

Effects of Sulphur on the Performance of Co 957

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ABSTRACT

A field experiment was set up at the Unilorin Sugar Research Institute's farm at Bolorunduro village, Ilorin, to study the effects of different levels of sulphur fertilizer on the productivity of sugarcane variety Co 957. The results of the soil physical analysis reveals a high percent sand having free drainage facility and medium pH. Sulphur was found to have no effect on percent brix for both plant and ratoon crops. A significant difference was, however, observed in yield at both cropping seasons. Tiller population was affected by different treatments at 8 weeks after planting (WAP), while none was observed for tiller population taken at 16 WAP. Highest yield was obtained in both plant and ratoon crops at 35 kg S ha⁻¹

INTRODUCTION

In Nigeria various attempts have been made to increase sugarcane yields with chemical fertilizers which supplying primary elements and never includes secondary and micro-nutrients. Deficiencies of sulphur have been reported for many field crops among them cotton and grasses including sugarcane in several parts of the world (Chowdhury and Rahman, 1985; Clements, 1983; Nagarjan and Sundaraja, 1964). Afolabi (1985-unpublished) observed declining use of sulphur in the production fields of the Nigerian Sugar Company Bacita due to acidity problems. The Nigerian Sugar Company Bacita accounts for 80% of the country's local sugar production. Although very few reports have been made concerning sulphur deficiencies in this part of the country, leaching losses are highest on coarse textured soils under high rainfall. Under such conditions fertilizers containing sulphur may have to be applied more frequently than on fine textured soils under lighter rainfall. The prolonged use of sulphur free fertilizers will eventually induce sulphur deficiency in sugarcane plants.

Since no information is available on sulphur application in sugarcane production in Nigeria this study was undertaken to study the effects of sulphur on sugarcane production.

MATERIALS AND METHODS

A field experiment was conducted on portions of the Unilorin Sugar Research Institute's Experimental Station, Ilorin in the cropping seasons 1984/85 and 1985/86. Prior to fertilizer application, soil samples were taken for particle size analysis and pH. The experiment was set up following randomized complete block design. Sulphur was applied as sulphate of ammonia ($(\text{NH}_4)_2\text{SO}_4$) using the following rates: 0 kg ha⁻¹, 35 kg ha⁻¹, 50 kg ha⁻¹ and 85 kg ha⁻¹. The variety used was Co 957 a standard commercial variety cultivating in Nageria. Basal application of nitrogen fertilizer was broadcasted at planting using 120 kg N ha⁻¹ in the form of calcium ammonium nitrate. P and K were applied at 60 kg P₂O₅ ha⁻¹ and 60 kg K₂O ha⁻¹ as single superphosphate (SSP) and muriate of potash (MOP) respectively. Intercultural operations were done as and when required.

RESULTS AND DISCUSSION

The result of the soil physical analysis are presented in Table 1. The textural class is loamy sand. It reveals a high percent sand and medium pH but freely draining. A significant difference was observed for tiller numbers taken at 8 weeks after planting (WAP). Even though the different sulphur levels did not affect tiller population at 26 WAP, tillering was better than tillering at 8 WAP (Table 2). This might be associated with the fact that tiller population increases with the age of sugarcane to a reasonable extent. A high correlation has been reported between age of cane plant, variety and stalk numbers by Van Dillenwijn (1952).

Table 1. Physical characteristics of soil before planting.

Depth (cm)	SOIL PHYSICAL ANALYSIS (%)				TEXTURAL CLASS
	pH	Sand	Silt	Clay	
0-30	6.2	80.4	14.0	5.6	Loamy sand

Table 2. Effect of different levels of sulphur fertilizer on the tiller population of variety Co 957.

Fertilizer rates (kg ha ⁻¹)	Tiller at 8 WAP	Population at 16 WAP
0	642.0 b	930.5 a
35	567.2 b	1007.4 a
50	545.0 b	976.4 a
85	533.0 a	1002.5 a

Means followed by the same letter for a given column are not significantly different from each other by the DMRT.

Table 3. Effect of different levels of sulphur fertilizer on the total soluble solids of variety Co 957.

Fertilizer rates (kg ha ⁻¹)	% Brix		
	1984/85	1985/86	Mean
0	19.0	19.0	19.00 a
35	19.5	18.8	18.80 a
50	18.0	17.8	17.90 a
85	18.5	18.4	18.45 a

Means followed by the same letter for a given column are not significantly different from each other by the DMRT.

A significant difference for the yield was observed at both plant and ratoon crops (Table 4). Highest yield was obtained 35 kg ha⁻¹ sulphur level. This report agrees with the work of several workers (Dutt, 1962; Yonemitsu, 1968; Hansari, 1976) who obtained significant response of sugarcane to different sulphur fertilizer levels. This

Table 4. Effect of different levels of sulphur on the yield of variety Co 957.

Fertilizer rates (kg ha ⁻¹)	Yield ((ton ha ⁻¹))	
	1984/85	1985/86
0	24.5 a	22.5 a
35	33.0 c	30.0 b
50	28.5 b	25.0 c
85	24.4 a	25.5 c

Means followed by the same letter for a given column are not significantly different from each other by the DMRT.

result clearly indicate that sulphur is an important nutrient element to be considered in sugarcane fertilizer programme. Higher doses of sulphur fertilizer do not appear to have any significant effect on yield increase under Ilorin soil conditions (Table 4). Sulphur fertilizer did not affect the juice quality of variety Co 957 (Table 3). Even though the use of fertilizers containing sulphur was found to be desirable on a loamy sand in this study, other factors such as fertilizer cost, acidity problems and varietal response should be carefully evaluated to ensure a judicious use. Further studies are sought to determine the yield loss due to sulphur deficiency.

ACKNOWLEDGEMENTS

The author is grateful to the Director (Ag.), Unilorin Sugar Research Institute for providing funds for this project.

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