Yield Performance of Sweet Potato **(BNAS 51)** in Response to Different Amounts of NPK (14-14-14) Application

Floraceli **R. Rodillas**

Abstract

The study was conducted in Damuman West, Sta. Maria, Ilocos Sur to determine the yield performance of sweet potato in response to different amounts of NPK (14-14-14) application and to compare the yield in kilograms per plot.

Sweet potato (BNAS 51) was used as the main crop. Thus the treatments were: Ti – 4.4 kg of NPK/plot, T – 8.8 kg of NPK plot, T – 13.2 kg of NPK/plot and T -- 17.6 kg of NPK/plot. These including a control (T, – no fertilizer application) were laid out following a Randomized Complete Block Design (RCBD) with three (3) replications.

Results of the study showed significant difference of the different amounts of NPK application. T (13.2 kg of NPK/plot) in Replication II gave the highest computed yield of 18.3 kg/plot and was followed by T again in Replication III with 17.7 kg/plot and T (17.6 kg of NPK/plot) in Replication II with computed yield of 17.3 kg/plot, respectively.

Despite the increases in root yield as a result of fertilizer application, addition of higher amounts of fertilizer was not profitable considering the present cost of fertilizer used

Introduction

Rationale

Sweet potato *(Ipomea batatas)* commonly known as "camote" is a root crop that can be grown throughout the year under wide range of climatic and soil conditions. It is considered as one of the most important root crops in the Philippines. Its usefulness for both human and animal consumption, its high nutritive value and ease of production are the other reasons why more people prefer to plant this crop. All parts of the sweet potato can be utilized for food, the marketable roots for human food, culled or non-marketable roots for animal feed, the tender shoots and leaves as green vegetable and the older shoots as roughage for animals. Other than food for human, stock feed for animals the influence and contribution of sweet potato to soil conservation as in erosion control and other possible indirect effect on soils make this crop a very valuable one.

Objective

To determine the yield performance of sweet potato in response to different amounts of NPK (14-14-14) application.

Review of Literature

Drillon, (1980) cited that since soil fertility is an external problem requiring precise application of fertilizer, and other management techniques, this must be well understood and the necessary inputs for application must be available and because different crops and different soils, the requirements are different.

Stino, (1983) stated that sweet potato as a root crop needs not only nitrogen and phosphorous but especially adequate potassium to yield satisfactorily.

Constantin, et. al. (1977) found out that in addition to yield, the grade size. starch and carotene content are reported as being influenced by the amounts of nutrients available in the soil.

Wang (1975) stated that if the yield of sweet potato is to be increased, it will be necessary to increase the supply of potash.

. . It has often stated that sweet potatoes will give high yield without application of fertilizers. Park (1975) indicated that this statement is not correct under some conditions, and the high yield potential can be attained only if the crop is grown with adequate quantities of fertilizers and with good cultivation techniques.

Procedure and Methodology

The field experiment of the study was conducted in Danuman West, Sta. Maria, Ilocos Sur having sandy clay loam soil.

A total land area of .029 hectare was planted with a recommended variety of sweet potato (BNAS 51) violet skin with white fleshy roots and medium large harvest-shaped leaves; resistant to scab with a maturity of 150-160 days was used. The area per plot was .001hectare and having five (5) rows per plot.

Shoots of sweet potato (BNAS 51) having at least six or about 30-40 cm was used. Planting was done 30cm. between hills and 75cm. between rows. Shoots planted were cut one day before planting to initiate root fonnation in preparation for adverse field condition.

Before planting (4-6 hours) cuttings were dipped in Malathion solution (2cc/gal) to prevent the introduction of insect pests especially potato merril into the area. The first half of the NPK (14-14-14) fertilizer for every plot with *5* rows was applied in band one week after transplanting and the other half of the NPK (14-14-14) fertilizers was applied also three weeks after transplanting.

All the necessary cultural management for the sweet potato (BNAS 51) such as weeding, cultivating, lifting-up, water management and pest control methods were employed up to the termination of the field experiment.

Results and Discussion

The result of the experimental study is shown in the following tables:

Table 1. Yield performance of sweet potato in response to different amounts of NPK (14-14-14) application in kilograms.

TREATMENT	REPLICATION		
T	10.5	11.3	10.8
T,	11.7	13.9	16.3
T,	13.9	15.75	15.80
T,	12.65	18.3	17.7
T,	12.8	17.3	17.05

Legend: T – control (no fertilizer application)
T,–4.4kg/plot T,–13.2kg/plot
T,–8.8 kg/plot T,–17.6kg/plot

Table 1 shows the yield performance of sweet potato in response to different amounts of NPK (14-14-14) application in kgs.

In the second replication, the yield of sweet potato is 18.3 kg in T, while in the third replication is 17.7 kg with the same treatment. The amount of NPK (14-14-14) application is just the right amount applied to the sweet potato.

Table 2. ANOVA on the yield performance of sweet potato among the different treatments.

SOURCE OF VARIATION	SUM OF SQUARE	DF	MSS	F-RATIO	CRITICAL VALUE	INTERPRET-ATION
Between groups	54.8016	4	13.9	9.17	3.48	Significant*
Within groups	45.3117	10	4.53			
Total	100.1133	14				

Note: * Significant at .05 level
** Highly significant at .01 level

Table 2 presents the ANOVA result which showed significant difference. This means that the yield performance of sweet potato is adversely affected by the different amounts of NPK (14-14-14) application.

Table 3. Treatments with Significant Difference

TREATMENTS	VALUE OF t	INTERPRETATION
$T_0 \rightarrow T_2$	6.44	Significant
$T_0 \rightarrow T_3$	2.93	Significant
$T_0 \rightarrow T_4$	3.27	Significant

Note: * Significant at .05 level
** Highly significant at 0.01

Table 3 shows the treatments with the significant difference. T versus T, has a value of 6.44 with a significant difference. T versus T, attained a value of 2.93 while T versus T, has also a value of 3.27 respectively. These imply that the yield performance of sweet potato has something to do with the nature of the soil, the different amounts of NPK application and the volume of water received by the sweet potato during its early stage of growth as well as its full development.

Conclusions

1. The highest yield *was* obtained with moderate amount of NPK 14-14-14 fertilizer application at 13.2 kg of NPK/plot.
2. The yield performance of sweet potato significantly increased using the right kind and amount of NPK fertilizer.

Recommendations

Based from the result of this study, the following recommendations are forwarded:

1. Addition of fertilizer increases yield in sweet potato but the optimum amount should be determined with due consideration on the present cost of fertilizer,

2. A follow-up study on fertilizer trial in sweet potato should likewise be conducted using different types and amounts of NPK (14-14-14) other than the levels and types tested in this study.

References

CARPENA, A. L. and N. ADENA. 1991. *Fertilization of Sweet Potato.* Mimeograph paper.

CONSTANTIN, R J., L. G. JONES, and T. P. HERNANDEZ. 1977. *Effect of NPK Fertilization on Quality of Sweet Potato.* Journal of American Soc. For Horticultural Science 102 (6): 779-781.

DUNCAN, A. A., L. E. SCOTT and F. C. STARK. 1978. *Effect of Potassium Chloride and Potassium Sulfate on Yield and Quality of Sweet Potatoes,* Proceedings of the American Society for Horticultural Science. 17:391-197.

FUJISE, K. and Y. TSUNO. 1979. *Effect of K on the Dry Matter Production of Sweet Potato.* In E.A. Tai. WB Charles, P.H. Haynes et al. Proc. Of the International Symposium on Tropical Root Crops St Augustine, Trinidad. 2-8 April 1976. Vol. I, II, pp. 20-23.

GODFREY, SAN AGGREY, W. and MJ. GARBER. 1977. *Effect of Potash Fertilizer on the Leaf Nutrients and their Relationships to Tuber Yields of Sweet Potato. Communications in Soil Science and Plant Analysis, 8(8): 629-644.*

HO, C. T. SU, N.R. TANG, C.N. and SHEG, C. Y. 1977. *Studies on Correlation of Soil and Plant Potassium with Response of Sweet Potato to Added Potash in Chingyi Prefecture.* Soil and Fertilizer in Taiwan.; 32-47.

HO, C. T. 1979. *Report On Response Of Sweet Potato To Potash In Taiwan.* Potash Rer. 27/44 pp.6.