

The Relationship Between Planting Depth and Growth Characteristics of Sugarcane in Nigeria

S. S. Afolabi

Sugar Research Institute,
University of Ilorin,
P.M. B. 1515 Ilorin,
Nigeria.

The germination of sugarcane cuttings is extremely important to achieve successful crop production. The germination characteristics of every commercial variety should therefore be evaluated so as to find a suitable management for obtaining an adequate crop stand. Since the inception of commercial sugarcane farming in Nigeria, the Sugar Estates have relied essentially on imported sugarcane planting materials. For sometime these exotic materials have performed quite satisfactorily in terms of tonnage and yield (Oworu, 1978).

Several factors including planting materials, planting depth and soil moisture affect the germination and growth of sugarcane (Yang and Chen, 1980). Some cultural practices have equally been shown to increase stalk population and yield (Richards, 1965). Sugarcane producers use height to gauge the growth rate of their canes, for detecting problems and estimating yields (Kiddler and Rice, 1979). Measuring the number of tillers per variety during the growth season is important as an indication of stool vigour and thus ratooning ability. The clones growth characteristics can also be important in environmental studies, mathematical modelling and use of growth regulators. The objective of this work was to study the effect of planting depth on the germination and other agronomic characters of sugarcane and find suitable planting depth to increase sugarcane stalk population and yield.

Healthy and uniform seed cuttings of two commercial varieties Co. 1001 and Co. 957 were used. Four cuttings were selected for each treatment. Four planting depths used were 5, 10, 15 and 20cm. Single-eye nodes were planted in five-litre buckets and the treatment was replicated four times. The pots were watered regularly and fertilizer applied at planting. Germination counts were taken at four weeks after planting while number of tillers and height measurements were taken monthly. Fresh weight of cane stalk was taken at 16 weeks after planting.

The effect of planting depth on the germination of two sugarcane cultivars are presented in Figure 1. The results indicate that the optimum planting depth for both varieties is 10 centimetres. Percent germination for the two cultivars decreased with increase in planting depth (Figure 1). The lowest percent germination was recorded

at 20 cm planting depth in variety Co. 957. This variety has thinner stalks which could be responsible for its low level of germination at 20 cm depth of planting.

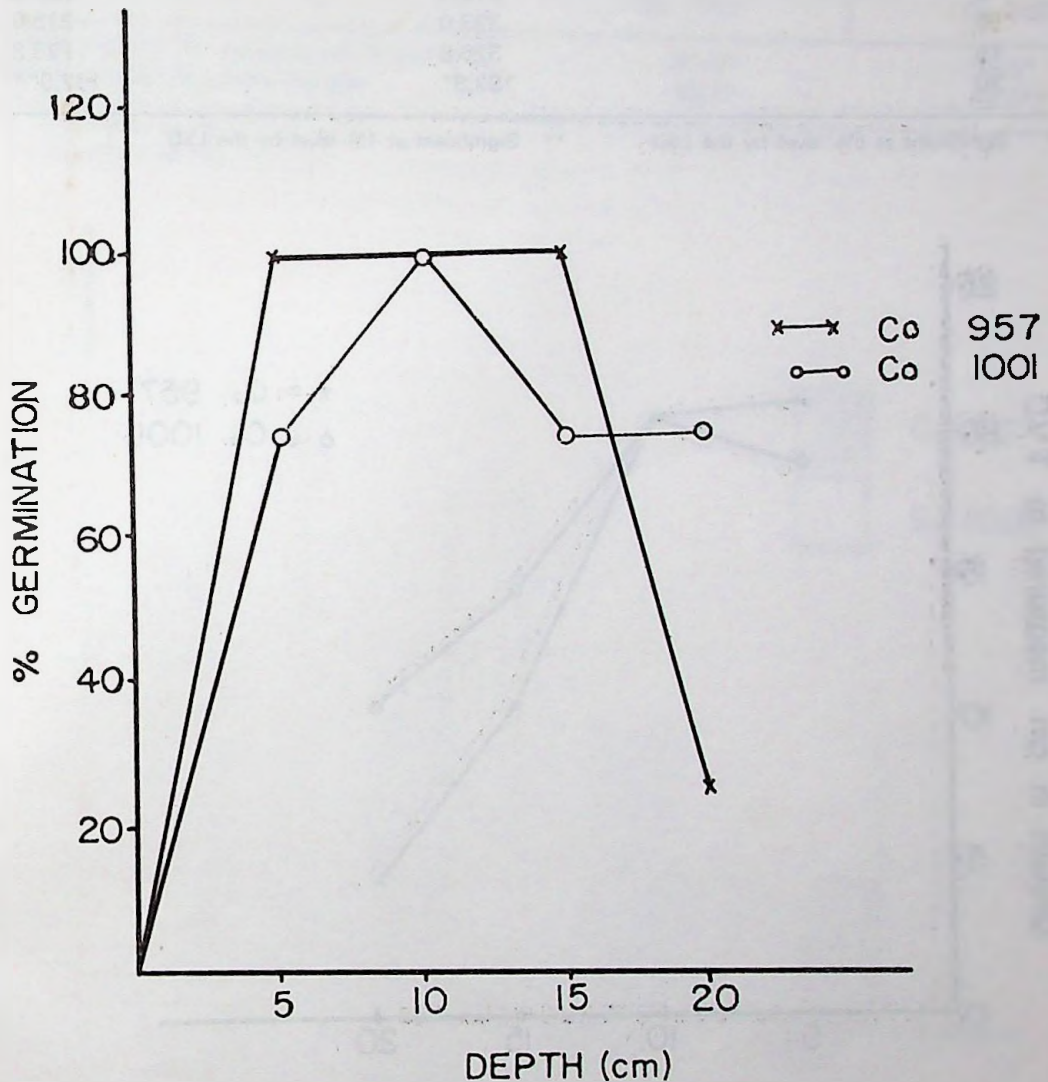


Figure 1. Effect of planting depth on the germination of two sugarcane commercial varieties.

Table 1. Effect of planting depth on fresh weight (g) of two sugarcane varieties.

Depth of planting (cm)	Variety	
	Co. 957	Co. 1001
5	312.5	265.0
10	323.0	215.0
15	326.8	273.3
20	192.8*	197.0**

* Significant at 5% level by the LSD

** Significant at 1% level by the LSD

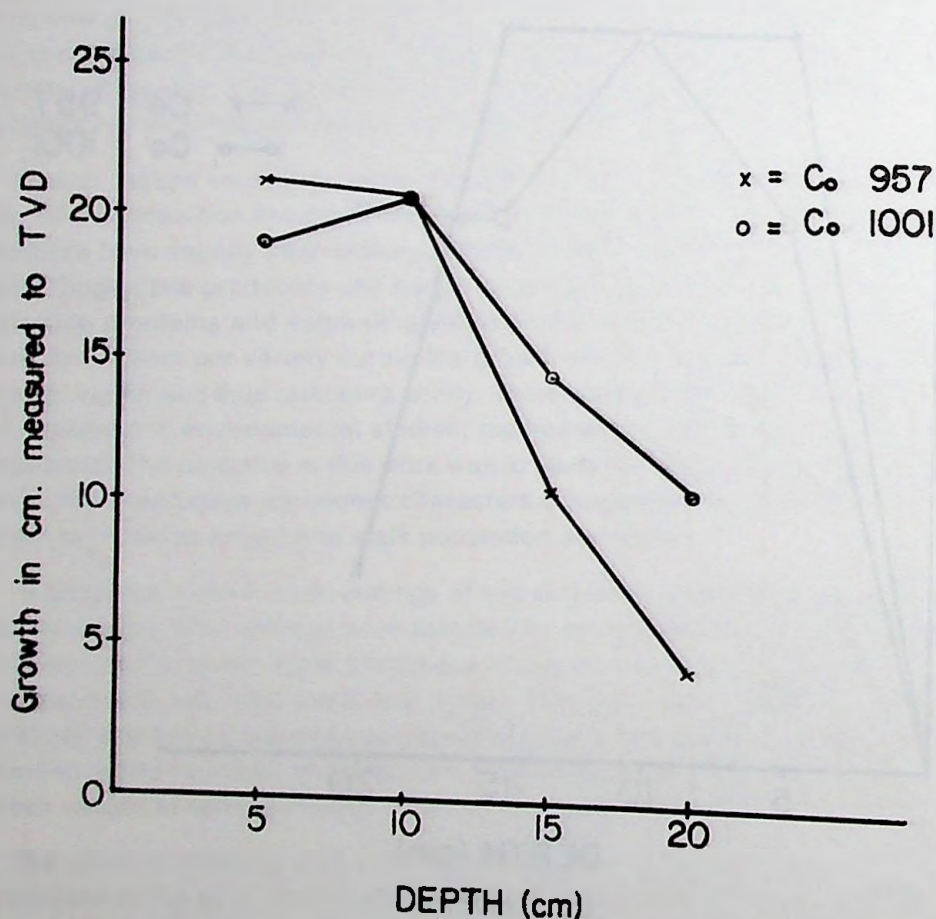
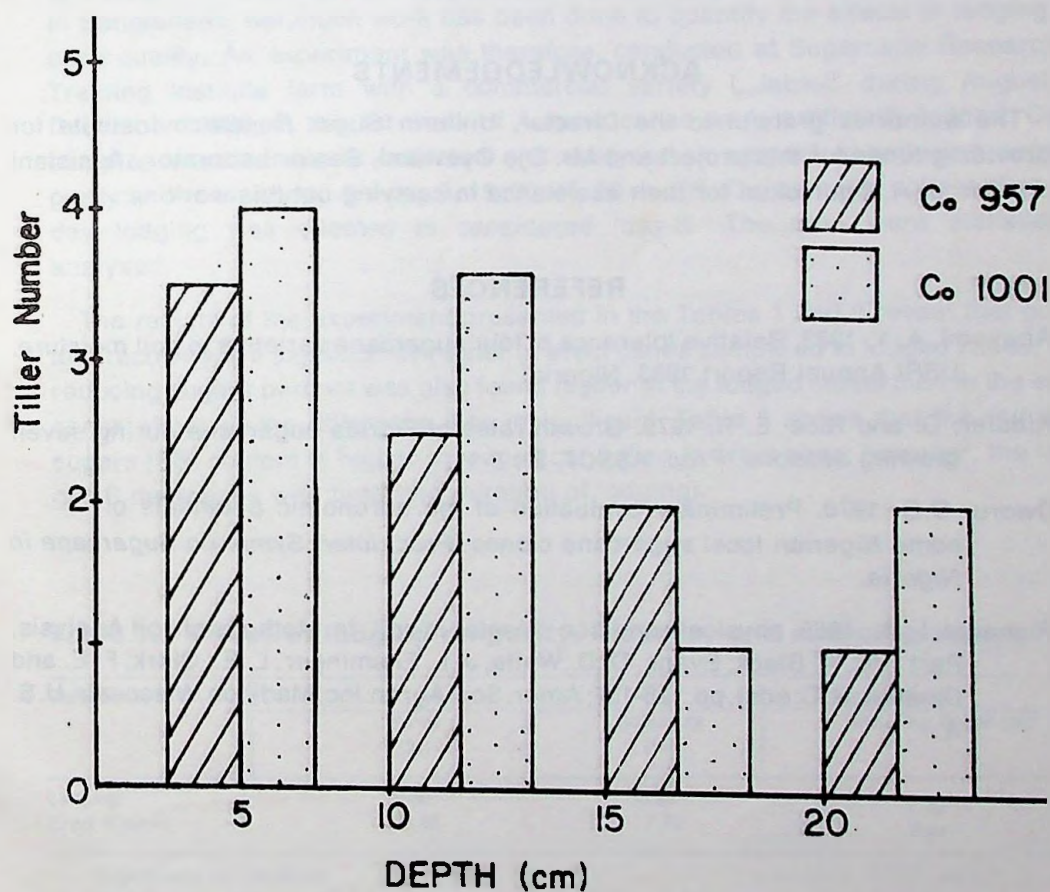
**Figure 2. Influence of depth on the growth of two sugarcane commercial varieties.**

Table 2. Correlation coefficients between tiller population stalk length and fresh weight.

Parameters	CORRELATION COEFFICIENTS (r)	
	Co 1001	Co 957
Fresh weight Vs number of tillers	99.8*	98.5*
Fresh weight Vs stalk length	95.3*	98.0**

* Significant at 5%

** Significant at 1%

**Figure 3. Influence of depth on tillering of two sugarcane commercial varieties.**

The results indicate clearly that height, fresh weight and number of tillers decreased with planting depth for both varieties (Table 1, Figures 2, 3). A significant difference was recorded for both varieties at a planting depth of 20 cm (Table 1). Several workers have described a high degree of correlation which exists between stalk length, number of tillers and cane weight (Abayomi, 1983; Richards, 1965). It was found in this study that a close relationship exists between number of tillers and cane weight, stalk length and cane weight (Table 2). Very deep plantings caused significant reduction in tiller number (Figure 3) and stalk growth (Figure 1). This condition imposed high infant tiller mortality and suppressed cane growth. Results of the present study indicate that the depth of planting has a great impact on germination, tillering and cane growth. However, it is required to repeat the experiment under field condition for firm recommendation.

ACKNOWLEDGEMENTS

The author is grateful to the Director, Unilorin Sugar Research Institute for providing funds for this project and Mr. Ojo Oyewumi, Senior Laboratory Assistant and Mr. J. A. Ogunlokun for their assistance in carrying out this work.

REFERENCES

- Abayomi, A. Y. 1983. Relative tolerance of four sugarcane varieties to soil moisture. USRI Annual Report 1983, Nigeria.
- Kiddler, G. and Rice, E. R. 1979. Growth rates of Florida sugarcane during seven growing seasons. *Proc. ASSCT*, 9 : 8-11.
- Oworu, O.O. 1978. Preliminary evaluation of the agronomic potentials of some Nigerian local sugarcane clones. *Proc. Inter. Symp. on Sugarcane in Nigeria*.
- Richards, L. A., 1965. physical condition of water in soil. *In: Methods of soil Analysis*, Part 1 (C. A. Black; Evans, D. D.; White, J. L. Ensminger, L. E.; Clark; F. E. and Dinauer, R. C; eds). pp.128-137; Amer. Soc. Agron. Inc, Madison, Wisconsin, U. S. A.