INFLUENCE OF COMPOST, LIME AND NPK ON PERFORMANCE OF THREE CASSAVA VARIETIES

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Introduction

Soil fertility decline is one of the acute problems farmers are facing in the world and in Nigeria in particular. The constraints to food security and widespread poverty, as they affect development and livelihoods, are well known in Sub-Saharan Africa (SSA), where population growth at 3% supersedes the agricultural production rate of 2% per annum (Bationo *et al.,* 2006). Although the causes of food insecurity and poverty are numerous, the importance of the decline in soil fertility with resultant decreasing crop productivity has been highlighted and stressed by several authors (Sanchez *et. al,* 1997; Smaling *et al.,* 1997; Bationo *et al.,* 2006).

Materials and Methods

The study was conducted at the International Institute of Tropical Agriculture, Ibadan, Nigeria. The experiment was a 4 factorial randomized complete block design in a split plot arrangement with three replicates. The first factor was compost application at 2 levels nil versus 5 Mg/ha; second factor was NPK 15:15:15 at 2 levels: nil versus 500 kg/ha (equivalent to 75:33:62 kg/ha N:P:K); third factor was lime at 2 levels: nil versus 500 kg/ha; fourth factor was the cassava variety at 3 levels: TMS01/1393, TMS1980581 and TMS101/0040, with the input combinations nested within varieties. Cassava was planted at 1 x 0.5m distance and harvested after 12 months.

Results

TMS01/1393 had the highest stem yield with an average of 22.65 t/ha followed by TMS1980581 (20.60 t/ha) and TMS101/0040 (14.30 t/ha). Compost + lime combination gave the highest stem yield (42.54 t/ha, $p \leq 0.0001$), significantly different from other treatments (Table 1).

Root yield across all treatments of TMS01/1393 was 36.96 t/ha fresh mass (FM) and 10.29 t/ha dry mass (DM), for TMS1980581 fresh root yield was 25.13 t/ha and 7.01 t/ha DM; TMS101/0040 produced 28.00 t/ha FM, being 6.33 t/ha DM. Combination of compost + lime produced the highest yield in TMS01/1393 at 42.32t/ha FM (10.97t/ha DM), which was not statistically different from the control at 40.29 t/ha FM, 9.40 t/ha DM. There was a significant increase over the control yield of 22.14 t/ha FM (5.14 t/ha DM) of TMS101/0040 in the following combinations: compost+lime+fertilizer 36.06 t/ha FM (8.20 t/ha DM), compost + fertilizer 36.60 t/ha FM (8.55 t/ha DM) and lime + fertilizer 34.85 t/ha FM (8.36 t/ha DM) (Table 2).

Table 1: Means fresh main stem yield (t ha^{-1}) of each cassava variety as influenced by different fertilizer combinations.

Fertilizer type	TMS-01/1393	TMS-I980581	TMS-I01/0040	Mean
Compost + Lime+ fertilizer	22.58	19.17	20.04	20.60
Compost + Lime	42.54	17.78	12.97	24.43
Compost + Fertilizer	25.08	24.46	18.07	22.54
Compost	17.24	21.64	8.60	15.83
Lime + fertilizer	13.46	24.05	21.91	19.81
Lime	14.66	16.48	12.04	14.39
Fertilizer	28.60	21.79	12.77	21.05
Control	17.05	19.44	8.03	14.84
Mean	22.65	20.60	14.30	

Table 2: Mean fresh root yield (t ha^{-1}) of each cassava variety as influenced by different fertilizer combinations.

Fertilizer type	TMS-01/1393	TMS-I980581	TMS-I01/0040	Mean
Compost + Lime+ Fertilizer	35.66	31.18	36.06	34.3
Compost + Lime	42.32	21.30	26.03	29.88
Compost + Fertilizer	35.64	25.55	37.59	32.93
Compost	36.13	32.18	21.03	29.78
Lime + Fertilizer	34.92	19.69	34.85	29.82
Lime	38.44	22.12	23.05	27.87
Fertilizer	32.26	22.13	23.22	25.87
Control	40.29	26.88	22.14	29.77
Mean	36.96	25.13	28.00	

Conclusion

Combinations of the inputs performed better than sole application of any of the inputs. However, the influence of fertilizer on root yield was more pronounced in the lower yielding TMS101/0040.

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References

Bationo, A., Hartermink, A., Lungu, O., Naimi, M., Okoth, P. L., Samling, E. M. A. and Thiombiano, L. (2006). African Soils: Their productivity and profitability of fertilizer use. *Background paper presented, for the African Fertilizer Summit,* 9th – 13th June, 2006, Abuja, Nigeria.

Sanchez, P. A., Shepherd, K. D., Soule, M. J., Place, F. M., Kokuranye, A. U., Buresh, R. J., Kuresiga, F. R., Izac, A-M. N, Ndiritu, C. G. and Woomer, P. L. (1997). Soil Fertility Replenishment in Africa: An investment in natural resource capital. In: Buresh, R. J., Sanchez, P. A. and Calhoun, F. (eds). Replenishing Soil Fertility in Africa. SSSA Special. Publication No. 51, Madison, Wisconsin, U. S. A.

Smaling, E. M. A., Nandwa, S. M. and Jaussen, B. H. (1997). Soil fertility in Africa is at stake. In: Buresh et al. (eds) above, Replenishing Soil Fertility in Africa. *SSSA Special Publication* No. 51, Madison, Wisconsin, U. S. A.

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