

Effects of Planting Depth on Germination, Growth and Yield of Two Sugarcane Varieties

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SCIENTIFIC NOTES

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Several factors including planting material, planting depth, age of cane etc. have been reported to affect germination (Yang and Chen, 1980; Oworu, 1978). The yield of exotic varieties used for commercial sugarcane production in Nigeria Sugar Estates have declined (Atanda, 1978; Agbana, 1991). The depth of planting plays vital role in cane establishment and successful sugarcane production. In the Bacita Sugar Estate, lower and uneven germination resulting gappy stands, and gap filling is a common practice (Anon, 1987). This situation may not augur well for a good planting operation since it is one of the factors responsible for low yield. Therefore, it is important to evaluate various cultural methods especially depth of planting for obtaining an adequate crop stand, and as such an investigation was undertaken to determine the effect of different planting depths on germination, growth and yield of two commercial varieties.

The experiment was conducted in the screen house of the University of Ilorin, Sugar Research Institute, Nigeria. Two sugarcane varieties Co 1001 and Co 957 were used. Healthy and uniform single budded setts were planted in 10-litre buckets filled with steam sterilized soils. Four planting depths 5, 10, 15 and 20 cm were chosen. The experiment was laid out as a completely randomised design with four replications. Single budded setts were planted in each pot, and watered regularly. The number of buds that germinated in each pot were counted two weeks after planting. Basal fertilizer application was done at the rate of 120 kg N/ha, 60 kg K₂O/ha and 60 kg P₂O₅/ha respectively four weeks after planting. The cane plants were then allowed to grow for 180 d before harvesting. At harvest the stalk's length was measured with a tape, and number of internodes from individual stalk counted from all the pots. The tiller population was counted per pot. The fresh cane weight of each pot was recorded.

The effect of planting depth on growth characteristics of sugarcane varieties Co1001 and Co 957 are presented in Figures 1 to 3. A significant difference was observed in germination in both the varieties (Figure 1). The highest germination was observed at a depth of 10 cm in the variety Co 1001, while 5 to 15 cm in the variety Co 957. The varietal response to germination might be due to differences in morphological characteristics of the two varieties. Several factors such as variety, reducing sugar content of cane stalks have been shown to affect germination of sugarcane buds (Mukerji, 1979; Oworu, 1985). Sugarcane growers use stalk length to measure the growth of canes, for detecting problems and most essentially in estimating yields (Kiddler and Rice, 1979). A close association has equally been reported between stalk

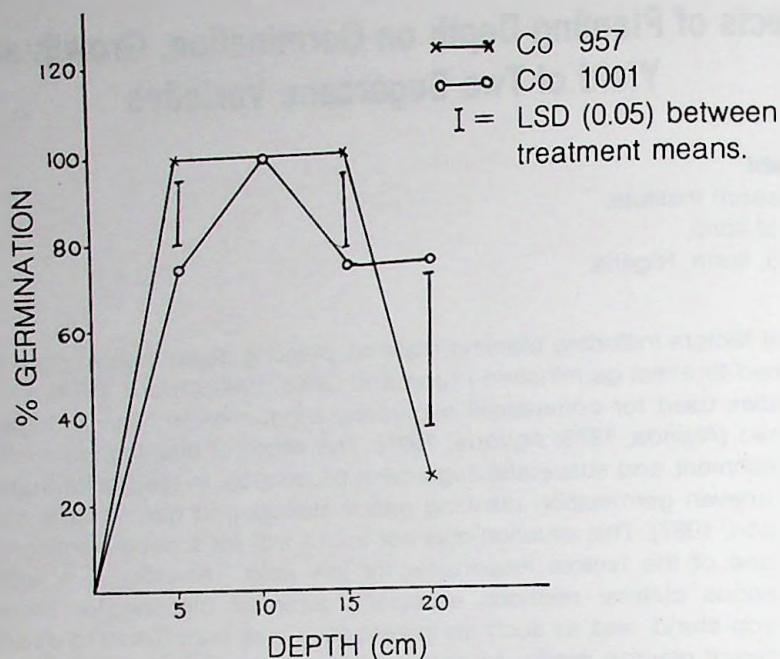


Figure 1. Effects of planting depth on the germination of two commercial sugarcane varieties.

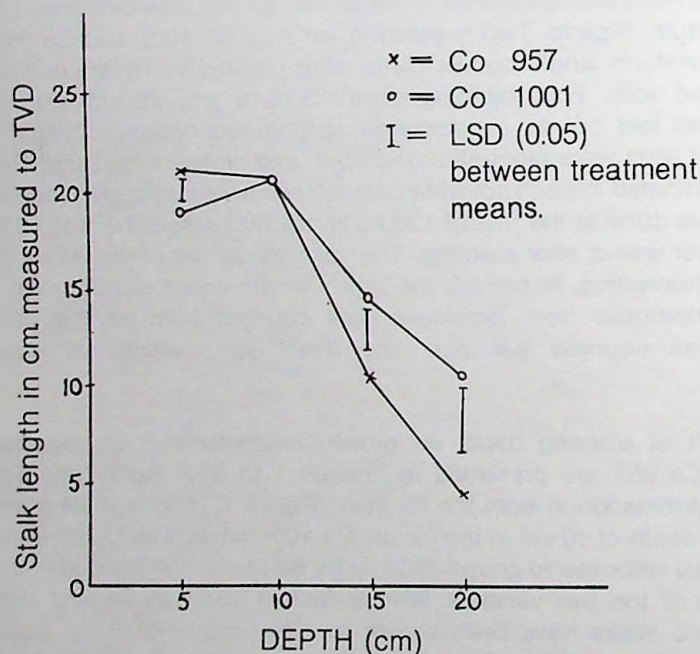


Figure 2. Effects of planting depth on the stalk length of two commercial sugarcane varieties.

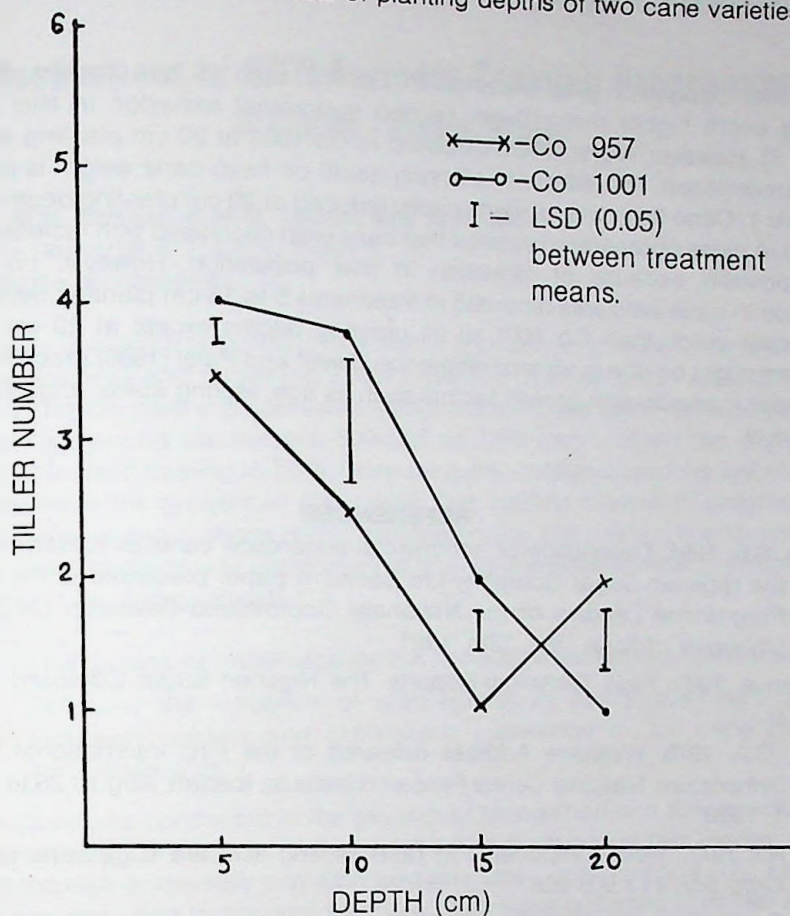


Figure 3. Effects of planting depth on the tiller population of two commercial sugarcane varieties.

length and cane yield by James (1977). A significant difference was observed for stalk length in both varieties (Figure 2). The results of this showed that stalk length decreased with increased soil depth beyond 10cm planting depth. Figure 2 also shows varietal difference and variety Co 1001 appears to be tolerant compared to Co 957. Significantly

Table 1. Effects of planting depth on fresh cane weight of two commercial sugarcane varieties.

Depth (cm)	Cane Weight (t/ha)	
	Co 957	Co 1001
5	31.3a*	25.6a
10	32.3a	26.5a
15	32.6a	27.3a
20	19.8b	19.7b

* Means followed by same letter in a column is not significantly different by the Duncan Multiple Range Test.

higher tiller population was obtained in Co 957 upto 15 cm planting depths, and planting depth higher than 10 cm caused substantial reduction in tiller population (Figure 3). However, higher tillers obtained in Co 1001 at 20 cm planting depth is not clearly understood. The effects of planting depth on fresh cane weight is presented in the Table 1. Cane fresh weight significantly reduced at 20 cm planting depth in both the varieties. A close observation revealed that cane yield decreased with increased planting depth possibly because of reduction in tiller population. However, no significant difference in cane yield was recorded in treatments 5 to 15 cm planting depths. Co 957 gave better yields than Co 1001 at all planting depths except at 20 cm. This yield difference might be due to varietal difference. Sweet and Patel (1985) reported that cane yield varies markedly with growth factors such as age, tillering ability, irrigation, soil type and variety.

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