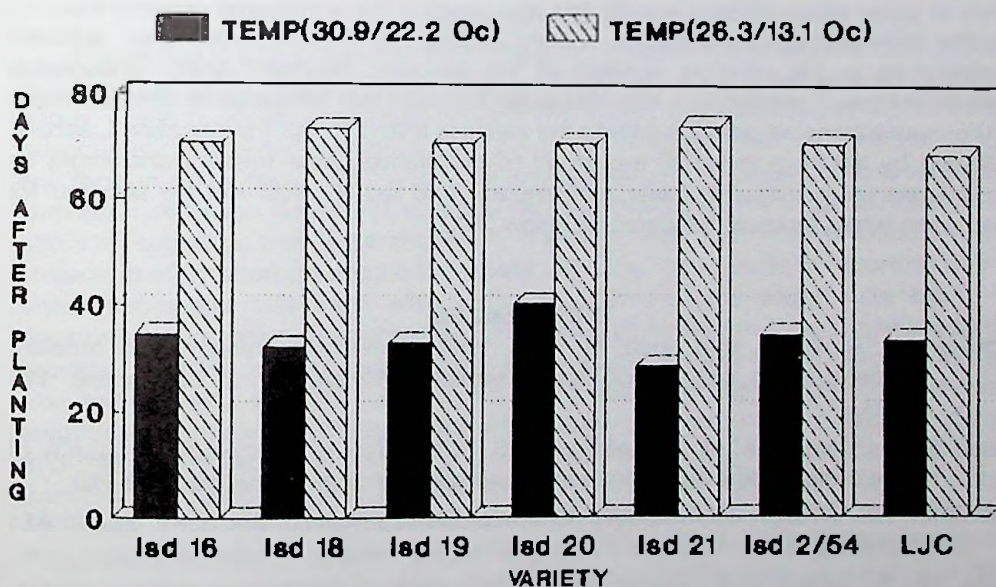


Figure 4. Number of days required for emergence of last shoot after planting.

after planting, and took 63 - 70 d to attain peak germination percentage when maximum and minimum ambient temperatures were 26.3 and 13.1°C respectively. At higher temperature level the varieties Isd-18 and Isd-19 gave the highest germination percentage (70.7%) while the lowest percentage (49.3%) was obtained in variety Isd-16.

Varieties Isd-20, Isd-21, Isd-2/54 and L.Jaba-C showed similar germination percentage at higher temperature. The comparative response to germination at higher temperature was Isd-18 > Isd-19 > Isd-20 > L.Jaba-C > Isd-2/54 > Isd-21 > Isd-16. At lower temperature (26.3/13.1°C), the varieties tested showed different behaviour in germination percentage. The highest germination percentage (51.3%) was obtained in the variety L.Jaba-C and the lowest germination percentage (34.4%) again was obtained in the variety Isd-16. The rest varieties also showed similar germination response to lower ambient temperature. The comparative response to germination was L.Jaba-C > Isd-21 > Isd-18 > Isd-19 > Isd-20 > Isd-16. These results agree with our earlier reports published elsewhere (Matin *et al.*, 1988; Miah *et al.*, 1988; Hossain *et al.*, 1989). In these previous reports it was shown that at higher temperature levels speed and percentage of germination was found higher compared to lower temperature in all the varieties tested, although different varietal response to cold temperature existed and showed variation in both speed and percentage of germination. Variety Isd-16 also showed shy in germination and variety L.Jaba-C showed relatively cold tolerant in respect to germination. This difference in sensitivity to ambient temperature among the varieties is possibly governed by genetic potential, and enzyme activity.

The Figures 3-4 show the great differences in time required for first and last shoot emergence at both higher and lower temperature. At higher temperature when first shoot emergence took place within 6-9 d after planting, while at lower temperature it took 32 to 41 d. Similarly last emergence of shoot at higher temperature was 26-40d while at lower temperature it was 66-74d. It is obvious that sugarcane growers have no control over ambient temperature, shifting of planting time to avoid lower ambient temperature is the principal solution of the problem. However, under unavoidable circumstances if plantation is required to be done at lower temperature varietal choice is the main alternative solution among the varieties tested. In this investigation L.Jaba-C followed by Isd-21, and Isd-18 are found to be relatively cold tolerant and might be considered for planting at lower temperature, and Isd-16 must not be selected for plantation when ambient temperature below 20°C.

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